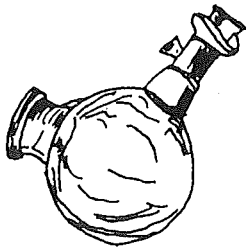

BULLETIN OF ANESTHESIA HISTORY

VOLUME 13, NUMBER 4 OCTOBER, 1995

Who Was the "First"?

by Maurice S. Albin, M.D., M.Sc.(Anes.)
University of Texas Health Science Center at San Antonio, Texas

The question of scientific priority has plagued us since antiquity. Interestingly, this question can be epitomized by the "ether controversy", and recently by the ASA Wood Library-Museum issuing T-shirts, the back of which has the phrase "Who Was the First?", and the front showing pictures of either Crawford Long, William Morton or Horace Wells.

I would like to add to this controversy by a reprint of the article that I came across written by Walter Channing, M.D. As is known, Dr. Channing was Professor of Midwifery at Harvard University Medical School and popularized the use of ether in obstetrics, his landmark work in this area entitled, "A Treatise on Etherization in Childbirth illustrated by five hundred and eight-one cases" (Boston: William D. Tickner and Company, 1848, 25 pages).

The article, reprinted below, was published in the *Boston Medical and Surgical Journal* (46:113-115, 1852) and is self explanatory. In this case report, Channing described a delivery in a woman who had self- administered ether during her deliveries, the first occasion occurring 19 years before the publication of the paper, which would signify that ether was used by her in 1833!

From the historical aspect it would be important to identify the name of Mrs. "Jane Doe" and that of her husband, since they certainly deserve mention in the history of anesthesia.

NOTES OF DIFFICULT LABORS, IN THE SECOND OF WHICH ETHERIZATION BY SULPHURIC ETHER WAS SUCCESSFULLY EMPLOYED NINETEEN YEARS AGO.

BY WALTER CHANNING, M.D.

Mrs.———, 41, was married at 19; has had sixteen labors at full time, and two abortions. Her last labor was in January, 1852. Labors have always been long and painful. The precursory symptoms have filled most of the time. I refer to the time which is taken for the dilatation of the os uteri to occur, and the head to enter the rim of the pelvis. The suffering now is very great, principally affecting the chest with a sense of suffocation, anguish, choking, gagging and vomiting. There is also great distress across the upper part of the abdomen. Spasmodic twitchings also attend. Now this state of things continued in the first labor ten days, and in others longer. In all a very long time is passed in this way. In her last it was four or more days. Then true expulsatory pains begin; for though this character of effort may show itself often and severely in the precursory stage, it never produces progress. The head remains at or above the brim, and not the least pressure is felt on the fingers during contraction.

I have attended this patient a number of times. Mrs.——— cannot endure labor in the horizontal position, or on a bed. She has a special arrangement for this process, viz.: three common Winsor *[sic]* chairs are tied strongly together, the bottoms looking towards each other, one behind and one on each side. A matrass *[sic]* is placed on them, and a chair is placed in front for her feet. In this half-sitting, half-lying position, she can exert great power. During uterine efforts she seizes the chairs at her sides and braces herself strongly against them, and in this way she gets much advantage. The vagina and external organs are forcibly pressed down, and fill up the vaginal outlet. This produces great distress. She finds relief in having both external and internal pressure so applied as in some measure to reduce these parts and keep them in a more natural position.

The difficulty in this case arises from the position of the pelvis. The promontory of the sacrum is mounted higher up and projects farther forward than is natural. This renders the plane of the brim more oblique, and the symphysis being depressed, it is more inclined than usual, or more *dished,* giving to the cavity of the pelvis somewhat

Continued on Page 15

PRESIDENT'S CORNER

As we begin our fourteenth year the Council continues in its concern and search for ways and means by which visibility and function of the Anesthesia History Association may be usefully improved. A long range planning committee (LRP) has been appointed to consider all suggestions. This is an on-going process expected to continue throughout 1995 and 1996. Elsewhere in this issue of the Bulletin is a request for each member of AHA to communicate with Donald Caton, Chairman of the LRP Committee, giving to him suggestions and ideas about projects you would like to have undertaken by your AHA.

The LRP is charged with the obligation of reviewing in some perspective (evaluating feasibility and relative benefits) the numerous good suggestions which are offered by members for consideration. The LRP will recommend to Council the establishment of priorities for a program to promote the purposes of this Association.

We also want to increase the involvement of members in other ways. One relatively easy way is to share your interest in anesthesia history through the gift subscription program which was initiated last year. Each member is urged to introduce at least one new friend through the gift subscription program.

Now that summer vacation interruptions are past it is a good time to plan for presenting a paper at our 1996 Spring Meeting in Buffalo. We are all primary sources of information about people and events in our professional lives that will provide grist for future historic interest Tell it like it was and keep the record clear.

Lucien E. Morris, M.D.
President

LONG-RANGE PLANNING COMMITTEE

We need your help!

All organizations benefit from a periodic review of their work. Please take a few moments to think about the future of AHA.

- What do you value most about its current work?
- What projects would you like it to begin?
- Do you think of the AHA primarily as a service organization? or as an educational unit?
- Would you like to see the AHA offer fellowships? or sponsor more lectures?
- How might the organization increase its income?
- In what area(s) would you like to work with other members?

Please send comments or suggestions to:

Donald Caton, M.D.; Chairman, Long-Range Planning Committee; Department of Anesthesiology; University of Florida; P.O. Box 100254; 1600 SW Archer Road; Gainesville, FL 32610-0254. FAX: (904) 392-7029 or Email: Caton.Anest2@WPO.Health.UFL.Edu

A.H.A. SPRING MEETING

The site of the 1996 Spring Meeting of the Anesthesia History Association is Buffalo, New York; the place is the Buffalo Hyatt Hotel; the date is May 9, 1996.

As in previous years, this meeting is being held in conjunction with the annual meeting of the American Association for the History of Medicine (A.A.H.M.).

Anyone interested in the history of anesthesia is urged to present a paper of historical interest at this meeting. Abstracts are due no later than January 31, 1996, and should be typed on 8.5 x 11 inch paper and should include the name and address of the author. Abstracts will be bound together to form a booklet and will be available at the meeting.

Judging by prior meetings, no one should miss attending the meeting.

Abstracts and further information should be sent to:

Douglas R. Bacon, M.A., M.D.; Chief Anesthesiology Service (128); Department of Veteran Affairs Medical Center; 3495 Bailey Ave.; Buffalo, NY 14215; Phone (716) 862-3448; Fax (716) 862-3395.

IN MEMORIAM
Richard Hancock Ellis, M.B., B.S., F.R.C.A.

(Born 11 September 1937 and Died 11 May 1995)

Richard (Dick) Ellis died suddenly and unexpectedly at the height of his career as a skillful cardiothoracic anaesthetist and a scholarly medical historian.

Dick's father and grandfather were respected family practitioners and, after a broad education at Chigwell School, which providentially included inspiring teaching in English and history, he too embarked on a medical career. He studied medicine at the London Hospital (M.B., B.S., 1961) and held house appointments in several specialties before choosing a career in the rapidly developing specialty of anesthesia and intensive care in the mid-sixties. His training at the London Hospital culminated in an exchange appointment at the Groote Schurr Hospital in Capetown before he joined the consultant staff at St. Bartholomew's in 1971. He had a successful clinical career as a cardiothoracic anaesthetist, but in addition he served the profession as Honorary Secretary to the Medical Council at Bartholomew's, and as a member of the Councils of both the Association of Anaesthetists of Great Britain and Ireland and the Anaesthetic Section of the Royal Society of Medicine, as well as an examiner for the Fellowship.

Richard Ellis contributed several interesting papers to the clinical journals early in his career but, from the early eighties onwards, his very considerable literary output of books and papers was devoted exclusively to the history of medicine. He was a master of both the written and the spoken word and was in much demand as a lecturer. Dick Ellis was well known in the U.S.A. and Canada and was the American Society of Anesthesiologists Wood Library-Museum Wright Memorial Lecturer.

Dick married Elizabeth Price, a nurse who trained at the London Hospital, in 1968, and they enjoyed an exceptionally happy family life. He is survived by his wife, two daughters and son.

We will all miss the intellect and presence of this wonderful person.

American Society of Anesthesiologists PANEL ON HISTORY OF ANESTHESIA

Anesthesia for Military Conflicts
Tuesday, October 24, 1995—2-5 PM
Room 201—Georgia World Congress in Atlanta

Moderator:
Maurice S. Albin, M.D., M.Sc. (Anes.)
Professor of Anesthesiology and Neurosurgery, The University of Texas Health Science Center, San Antonio, Texas

IN MEMORIAM:
RODERICK K. CALVERLEY, MD, LT. COL. USAR
(1938 - 1995)
Selma H. Calmes, M.D., Associate Clinical Professor of Anesthesiology, University of California, Los Angeles, California

THE CRIMEAN WAR AND THE MEXICAN-AMERICAN WAR
J. Antonio Aldrete, M.D., Medical Director, Pain and Spine Institute, Chipley, Florida

THE AMERICAN CIVIL WAR AND THE FRANCO-PRUSSIAN WAR
Maurice S. Albin, M.D., M.Sc. (Anes.)

WORLD WAR I AND WORLD WAR II
Arthur B. Tarrow, M.D., Col. USAFMC-Ret., Melbourne, Florida

THE KOREAN WAR AND VIETNAM
Manfred W. Lichtmann, M.D., Col. USAFMC-Ret., Williamsburg, Virginia

THE FALKLANDS CAMPAIGN AND DESERT STORM
H. Jerrel Fontenot, M.D., Associate Professor and Vice Chairman of Anesthesiology, University of Arkansas School of Medicine, Little Rock, Arkansas

THE CIVIL WAR IN SRI LANKA
Charles P. Kingsley, M.D., Associate Professor of Anesthesiology, Pennsylvania State University, College of Medicine, Hershey, Pennsylvania

WLM History Review: *Spirits of Anesthesia*

SUBJECT: Mesmerism

Mesmerism occupies an interesting place in the early history of anesthesia. Popularized by Franz Anton Mesmer (1734-1815), mesmerism was an outgrowth of earlier studies on magnetism by William Gilbert (1540-1603). Mesmer developed his ideas during the last days of heroic medicine, an era of medical theories and practices based more on philosophical speculation than on scientific observation or testing. Mesmerism also reflects the belief of 19th century physicians that the nervous system dominates all aspects of body function.

Mesmer claimed that his methods could cure many maladies. His claim evoked a skeptical reaction from many. At one time or another, the controversy involved such notables as Benjamin Franklin, Thomas Jefferson, Lavoisier and Lafayette and even King Louis XVI. Advocates, including London surgeon John Elliotson (1791-1868) and Scottish-born James Braid (1795-1860), suggested that mesmerism be used for pain relief from surgery.

The papers cited give useful background material about the mindset of physicians and the public just prior to the introduction of surgical anesthesia.

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Butterfield J. Dr. Gilbert's magnetism. *Lancet.* 1991; 338:1576-1579.

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Gravitz MA. Early American mesmeric societies: A historical study. *Am J Clin Hypn.* 1994; 37:41-48.

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Rosen G. Mesmerism and surgery: A strange chapter in the history of anesthesia. J Hist Med. 1946; 1:527-550.

*(A very complete reference. In particular, it describes the work of John Elliotson - an early proponent of pain relief for surgery. *The WLM has recently acquired an engraving of Elliotson.)*

*Loan or photocopy available from WLM; 520 N. Northwest Highway, Park Ridge, IL 60068-2573, (708) 825-5586.

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Donald Caton, M.D., *Associate Editor*
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An Anesthetic Apparatus

During World War II trichloroethylene was resurrected by Dr. C. Langton Hewer and Dr. Marrett designed a simple portable apparatus with which it could be administered. Portability was a need in the military, particularly with parachute troops. In the following article Dr. Marrett describes the evolution of the Marrett apparatus through the following 15 years. We are much indebted to him and to the Proceedings of the History of Anaesthesia for permission to reprint this paper (Proc HAS 15:18-23, 1994).

A BRIEF HISTORY OF THE MARRETT ANAESTHETIC HEAD

by Dr H R Marrett
Consultant Anaesthetist, Coventry 1947-1979
Honorary Member History of Anaesthesia Society

In most people's life span there is a time when you happen to be around when a particular circumstance occurs that makes a big impression on your future. This happened to me in 1941 when I was a resident anaesthetist under Dr C Langton Hewer at St Bartholomew's Hospital, St Albans.

One morning, the Senior Medical Officer from the pharmaceutical division of ICI came to give Dr Hewer a Winchester bottle containing a colourless liquid they named Trilene. It was, he said, purified trichloroethylene, and Dr C F Hadfield of the newly formed Medical Research Council had asked Dr Hewer to evaluate the anaesthetic properties of the substance.[1,2] It transpired that a chemist, Mr Chalmers, had inhaled the vapour of some trichloroethylene he had in his shop for the treatment of trigeminal neuralgia and put himself to sleep. Wisely he got in touch with Dr Hadfield. During the assessment stage we confirmed that it had considerable analgesic properties and found it most useful for changing plasters. These were done in a room some distance from the theatres, which meant transporting a Boyle's machine, so I adapted a Walton bottle by cutting a hole in a Valor stove wick and making in my workshop a simple one-way inlet valve. Thus it was possible to draw air over the Trilene and exhalation took place through an expiratory valve near the facepiece.[3] With this very simple apparatus I was able to change plasters and painful dressings, etc. in the wards. The analgesic property of Trilene was later to play an important part in the relief of pain in maternity cases. There being no such department at Hill End, it was left to others to develop apparatus for analgesia in labour.

It was becoming increasingly obvious that portable apparatus would be necessary for medical units in the mobile warfare that was being used in 1942 and talk of invading Europe was also in vogue. Trilene was good for induction and maintenance of light anaesthesia, but would not give muscle relaxation for abdominal surgery. I therefore added a second similar Walton bottle with ether. With this machine I was able to give satisfactory conditions to the surgeons, but found that I had to solder in a tap so that I could add a minute amount of oxygen to compensate for the reduction in tidal volume during deep anaesthesia (Figure 1).

As Barts had introduced Trilene to the profession, we had many visitors and the chief of the Canadian Medical Corps was impressed enough with this apparatus to get some made. I left Hill End and joined the Army, taking my apparatus to Normandy in June 1944. I found that I could leave it by the patient's head on a stretcher or table while my surgeon got on with the major injuries leaving me free to tidy up the smaller ones, so increasing production!

The city of Caen was our next objective. On exploring the surrounding area I found a rescue breathing apparatus. I quickly realised that it was a closed circuit with a sealed canister of soda lime, two one-way valves and two corrugated tubes.

A similar apparatus in the Guernsey War Museum has been kindly lent for the meeting by the owner, Mr R L Heaume. At this time there were three ways of giving an anaesthetic in the 'field': (1) by the open drop method on a Schimmelbusch mask, (2) ether with the Oxford vaporiser, which was good, but its casing had to be filled with hot water to give the correct concentrations of ether and induction was tricky, and (3) by an old first world war field pattern Boyle's machine which was encased in a beautiful inch thick mahogany box and took two men to lift it.

Clearly, in highly mobile warfare with ammunition and food as first and second priority, anaesthetic gases and machines were way down the list. There was an obvious need for a small, light apparatus for forward units, like my own No. 6 Field Surgical Unit. This consisted of a surgeon, anaesthetist, eight men and facilities for an operating theatre with ten emergency beds. All this was contained in two 3-ton lorries and a Humber 4-wheel-drive staff car.

The local REME unit lent me a soldering iron, and I modified the rescue apparatus into a very efficient closed circuit machine. I had to use a coffee tin for the soda lime canister instead of the

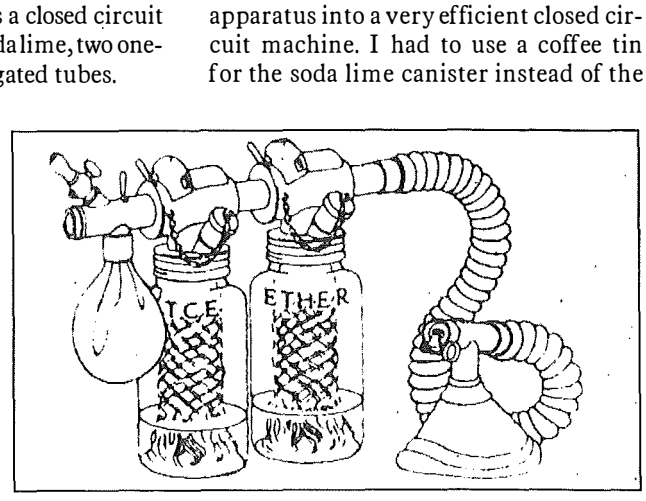

Figure 1. Trilene analgesia apparatus, 1942.

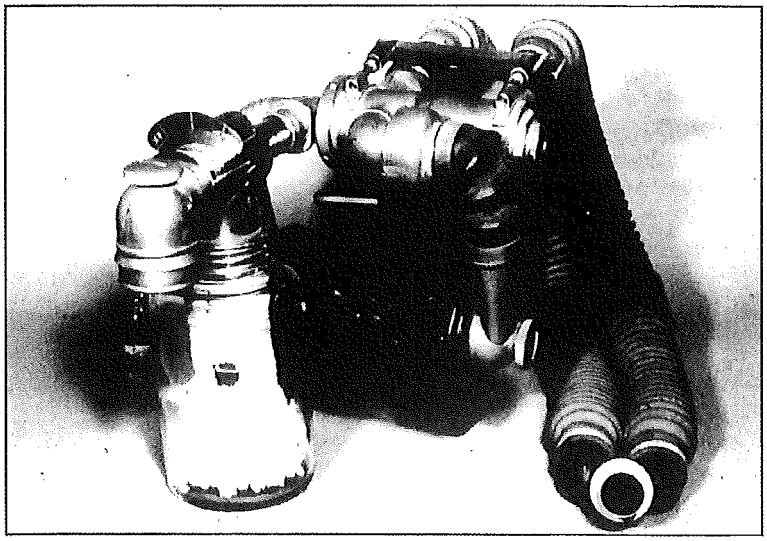

Figure 2. Wartime closed circuit apparatus.

sealed one, as I had to rejuvenate the soda time by spreading it out on a biscuit tin lid and heating it over a Primus stove. By attaching one of the Walton bottles with the one-way valve I had the perfect answer (Figure 2).

I scrounged an oxygen cylinder complete with an Adams reducing valve and by turning the cylinder key very gently till I could just feel the gas from the tubing against my ear I was able to anaesthetise dozens of casualties on one cylinder. I subsequently found that my ear test indicated a flow of about 1 L/min, enough to keep the patients pink. Being in a forward and mobile unit we were visited by various 'Brass Hats'. Much interest was taken in this apparatus, in particular by Lt Col Scriven o/c anaesthetics in Europe, and Brig Arthur Porritt, later Lord Porritt, o/c surgery.

After VE Day I was posted to various RAMC hospitals in England relieving those who had had no break, and eventually was asked to stay at Shaftsbury Military Hospital. Colonel Scriven, who knew that I was a partly trained engineer and had my own workshop, sent for me and asked if I had any ideas about designing a machine and stand, of unit construction as far as possible, portable, closed circuit and with no rubber parts so that it could be used in all parts of the world. It also had to embody the techniques used at the time, *e.g.,* insufflation for T's & A's, semi-open circuit, closed circuit and the draw-over should the gas supply fail. The reason for this specification was that current machines consisted of many individual parts pushed together with tapered joints which leaked, and not all parts were received from Army stores to form a complete machine.

After presenting my ideas I was interviewed by the Director General of the RAMC, General Hood, and seconded from normal duties for nine months to hopefully produce some result for evaluation. After looking at many makes of apparatus it was clear to me that the vaporisers and soda lime canister would have to be hard soldered into one unit,[4] and by making them into a circle this achieved rigidity and compactness. Initially I decided to make all the models out of hardwood as it was easy and quick to turn up on the lathe and to modify until it was time to make a real prototype in metal. Finally, I came to the right design of wooden apparatus that worked successfully on 20 different types of case. This model having been approved by General Hood and Colonel Scriven, the way was clear to make the final prototype in brass and copper. I was able to invent the first interlock between the Trilene and soda lime thus preventing any more accidents arising from the decomposition of Trilene by the soda lime over-heating. Both these models, to my great sadness, have been lost by the firm that eventually made the machines.

I was then posted to the RAMC headquarters hospital at Millbank, making frequent visits to the patent department of the Ministry of Defence. A patent was filed in my name as was the usual practice in those days. Now it was a question as to who would be chosen to make it. I suggested BOC but they turned it down. A gentleman in the Ministry of Defence suggested a small firm, Airbourne Equipment Ltd, of Harlow, Essex, later to become Airmed Ltd. This firm was making the oxygen masks for air crew and had as their managing director a previous employee of the old anaesthetic apparatus firm of Coxeters. As they were a subsidiary of the optical instrument makers Clement Clarke Ltd., they were ideally suited to making this machine, which required precision engineering and further design for manufacturing purposes.

Finally, I designed the assembly of the three drums in such a manner that it required a special spanner to remove them. This was done to prevent the enthusiasm that some orderlies had of polishing everything to hand including the drums of Boyle's machines, thus destroying the gas-tight fit required to prevent ether and chloroform entering the circuit when the taps were turned off.

In both an engineering workshop and an anaesthetic practice, safety procedures must be rigidly observed. This training guided my design of the Marrett Head. I designed the stand of lightweight construction with the 6 cylinders and 3 reducing valves arranged in a circle, making one complete unit for issue from Army stores. New reducing valves had to be designed, because the old Adams valves were bulky and unreliable, and the rubber seals deteriorated in the tropics.

With advances in techniques and the advent of relaxants, some modifications in design became necessary. The most important were moving the O_2 bypass to the patient side of the machine, preventing the rebreathing bag from being closed off, and switching to transparent jars for the soda lime. The modifications were published in 1958.[6]

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More Apparatus History

The following fascinating account of apparatus history holds special interest for the Editor. With the advent of the value of trichloroethylene as an analgesic, an apparatus similar in concept to the Cyprane inhaler (Duke University Inhaler) was designed in the United States[1] and found favor. Later, with the introduction of halothane in 1956, as noted in the subsequent article, the Fluotec vaporizer was developed, which revolutionized the safe delivery of potent anesthetic drugs. Mr. Fraser Sweatman, a personal friend from Toronto, Ontario, bought the Cyprane Company and carried on the distribution of the Fluotec until his company was absorbed by the British Oxygen Company. And so the merger continues. We are much indebted to Dr. R.S. Edmundson and the Proceedings of the History of Anaesthesia Society for permission to reprint this paper in the Bulletin (Proc HAS *15:41-42, 1994).* —*Editor*

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THE HISTORY OF CYPRANE

Dr R S Edmondson
Consultant Anaesthetist, Leeds General Infirmary Hon. Lecturer in Anaesthesia, University of Leeds

My career in anaesthesia began in 1947 at the age of ten, helping my father manufacture the original Cyprane Trilene Vaporiser. He read chemistry at Magdalen College, Oxford in the early 1920s and stayed on to do research for two years. On leaving Oxford he obtained a post with Coxeter & Son Ltd who were looking for a chemist to improve the purity of their nitrous oxide and, in particular, to tackle the irritating problem of residual water vapour freezing in the reducing valve. Attempts to overcome this difficulty, such as a hot water jacket, were not very effective and a bunsen burner flame was positively hazardous in this era of flammable anaesthetics.

The problem of removing water vapour was solved by passing the nitrous oxide through columns of silica gel and my father went on to further improve the purity and monitoring of nitrous oxide production. He also became involved with the design of anaesthetic apparatus for Coxeters and was obviously well thought of as he was made a director. Shortly before the second world war Coxeters were taken over by BOC and soon after the war my father fulfilled his long standing ambition of setting up his own business,

In 1947 he left BOC, moved from London back to his native Yorkshire and set up Cyprane (the name derived from cyclopropane) in the garage of an old house in the Pennine village of Oxenhope. His BOC colleague, Wilf Jones, joined him and Lord George Wellesley, a director of the old Coxeters, showed his faith in the venture by investing in the shares and becoming a non-executive director. Although loath to travel north of Watford, his business advice and contacts were invaluable. It proved to be a good investment for him.

The first product was the Cyprane inhaler, a simple hand-held Trilene inhaler designed mainly for obstetric analgesia but also used in other fields such as dentistry. The patient held the apparatus and if too much was inhaled it fell away from the face—a 1947 P.C.A.S. The Cyprane inhaler was very successful with worldwide sales. Production increased and two more refugees from BOC, Bill Hanson and Eddie Moore, joined. In 1950 the firm moved to larger premises in nearby Haworth,

About this time the Central Midwives Board produced a demanding specification for more accurate Trilene vaporisers. This required temperature compensation from 55-95°F and percentages of 0.5 or 0.35% Trilene ± 20%. After a good deal of research and development, Cyprane produced the Tecota (TEmperature COmpensated Trilene Apparatus) using a brass/invar bimetal strip thermocompensatory mechanism. This was also a success, the only rival to pass the specification being the Emotril. The research involved in producing the Tecota laid the foundation of Cyprane's next big step forward.

In 1956 halothane appeared. Its virtues were immediately apparent but its potency demanded an accurate and reliable vaporiser; use in Boyle's bottles had resulted in disasters and when Cyprane were approached by Johnstone & Brennan from Manchester they quickly produced the Fluotec which swept the world. There was a third move to a yet larger factory a few miles down the road in Keighley.

Having done a year's anaesthesia I joined Cyprane in 1963. My job title caused some discussion. My father suggested "Apprentice Boss" but I thought this looked rather flippant on my CV if I returned to medicine and smacked of nepotism if I stayed with Cyprane. I was therefore designated Medical Research Manager and spent an enjoyable and useful year working on the transition from the Mark 2 to the Mark 3 Fluotec. The Mark 2 had two faults. The first was accumulation of thymol preservative around the control spindle making it stick. This was cured by a fundamental redesign using a fluon plate mechanism instead of the spindle. The second fault was the non-linearity of output at low flows which was cured by raising the resistance across the vaporiser and redesigning the by-pass and vaporising chamber orifices so that the change from laminar to turbulent flow occurred at the same time.

By 1964 the firm employed some 60 people and I decided to return to medicine rather than become a businessman. My father who wanted to retire therefore sold the business to his American agent, Fraser Sweatman, whence a few years later it returned full circle to BOC. Mark 4 and Mark 5 'Tecs appeared for various agents without fundamental design alterations. The latest 'Tec for desflurane is a totally new design approach to cope with the low BP of desflurane, but has retained the clean looks and user friendly aspect of previous Cyprane products, which I think account for their success.

Cyprane made other excellent apparatus: the AE patient-demand O_2/NO_2 machine was rivalled only by the BOC Walton 5. It coincided, however, with the decline of the dental "gas" and was never actively marketed, as all energies were occupied with the 'Tec vaporisers. An excellent machine, similar to the Tri-service apparatus for field use, the "Haloxair" was manufactured but never achieved great sales for similar reasons. Low resistance draw-over

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Anesthesia in the Boer War (1899-1902)

An interesting episode during the Boer War is described in this artide. Of note to historians is the relatively bleak type of anesthesia employed and the prominent medical personages who assisted in the care of the injured. We are indebted to Dr. B.C. Hovell, Consultant Anaesthetist at the Hull Royal Infirmary and to the Proceedings of the History of Anaesthesia Society, 15:55-58,1994, for permission to reprint this most descriptive paper. —*Editor*

ANAESTHESIA AND THE SIEGE OF LADYSMITH

by Dr B Hovell, Consultant Anaesthetist, Hull

The second Anglo-Boer War began in October 1899. It was fought between the citizen army of the Transvaal and the Orange Free State and the British. The Boer objective was to invade Cape Province and encourage an uprising amongst pro-Boer sympathisers living there. Taking the ports of Cape Town and Durban were further objectives, to prevent the British landing reinforcements. The initial attacks by the Boers caused the numerically smaller British forces to take defensive positions in Mafeking, Kimberley and Ladysmith. The Boers then halted their advance to besiege these towns. The delay proved fatal to their plans and gave time for the British to send a large army which, by May 1900, had relieved the besieged towns, flung the Boers back, and captured their capitals, Pretoria and Bloemfontein.

Ladysmith was named after Juanita, wife of Sir Harry Smith, governor of Cape Province. She was a beauty whom he had rescued from the French at the siege of Badajoz in 1812 and subsequently married when she was 14 years old. The town was situated along the Durban to Johannesburg railway line—a dry and dusty place subject to flooding. Intense heat, violent storms, flies, scorpions, ants, spiders and snakes were just some of the pleasures of life for its 8,000 inhabitants. Early in the war General Sir George White, afraid of being cut off by the Boers, retreated to Ladysmith with his 13,000 troops and the siege of Ladysmith began, lasting 118 days. The British maintained a 14-mile perimeter on the plain around the town.

The Boers in the surrounding hills bombarded the little town with large siege guns of French and German manufacture; the British replied with some naval guns they had. During the siege the Boers fired over 16,000 shells but caused little damage and few deaths to the well dug-in and well spread out population. Far more people were killed by enteric fever.

MEDICAL FACILITIES AT LADYSMITH

Initially, the Town Hall was used as a hospital, but after it was hit by shellfire White negotiated with Joubert, the Boer leader, for a neutral zone to site a hospital. So, 3.5 miles out of town under the noses of the Boers, 15 minutes by rail, a 300-bed tented hospital was created at Intombi. Over the next four months it expanded to 1,900 beds and received a total of 10,673 patients, many fever cases. In the tents it was a tight squeeze to fit in the operating table, the instruments and personnel. Lighting was by acetylene or candle, water was at a premium and the heat and dust were oppressive. Flies were everywhere despite sticky fly papers. The doctors operated in riding breeches, shirts, sleeves rolled up, and tropical helmets. The junior surgeons gave the anaesthetics. In this war for the first time army doctors were augmented by civilians who included such eminent volunteers as Sir William McCormac, President of the Royal College of Surgeons of England, Sir William Stokes, Frederick Treves, Watson Cheyne and Makins, all doyens of the surgical scene. These few were paid £5,000 for a year in South Africa. Sir William Stokes died there of jaundice and pleurisy, aged 61 years.

Most war wounds were from bullets rather than shells and the effects of the new high velocity bullets were of great interest to the surgeons. These wounds were less liable to become infected than those of earlier wars. Because of this, together with antisepsis and the favourable climate, the incidence of wound infection was very low. Treatment was therefore more conservative than expected and operations were less common. The exception was for head wounds where trephining was widely practised. Head injuries were often given morphine to keep them quiet.

Transport of the injured was by stretcher, cart and rail. The D'Hoolie stretchers were carried by Indian bearers, who were organised for the army by Gandhi during his early career as a lawyer in South Africa. These body snatchers, as they were called, had to carry injured men long distances over very rough ground at times. On arrival at the dressing station of a field hospital, triage was carried out and hopeless cases were given large doses of morphine. X-rays, discovered in 1895, were soon made use of by the military, and a machine was in action at Ladysmith. When surgery was performed it was mainly for extraction of bullets, primary and secondary amputations and trephining, though cholecystotomy and resection of bowel with insertion of Murphy's button were performed at Intombi by Dr Campbell in whose unpublished diary they are described.

ANAESTHESIA AND RESUSCITATION

Only passing mention is made to anaesthesia in the Boer war literature. Why is this? Firstly, anaesthesia had slipped into an uninspiring routine which held little attraction for most doctors and was taught badly, if at all, in Britain. Secondly, a large percentage of doctors were trained in Scotland which meant that their anaesthetic training, such as it was, was based on an open chloroform technique. Many of these Scottish graduates found their way into the army, others to countries of the British Empire. It is not surprising that those doctors detailed to give anaesthetics did not record their results, and easily settled into the army routine of chloroform anaesthesia, tried and tested in battle since the Crimean war. Chloroform had many virtues for battlefield use. Where ether had been tried it was said to be too volatile in a hot country although the army did supply Clover's inhalers and ether as standard equipment. Nitrous oxide, favoured in more erudite circles, was unsuitable for logistical reasons. Anything not shipped by rail had to go by cart over very rough tracks on the veldt. This was both slow and costly in animals. Over 350,000 horses were to die in this war, let alone the mules and oxen, many from overwork. General Buller, in his march to relieve Ladysmith, had no such logistical qualms. He travelled with iron bath, kitchen, feather bed and 600 bottles of wine.

I came across only one civilian anaesthetist who volunteered. Dr H J Scharlieb, assis-

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Boer War. . . *Continued from Page 7*

tant anaesthetist at University College Hospital, went as a surgeon with the Langman Hospital under the direction of Arthur Conan Doyle. Goodman Levy, who in 1911 described ventricular fibrillation due to chloroform, had recently left Africa. Had he stayed he would probably have served in the column from Rhodesia marching to the relief of Mafeking and Baden Powell.

BOER WAR
ANAESTHETIC PRACTICE

On arrival at a field hospital the patient was given a sort of pre-med in the form of Bovril and/or brandy. Morphine was given if required. His garments were removed or cut away and he was put in a night shirt whilst still clinging grimly to his boots and cholera belt. Some men were phlegmatic, a few even refused any anaesthetic. Treves, in his book, *The Tales of a Field Hospital,* describes two cases induced with chloroform where the patients relived their recent battle experiences as they sank deeper under the anaesthetic.

Monitoring and postoperative care were minimal. Blood pressure was not recorded. In Intombi there were only 32 nurses and 22 doctors for 1,900 beds, helped by 152 orderlies and bearers. Complications were seldom described. The wooden wedge, Mason's gag and tongue forceps were available and even a tracheotomy set. Cardiovascular collapse was treated with strychnine, often in large doses, and brandy. Sometimes musk, a medullary stimulant, was used. Serious shock from blood loss was treated by elevation of the legs, subcutaneous ether, strychnine and, occasionally, rectal saline. Campbell describes a case in Ladysmith where axillary intravenous saline was given. Postoperative pain was controlled with morphine and sometimes dilute chloroform inhaled from capsules. Postoperative nausea was no doubt largely ignored. One drug, called cerium oxalate, the ondansetron of its day, was mentioned by Hewitt and might have been available to the civil surgeon. This drug is still currently available nearly 100 years later, in the Austrian and Spanish pharmacopoeias as Novonausin.

Some of these cases, dehydrated, toxic, undernourished and wounded, must have presented a serious challenge to novice anaesthetists using open chloroform. We will never know—they did not think it worth reporting. Dr Campbell did record some details of a doctor's life in the siege and describes his feelings---the emotional lability, the hope of a quick clean death, the boredom and the preoccupation with food. On 19 November he records the arrival of British wounded handed over by the Boers. They had been ambushed near Chievely when their train was derailed. This was the occasion made famous by the capture of Winston Churchill. By December the whisky was all gone, by January it was dry bread and horsemeat.

MEDICAL ARRANGEMENTS
OF THE BOERS

The Boers had no formal army medical service as they had no regular army. They had only the Red Cross and volunteer groups from abroad. Behind the front lines were the first-aid posts. They were manned by one doctor, or even a medical student, four untrained attendants and some bearers. Occasionally, the single handed doctor had to operate with or without anaesthesia. Who would give the chloroform in this situation, I wonder? One doctor on the Boer side at Ladysmith was a Dr A C Neethling, MB ChB (Edinburgh 1899) who left his post as house surgeon to Bradford Infirmary to serve there.

In 1990 Professor Ole Secher addressed this Society on the subject of Hildebrandt who assisted August Bier to perform the first spinal anaesthesia experiments in 1898. Hildebrandt in 1899 volunteered for the staff of the first German ambulance on the Boar side. I wonder if he gave any spinal anaesthetics there? Certainly nothing is written about the use of local anaesthesia in this war, though cocaine eye drops were probably very useful.

The siege of Ladysmith ended on 28 February 1900, but the war dragged on till 1902. Anaesthesia was not advanced at all by this war, which probably represented the high water mark for chloroform.

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Cyprane. . . *Continued from Page 7*

'Tecs designed for the AE dental machine and the Haloxair are still available.

I am pleased to say that, although the firm now has a large and prestigious new factory, it is still located in the same area and continues to flourish, although sadly the name "Cyprane" is fading in favour of "Ohmeda".

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Food for Thought

The following discourse was presented by Dr. Carlos Parsloe as the STA Distinguished Lecture at the annual meeting of the Society for Technology in Anesthesia, 1993, in New Orleans, Louisiana, and published in the Journal of Clinical Monitoring 10:147-152, May, 1994. We are much indebted to Dr. Parsloe, a Past President of the World Federation of Societies of Anesthesiologists, and to Little, Brown and Company for their kind permission to reprint this timely paper. —*Editor*

THE INTRODUCTION OF TECHNOLOGY IN THE THIRD WORLD: PROBLEMS AND PROPOSALS

by Carlos Parsloe, MD, TSA-SBA, FRCA, FANCZA
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That first Eden was rich in life-forms but devoid of technology. New Eden is a technological miracle without any life forms at least initially, except a few human beings.

—*The Garden of Rama,* Arthur C. Clarke and Gentry Lee, Bantam Books, New York, 1992.

INTRODUCTION

I should make it clear at the start that what follows is my own responsibility and is not meant to represent any policy of the World Federation of Societies of Anaesthesiologists. I will be long and discursive on the Third World and its problems, while short on technology and eventual solutions. The problems are many and can be epitomized in one word: ignorance. The solutions are few, and their epitome is: education.

It may seem easy to decompose this complex problem–solution binomium; but, unfortunately, it is extremely difficult to implement adequate solutions. The task will take time and is not dependent only on the amount of money and energy that is supplied. It depends as well on the capacity and, indeed, on the willingness of the recipient to absorb technology. Perhaps, paradoxically, I propose the following subtitle: A Plea for Humanism. There is no philosophical principle of opposition between technology and humanism[1] only as long, however, as technology remains subservient.

Table 1. Developing Regions Needs

Food
Water
Sewage
Clothing
Housing
Education
Work
Transportation
Energy
Leisure
Endemic and epidemic disease control
Medical care
Anesthesia technology

As a first approximation to the analysis of the problem, it is hardly questionable that basic human needs must be attended to before trying to introduce anesthesia technology in the Third World (Table 1). It is evident that there are more problems than possible solutions. It is also evident that technology in anesthesia certainly is not the first priority in the Third World. It could be argued that it may well be the very last priority. For instance, UNICEF estimates that 13 million children under 5 years of age die each year from avoidable diseases.[2] A simple calculation reveals the somber figure of about 1,500 children dying every hour. Simple measures to eradicate the underlying problems of malnutrition and lack of sanitation would stop this veritable carnage. The cruel reality is that the impact of anesthesia mortality in this setting becomes almost meaningless.

THE THIRD WORLD: A CONUNDRUM?

The Third World can be many things depending on one's outlook. It can be the proper habitat for the naturally robust Amazonian Indians prior to interfacing with "civilized" man and his greed and diseases. J. J. Rousseau's "bon sauvage," when abruptly faced with technology, becomes disoriented and even lost in the maze of what to him is incomprehensible.

Battery-operated radios are fast becoming ubiquitous in the Amazon area, as well as in many other areas of the so-called Third World. They serve as modes of communication and could well be the cornerstone for incipient education. But, the radio by itself is next to useless, bringing only unrealistic expectations and frustration. The same could be said for high-tech anesthesia equipment and monitors.

The Third World may seem to be an idyllic paradise for an inexpensive vacation enjoyed by lucky "First Worlders." Visitors come and go without getting to know the harsh reality of everyday life of those whom they usually refer to as the "exotic natives." Most likely, no tourist will witness the wholeness of simple relationships between man and animals, plants, trees, rivers; natural life in communion with nature. Simple, effective ecology devoid of any technology as the First World would define it, but rich in common understanding. Ideally, technology should not be introduced at the cost of destroying such elementary and fruitful associations. It is haunting to scrutinize the development of native technology without any apparent consortium with science. Curare, for instance, was extracted and made into a powerful tool to kill animals. How could primitive Indians discover the exact plant, the process for extraction of the crude venom, the fact that meat poisoned with curare could be safely eaten? The use of coca leaves is another example. It is hardly conceivable what modern anesthesia would be like without the present day synthetic substitutes of these two drugs, both originating in South America. As the late J. Usubiaga used to say, the South American Indian was a better pharmacologist than the North American Indian.

On the other hand, the Third World has an abominable face. Miners work in primitive conditions without any safety measures. Ant-like human conveyor belts carry heavy loads of earth, containing gold, up

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Technology. . . *Continued from Page 9*

the walls of deep, open-pit mines, again, without any safety measures—up and down, up and down every day.

An estimated 350,000 children each year suffer vision impairment from lack of vitamin A in their poor diets. *Chlamydia* infection is responsible for about 9 million blind human beings in the developing world. Xerophthalmia and trachoma are avoidable and should no longer be scourges of humanity.[3]

In the drought areas of Brazil, life seems to be at a standstill. People have a forlorn look in their faces when surrounded by dry earth and scalding sky. Today is like yesterday; yesterday is like the day before. Tomorrow will be no different. One room houses the family as well as everything it possesses. Crevices in the dry mud walls are the perfect habitat for the insect vector of Chagas disease. Several million people are infested with *Trypanosoma cruzi* in Brazil alone. Foreigners tend to call these people lazy without knowing that they are diseased and, consequently, have inadequate energy for work. These examples should suffice, but more could be described *ad infinitum.*

In short, the Third World lies where life and labor are cheap, and proper food and medical care are scarce or do not exist at all; where there is poverty, illiteracy, and violence; where human rights and social justice are mere words, and there is no hope for a better future. It is essentially energy deficient and energy inefficient,[4] and devoid of information exchange and infrastructure. A quotation from the moralist La Bruyère referring to life conditions in 17th century France is illustrative: "There is a special kind of shame in being happy in the view of such misery".[5,6]*

There are several definitions of the Third World (Table 2). Whatever the definitions, they are nothing but euphemisms for dire subhuman living conditions. Lack of infrastructure is a major problem and, in fact, may be accepted as its ultimate definition. The designation "Third World" was coined and became commonly used in the 1950s and 1960s. It described Asian and African nations emerging from colonial status, nonindustrialized and developing countries, in general; and it was originally used in the sense of a third "bloc," distinct from Communism and western countries.[7]

Table 2. Third World Definitions

Geographical:	North, South, East, West
Historical:	Metropolis and Colonies
Political:	Pawns of kings
Sociological:	Lack of infrastructure
Ideological:	Cold War weapon

The prevailing sense of exploitation was duly capitalized in the days of the cold war. Such feelings were expressed by J. P. Sartre's paraphrase, "Natives of all underdeveloped countries, unite,"[8] a theme that became a decolonization era slogan. The politicization of the issue led other intellectuals to discuss its implication, so well expressed by Hannah Arendt: "The Third World is not a reality, but rather an ideology."[9]

A modern definition differentiates two distinct prototypic countries: the fast and the slow. They represent the extremes of a broad spectrum of developmental levels, and could be called the live and the lethargic countries. "The world is no longer divided between east and west, or between north and south, nor even between rich and poor. Today, the division is between the fast and the slow."[10]† Fast countries are characterized by a high energy flow of non-reusable resources. The slow world, however, is unable to keep pace with scientific and technological development and depends on reusable resources.

Slow countries are usually resource rich, decision poor, and likely to establish the wrong priorities. C. P. Snow properly focused on the problem: "The main issue of the scientific revolution is that the people in the industrialized countries are getting richer, and those in the non-industrialized countries are at best standing still. Thus the gap between the industrialized countries and the rest is widening every day".[11]

Irrespective of its definition, the Third World is a cruel reality for several billion human beings, whereas the First World is a chimera for the same billions and a reality for only a few privileged millions. In fact, the First World is not immune from Third World enclaves.

TECHNOLOGY: PSEUDO SOLUTIONS

Szent-Györgyi placed the power of technology in its proper perspective. "Technology has had a more profound influence on human history than science".[12] Others fear the tyranny of technology over man's individuality and natural patterns of life. The French philosopher, J. Ellul, an exponent of the antitechnological movement, thus defines technology as "the ensemble of practices by which one uses available resources in order to achieve certain valued ends."[13,14] In anesthesia, resources encompass drugs, equipment, and monitoring, plus the competent anesthesiologist. Valued ends equate to better outcomes. Better outcome is the crucial aspect of anesthesia technology that makes it a valuable adjunct to be accepted within its limitations, but not with fear.

Table 3 lists some pertinent questions related to anesthesia technology in the slow world. These are six questions in search of answers. Permeating all of these questions is the fact that anesthesia technology can only be introduced into areas where basic prerequisites already exist. It cannot flourish by itself.

For the successful introduction of technology, certain minimum requirements are necessary, such as (1) national and local receptiveness, (2) an existing critical mass of knowledge able to absorb the technology, and (3) recipient participation at levels of decision and implementation. These prerequisites can be considered as the *sine qua non* of any attempt to introduce technology.

Table 4 lists some of the problems faced in introducing technology. Fear of new things and ignorance of the tools are paramount. Few, if any, anesthesiologists unfamiliar with new equipment will admit their ignorance. There is a subjacent, atavistic fear of novelty. Attempts at introduction of new technology without adequate instruction and supervision becomes a sce-

Table 3. Anesthesia Technology in the Third World: Pertinent Questions

Does it need technology?
Can it afford technology?
What kind of technology?
How fast can it absorb technology?
How should technology be introduced?
Can technology be retained?

* Il y a une espèce de honte d'être heureux à la vue de certaines misères.

†O mundo não mais se divide entre Leste e Oeste ou entre Norte e Sul. Nem mesmo entre ricos e pobres. Ele se divide, hoje, entre rápidos e lerdos.

Table 4. Problems Faced

Language barrier
Expectation vs reality
Existing body of knowledge
Funding required
Equipment acquisition and maintenance
Initial thrust
Retention capacity
Misuse loss and discredit
"Timor inventiones"
"Ignoratio elenchi"

nario for disaster. The budget and the personnel must also be considered. Budgets seem to exist mostly for the purchase of equipment, but not for its maintenance. Personnel using the new technology must be properly motivated. Monitors in the hands of technology illiterates may last one minute, one day, one week or perhaps one month. They will survive no longer and the project can be considered finished. Instruments may have been purchased on the basis of their impressive looks and high list prices in catalogues without any firsthand knowledge of their functions and limitations. Prestige, there as in other areas of human behavior, can be an impulsive force. Some, if not most, of the equipment thus purchased may, in fact, never be used at all. Government-to-government exchanges offer a whole range of possibilities; for example, coffee has been exchanged for outmoded equipment. Donations of discarded equipment may appear good in the list of accomplishments, but be of no use for the care of patients. Anesthesia machines with wrong connecting inlets for anesthetic gases may be put in the showrooms of hospitals, but not in the operating rooms where they belong. The question could be raised of an industrial-bureaucratic complex working for its mutual benefit, but certainly not for the benefit of the patient.

In the background, there is the persisting fixed idea of introduction of foreign technology obliterating the possibility of developing autonomous technology. In actual fact, locally made equipment would be both less expensive and easier to maintain, not to mention the fact that there would be an accompanying growth of expertise and availability. For example, anesthesia for the first heart transplant in Brazil some 25 years ago was given with a simple bubble through vaporizer and a small, portable, hand-sized constant flow, pressure cycled, 1:1 fixed inspiration to expiration ratio, oxygen-driven ventilator. This equipment was developed in São Paulo and has been used extensively for decades for general anesthesia with volatile or intravenous agents by means of tracheal intubation and controlled ventilation. It made possible accurate alveolar ventilation and was used for all age groups and every conceivable type of operation.

Clinical practice should not be mandated by technology. There are some assumed, but not always proven, virtues of new technology. It may turn out to be potentially dangerous as an overall practice standard. A technology-dependent anesthesiologist is an anathema for the Third World. Essentially, the Third World anesthesiologist must be clinically oriented, versatile, ingenious, and possess a high degree of competence. Technology was never intended to replace clinical acumen; indeed, it must be man's servant, not his master. The first objective should be the proper training of physicians—not necessarily of anesthesiologists, but certainly not of non-physicians—to administer anesthesia. It is easier to teach techniques to medically qualified personnel, rather than to teach clinical concepts to nonphysicians.

Obsolescence of equipment gives room for thought in the Third World. I use 40-year-old machines daily, all museum pieces from the viewpoint of the First World, properly upgraded with absorbers, vaporizers, and ventilators and possessing relevant qualities: They work faithfully and need no maintenance except cleaning and tender care. I also work with new equipment, but feel the old machines are not putting patients at jeopardy. When the budget is limited, it seems wiser to invest in monitoring capability, which imparts the safety net needed for clinical practice.

Before First World anesthesiologists start telling their Third World colleagues that pulse oximetry and electrocardiograph are indispensable in any patient, one small peculiarity of these instruments must be considered: they must be plugged into some electrical outlet. This fact leaves ample room for the imagination to think of wrong voltage, of voltage variations, and of power failures to annul the concept of technology-based safe practice. I have seen new, expensive equipment plugged into the wrong current and be put aside before it could be used. In the First World, such occurrences would be easily solved by calling in the maintenance representative. In the Third World, representatives and distributors may be only an office dealing with import and export business. Maintenance and repairing ability may be a few thousand kilometers away in a foreign country, thus rendering the equipment a candidate for the cemetery. The First World message then becomes rather irrelevant to the Third World. The most common first thing done to foreign electrical instruments is to cut away the grounding third plug, since outlets usually possess only two holes. And the holes may be round and of different diameters, rather than flat, needing special connecting pieces, which may or may not be available. Communication and cooperation are essential for education prior to or at least concomitant with the introduction of technology.

It is here that the role of professional organizations, national and international, becomes influential. Practice standards must take into consideration all peculiarities of the slow world. Recently, the World Federation of Societies of Anaesthesiologists adopted a set of valuable International Standards for the Safe Practice of Anaesthesia,[15] as proposed by a special task force consisting of seven professors, all from First World universities. These standards accrue in value where they are nonexistent, *i.e.*, in the Third World. Yet, no representative from the Third World participated in the work. This certainly was not intentional; but, nevertheless, it makes the task force hardly international, at least from the Third World standpoint. The underlying assumption is pervasive. The Third World has nothing to add; it is considered only a passive, inert, nonreactive recipient body. This is far from the truth. Better than their colleagues working in privileged circumstances, Third World anesthesiologists would have much to contribute. At the very minimum, they could establish what is realistic and what is not in any standards enacted from the outside, so to speak, by professors not living with the daily grinding task of making do with what is available. This is not meant as a criticism, since the labor was highly laudable and the adopted standards are all-encompassing. It is just a statement of fact.

P. Heim provocatively stated: "When Technology is master, we shall reach Disaster, Faster".[16] His dictum perhaps could be restated as: When Technology is Servant, we shall reach Success, Faster. As a corollary, the introduction of anesthesia technology must be congruous and consis-

Continued on Page 12

Technology. . . *Continued from Page 11*

tent, not a mere haphazard collage. Above all, it must not be precarious.

COMMENTS

If the First World is to be considered a paradigm, which is sometimes questionable, and the Third World a stereotype, which may be wrong, technology should be introduced in a humanistic manner to the real benefit of the human species. "What then, does he have in his head, this *Homo* that shamelessly calls himself *sapiens?*" .[17]‡ The answer is the potential for good as well as the potential for evil. Knowledge alone does not impart wisdom. Witness the development of self-destructive technology. Should *Homo sapiens* be renamed *Homo asininus?* The final message is: If given a choice to anesthetize a malnourished, anemic, Third World, dehydrated child with bowel perforation due to *Ascaris* with all the best possible paraphernalia of equipment and monitoring, or a well-nourished, First World child with the bare minimum of equipment and no monitoring, at least I would have no hesitation to prefer the latter situation.

Having said all of this, I should point out that in spite of my apparent pessimism, I welcome new technology when used by capable hands and prepared brains in a supportive environment. Technology has become pervasive and useful; however, it should not be considered a fetish or adored as the new golden calf. Certainly it is not thaumaturgic by itself . Indeed, it is ethically nihilistic. I am a techno-optimist, only with the reservation that a solid clinical foundation is essential to derive the full benefits of modern anesthesia technology. Without this, it may well become worse than nothing.

Table 5 indicates a decremental order of technology availability in the First and Third Worlds. Low tech is better than no tech. Anything is better than wrong tech. High tech does not necessarily imply high quality of care. Conversely, low tech does not mean low quality of care. High tech is not a substitute for enlightened, empathic human care. Hopefully, the Third World will not become forever stigmatized as a synonym for low tech, no tech, or, worse still, wrong tech associated with disregard for human life.

‡Qu'a-t-il done dans la tête, cet *Homo* qui s'attribue sans vergogne l'épithète *sapiens?*

Table 5. Decremental Order of Technology

First World: High tech
Third World: Low tech, no tech, wrong tech

CONCLUSION

I have been long on the problems of the Third World and short on the solutions for the introduction of anesthesia technology. The implication is that anesthesia technology is a low priority in the Third World and can be adequately introduced only after basic human needs have been satisfied.

The Society for Technology in Anesthesia is young, with abundant brain power. If presented the problems, it will be able to find answers. On the other hand, if given solutions, it may not perceive all the problems. In this address I tried to follow the French Encyclopedist, D. Diderot's approach to intellectual stimulation: raising questions instead of providing answers.[18,19]

I am grateful for your indulgence and must apologize for not having offered a universal recipe of satisfaction and, therefore, for leaving you with more problems than proposed solutions.

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ANESTHESIA HISTORY ENTERS CYBERSPACE

On July 7, 1995, anesthesia history arrived on the Internet in the form of a new discussion list. Thousands of these lists populate cyberspace and serve as forums where people around the world who share similar interests — whether it's genealogy, Star Trek, or something more academic or technical — can "gather" and "talk" via electronic mail. Medically-related lists are proliferating, and anesthesia has several forums where clinical and professional matters can be discussed.

A wide variety of history lists have also appeared on the Internet, but only one, CADUCEUS-L (which has existed for a couple of years), has been devoted to medicine. One of the most active anesthesiologists in cyberspace, Keith J. Ruskin, MD, is the co-founder of the "anes-hist" forum; and it becomes a part of his suite of electronic services known as GASNET. Within 24 hours of its announcement on various other lists, anes-hist had 45 subscribers.

Readers with email access who would like to subscribe to the new anesthesia history forum can contact Dr. Ruskin (ruskin@gasnet.med.yale.edu) or A.J. Wright (awright@ms.jt.anes.uab.edu).

The Falklands War

The following article is an eyewitness account of how casualties were cared for during the recent Falklands War. In spite of limitations in staffing and equipment superb treatment was rendered to the 730 wounded personnel. We are most grateful to the author, Dr. P. T. Bull, and to the Editor of the Proceedings of the History of Anaesthesia Society 15:77-78,1994, for their premissions to reprint this paper. —*Editor*

ANAESTHESIA AT SEA DURING THE FALKLANDS WAR

Dr. P. T. Bull
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Formerly Surgeon Commander Royal Navy

The Royal Navy had almost abandoned its plans for hospital ships when, with the need to recapture the Falkland Islands in April 1982, it became necessary to have a floating base hospital in the South Atlantic. The school cruise ship SS Uganda was hastily requisitioned and converted in Gibraltar to carry a basic hospital unit. I was appointed at two days' notice to be head of the very small Anaesthetic Department: I was supported in the fleet by 5 other RN anaesthetists (2 in Canberra, the original designated Hospital Ship but she became a troop carrier, 1 in HMS Invincible, 1 in HMS Hermes and 1 in a refuelling tanker). Two other RN anaesthetists joined the 4 army anaesthetists ashore in Field Hospitals.

My Department had 3 main areas of responsibility: casualty reception, an operating theatre of 3 tables and a 20- bed ICU. Our staffing comprised 2 anaesthetists (1 Consultant, 1 senior registrar), 2 ODAa, 2 ICU sisters, 1 ICU staff nurse, 7 ICU nurses (SEN), 1 casualty sister and 1 P & 0 sister. All except the latter were Royal Navy personnel. The passage out was used for intensive training, particularly in casualty handling and resuscitation. Stores were sadly deficient, particularly ventilators, drugs and disposables. These were partially made good on the journey south, but the need to supply other ships and shore units meant a strict non-wastage system, and a continuous demand for re-supply. Eventually we carried, in addition to the basic scale equipment, 2 model M Boyle's machines with 1 circle absorber unit, 4 units of the Tri-Service apparatus, 2 Penlon Oxford ventilators with air compressors and 3 Pneupac ventilators: the ventilators were not our first choice as they were dependent upon a driving gas and/or electricity!

Action began with the admission of Argentine wounded even before the sinkng of HMS Sheffield, then increased gradually to include the battles at San Carlos on May 21 and then Darwin/ Goose Green a few days later, but reached a maximum of 160 admissions in a 4-hour period on the day of the Bluff Cove incident, when Sir Tristram and Sir Galahad were bombed with units of Welsh Guards aboard.

CASUALTY RECEPTION

Casualties were received by helicopter mainly from the field hospital at Ajax Bay, but also direct from damaged ships and any major cases transferred from warships. One anaesthetist was always present for resuscitation and triage if necessary. He was assisted by available medical officers, particularly the radiologist and oral surgeon. Omnopon 2 mg/ml iv was used liberally to achieve analgesia, and Haemacel for initial volume replacement.

OPERATING THEATRE

The basic rules of battle surgery were followed regarding debridement and delayed primary suture. Adaptation to the situation meant less than ideal sterility: surgeons usually wore gloves only, much disposable equipment was sterilised with Cidex, and syringes and needles recycled in case of need (the latter never became necessary). Plastic bags were used to occlude burns. An "anaesthetic nurse" system was used, allowing the ODAs to look after stable cases while the anaesthetists were occupied elsewhere, the ICU and casualty reception areas both being adjacent and within shouting distance.

The commonest anaesthetic technique was fentanyl, alcuronium. thiopentone with a modified rapid sequence induction and N_2O/O_2 maintenance using halothane and a low flow circuit. Nerve blocks and iv regionals were impractical because of multiple wounding. Two spinals were given, one for a casualty carrying a "malignant hyperpyrexia risk" card. Four epidurals were used to deal with postoperative stump pain. The Tri-Service apparatus was used as the third anaesthetic machine and found to be invaluable, particularly in its saving of medical gases.

INTENSIVE CARE

Inadequate numbers and experience of staff were compensated by enthusiasm and hard work. They were greatly assisted by the P & 0 Officers and crew, by the Royal Marines bandsmen, naval ratings and junior medical officers who found time from their other duties. On one occasion manual ventilation was needed for 3 patients when only 1 functional ventilator was available. Fortunately, 2 East Radcliffe machines arrived later from shore bases to ease the situation. Tracheostomies (6) proved difficult to manage due to shortage of tubes and humidifiers, and to language problems with the Argentines. Entonox was invaluable for dressing changes.

STATISTICS

Of 730 admissions, some 150 were Argentine wounded. Many of the 420 anaesthetics given were repetitions on the same patient, often up to 5 tiines. The delayed and repeated surgery required is reflected in the number of anaesthetics before (211) and after (208) the surrender. *There were only 3 deaths,* all unavoidable due to the severity of their injuries. These figures may flatter to deceive. How many others may have survived long enough to reach a medical sanctuary if more helicopters had been available or the war not largely fought at night?

Australian Forces in Vietnam

The following account of the Australian presence in the Vietnam conflict and the medical and anesthetic care provided to the participants is described painstakingly by Dr. Marshall Barr, now practicing in England. We are most grateful to him as an individual and as Editor of the Proceedings of the History of Anaesthesia Society 15:74-76,1994, for permission to reprint this paper. —Editor

ANAESTHETIC EXPERIENCE WITH THE AUSTRALIAN ARMY IN VIETNAM

by Dr A Marshall Barr
Consultant Anaesthetist, Reading
Honorary Editor, History of Anaesthesia Society

BACKGROUND

In April 1967, I left a Staff Anaesthetist post in Western Australia to spend a year as Specialist Anaesthetist with the Australian army in Vietnam. The 2nd World War left Australia very Asia-conscious, and owing a great debt to the United States for deliverance from the threat of invasion. Post-war, Australians were vehemently anti-communist, a view confirmed by the defection in Canberra of the Petrovs, with information on communist plans for world domination. In the '60s, the domino theory of successive countries falling to communism was actually happening, and expansionist Indonesia was causing fright. In Vietnam, a stand as in Korea seemed to be called for. When the U.S. asked, Australian troops were sent—first advisers, then in 1966 a Task Force of two battalions plus logistic support. Compared to the American commitment of half a million, the total was about 5,000 Australian servicemen.

The fighting Task force was based at Nui Dat, and the Logistic Support Group about 15 miles south in the sand dunes behind the beach at Vung Tau. This was previously the French resort of Cap St Jacques, south-east of Saigon and 10 degrees north of the equator. There, in 1966, 2 Field Ambulance set up in tents. Their anaesthetist was Max Sloss who, at that time, was at registrar level in his training. One year later the tents were being replaced by Kingstrand huts, and we arrived to the luxury of an air-conditioned operating theatre.

8 FIELD AMBULANCE/
1 AUSTRALIAN FIELD HOSPITAL

Our unit was a Field Ambulance in name only, and soon changed to the more accurate title of Field Hospital. We had 60 beds, and were tasked with the hospital treatment of all Australian sick and wounded. The holding policy was 30 days. If a patient was not going to be fit for duty in this time, he was evacuated by air to Australia, on a fortnightly Hercules flight staging through Butterworth, Malaysia.

On the surgical side, our unit had one surgeon, one anaesthetist, two general duty Medical Officers with some surgical and anaesthetics experience, five Operating Theatre Technicians and, later, four nurses, one of whom was always rostered to theatre duty. We had two operating tables, two Boyles machines , one CIG Midget portable and one EMO. For ITU we had one Bird and one Bennett ventilator, neither of which was used. Our agents were thiopentone, suxamethonium, curare, pethidine, N_2O, halothane and ether. The standard intravenous device was the 14 gauge catheter-within-needle Intracath. Our supply system was via the U.S. Army. The backup facilities were the 400 bedded U.S. 36 Evacuation Hospital a mile away, and specialist services including neuro and chest surgery at the 24th and 93rd Evac Hospitals at Long Binh, near Saigon.

CASUALTY MANAGEMENT

The main injuries were from mines and high velocity rifles. With helicopter evacuation it was normally less than 40 minutes from injury to hospital. Chest and head injuries were diverted to the U.S. specialist hospitals. The more common limb and abdominal cases were landed 100 metres from our theatre/resuscitation building. The theatre team would meet the "dust-off" helicopter on the landing-pad, and carry the wounded on a litter to the triage area adjacent to theatre. The routine was O_2, a peripheral drip, increments of iv pethidine to full analgesia, rapid crystalloid 1-2 litres, cvp measurement via an external jugular line, colloid only if there was a delay in cross-matching. After 10 units of stored blood, a unit of fresh blood was given, donated by soldiers of the Logistic Support Group. This differed from the U.S. system of many litres of crystalloid, followed by low-titre 0-positive uncrossmatched blood. In my year, we had no "Da Nang" lung, no requirement for postoperative ventilation and no coagulation problems.

Still in the triage area, the casualty was stripped, searched for all injuries, and x-rayed. Penicillin was started iv at the rate of 10 mega units daily. In theatre, following a rapid sequence induction, the standard principle was followed of débridement and delayed primary closure.

The casualties came in bursts. The policy of quiet periods was to maintain training, while having staff and facilities available to deal with casualties at 30 minutes notice. We ran short lists, *e.g.*, circumcisions, plantar warts, ingrowing toenails and appendectomies, training the MOs and technicians in airway management, drips and surgery. We used the EMO to have experience if the N_2O supply failed, which almost happened during the Tet offensive. I used brachial blocks for hand injuries and spinals for leg injuries. There were several severe burns for which I used a lytic cocktail. The heavily-muscled soldiers sedated with a mixture of pethidine, morphine and chlorpromazine cooperated in turning themselves for widespread débridement which they accepted without complaint

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"First"?. . . *Continued from Page 1*

of a funnel shape. The abdomen is very pendulous. Her children are large. The head is particularly so. It is not difficult to understand that in such an arrangement, the entrance of the head is delayed, the symphysis and bladder much compressed (frequent micturition always being present) and that the length of the precursory stage of labor should be so great. Mrs.——— is very short in stature, and I lately asked her if she was deformed. She said no; on the contrary, she thought her form quite natural. I have used ether in the labors which have occurred in this case, since its discovery, and with the very best advantage. The precursory symptoms have been removed, or so lessened as to be tolerable. Voluntary efforts have been controlled, and the protrusion of organs referred to has been diminished or has ceased. The greatest comfort has thus been derived from etherization. It was used in her present, or latest labor, with excellent effects.

In this, Mrs.———'s last labor, I was not called till many hours, nay days, had passed from its beginning. I learned that she had not slept for two nights. She was conscious that no progress had been made in the labor. Her old troubles of the precursory stages were present in their fullest degree, and with these, strong expulsatory contractions were conjoined. It seemed as if the womb would yield to its own violence. Examination showed perfect relaxation of vagina and external organs. The os uteri was beyond reach, and no presenting part could be felt. I called again and again, and at length, towards evening, reached the os uteri, and found that it was dilated; and a large bag of water was protruding into the vagina. I determined now to break it, and as the quantity of water seemed very large, a white wash bowl was placed to receive it. The discharge was large, estimated at two quarts. It was perfectly *black* in color, as seen by lamplight—not brownish, as is the meconium color when this substance is mixed with the liquor amnii, but black like ink. In subsequent contractions more fluid of the same appearance was caught in a bowl. Sulphuric ether was now used with its usual excellent effects; and in less than three hours from the breaking the bag, a living child of full size was born.

From the color of the liquor amnii, and the possibility of its dependence on the meconium it occurred to me that the child must be dead. The great quantity of liquor amnii, however, prevented much pressure upon the foetus or the placenta, during so long a labor, and the child was born living. Mrs.——— recovered rapidly. The bowels were naturally evacuated the second day after delivery, as so often happens after etherization; and my attendance soon after ceased.

Remarks.—This case has interest because of the character of its precursory symptoms, or the *first stage* of the process. This stage has always been exceedingly protracted, and accompanied by great pain. It is not spurious labor, which gives this character to this stage. There is no question of the dilatability or dilatation of the os uteri, though it cannot be reached. This state of the vagina and external organs is as perfect as is ever met with, and the *show* abundant. The depth of the pelvis, its direction, the distance of the os uteri, only prevent the reaching of it. The head enters the brim very slowly, and the bag forms in the same way. I have met with other like cases, some of them very strikingly like the above, but no one in which this extraordinary slowness of descent in the first stage has been so remarkable, or any in which the others have been completed more happily, or in a shorter time.

Its interest is increased by another fact which it presents. This is far more interesting and important than is this naked recital of delay and of suffering. In my visit following her delivery, I asked Mrs.——— how many times she had used ether. She named them, and added that there was one other time in which she used it with great advantage. I asked when. Nineteen years ago, she said, she gave birth to her eldest son. Her labor lasted more than a fortnight. In the absence of her physician, her husband tried to find something which had given some relief in her former and first labor. He failed; but being engaged in preparing a chemical lecture, and making experiments with sulphuric ether, he thought he would try that. It was wiped freely over her face, and forehead, and breathed. To his surprise all her distress passed away—the spasmodic twitchings disappeared—violent voluntary effort, and which constituted so much of her misery then, and has in all subsequent labors, ceased to annoy her. Her physician arrived, and was so much pleased with the effects of the ether that it was employed during the rest of the labor. Her labor was now easy, was soon completed and a stout living boy born. Such was her account of her first use of sulphuric ether to diminish or to abolish pain.

Here, then, is the first recorded case of the breathing of sulphuric ether for lessening, or abolishing pain in labor. Is it not the first case in which ether was purposely employed to remove suffering—pain as a mere symptom. It was not used by a medical man, nor because this woman's husband knew anything of its medicinal uses. It was at hand, had special properties. It was simply *tried*, and perhaps because of its peculiar and positive physical properties alone. Its effects were marked. The patient was at once relieved, and as she stated to me with great distinctness, "the effects were precisely the same as she has experienced from it by my own ministrations in subsequent labors."

Mr.——— was surprised, on looking back on cases which succeeded that in which he had used sulphuric ether with so much success, that he had not tried it again. Had he done so, he might have claimed to be regarded as the discoverer of its anaesthetic agencies. Would he not have been the discoverer? If simple priority of use determine such a question, is not his claim now established? Newton discovered the calculus in 1669, having then written a treatise, which contained its principles. It was not published till many years after. Leibnitz made the same discovery, and published it before Newton, and with a much better notation, which is now universally adopted. But who questions if Newton were not the *first* discoverer, and who refuses to him the honor due to such a discovery?

Viet Nam. . . *Continued from Page 14*

PROBLEMS

Surgical and anaesthetic problems were minimal. Considering the circumstances, the staff and facilities were satisfactory.

We all suffered some degree of stress. Although Vung Tau proved to be a very safe area, there was always a worry that one might be a target. The climate was wearying, the combination of heat, rain, wind and sand being most unpleasant for tent-dwellers. A considerable burden for the single surgeon and anaesthetist was knowing that we had the only real expertise. Fatigue due to intensive activity meant we sometimes had to close the theatre and send our casualties to the 36 Evac hospital. In contrast, there were also long periods of tropical fevers and malaria were frequent in the medical wards. Alcohol and cigarettes were amazingly cheap, and amazing quantities of both were used. The greatest stress was awareness that we were in an unpopular war, with fading support from home.

THE TET OFFENSIVE

In February 1968 we were swamped with casualties. The Tet offensive was all around us, but our area was fortunately untouched by enemy action. The casualties came from our own troops and Americans sent on from the 24th and 93rd Evac hospitals. These "transfers in" had received minimal or no treatment because the transferring hospitals were fully occupied. This meant two weeks of unremitting work, with triage assessments often being changed as new helicopter loads arrived, and the Vung Tau recreation centre being converted to a convalescent hospital to create more hospital beds.

From the casualties we learnt the truth about the Tet offensive. They described seeing literally hundreds of dead VC on roadsides all the way around Saigon. All had a flag and clean uniform in their pack ready for their victory march through the capital. Instead, they suffered a huge military disaster. But the western media were by now vehemently against the war. They reported the success of the enemy in being able to mount such an attack despite 500,000 U.S. servicemen in Vietnam. The United States never regained confidence and the war was lost.

CONCLUSION

Tet was the turning point, but the war continued. During the next three years the Australian medical facilities continually improved, with the hospital expanding to over 100 beds. My description is a one year "snapshot" of a still relatively primitive set-up, in which much good work was done, thanks largely to the quality and training of our supporting staff.

JOHN SNOW— A BIBLIOGRAPHY

A biography of John Snow, subtitled *Anaesthetist to a Queen and Epidemiologist to a Nation*, has recently been published by the Canadian anaesthetist, David A.E. Shephard, who in 1993 published a history of the Canadian Anaesthetists' Society. He has an absorbing interest in biographical history.

This soft-cover book of 373 pages is tastefully illustrated and acknowledges in memoriam the works of the late Roderick K. Calverley and the late Richard H. Ellis. It is divided into four sections: 1) Preparation—his growing up in Yorkshire and his apprenticeship and practice as a physician; 2) Achievement—his practice in London leading to his pioneering work in anesthesia and the source of cholera; 3) the Legacy which he has left us in his writings; and 4) Appendices, which include a chronology of his life and career, a bibliography of his published works and the factors surrounding his death.

This book may be purchased by writing to York Point Publishing, P.O. Box 843, Cornwall, P.E.I. COA-1H0, Canada. The cost is $17.50, plus $6.50 (U.S.) for handling and shipping.

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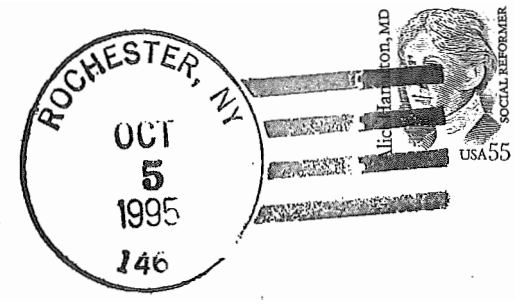

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