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BIR
The British Institute of Radiology

News

News and information for members

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Professor Brian Steward Worthington 1938 -2007

Obituary: Professor Brian Steward Worthington, FRS, FMedSci

Brian Worthington's death in 2007 was a great loss for British Radiology. A true scientist, he was one of the pioneers of clinical magnetic resonance imaging, producing much seminal work during the early development of MRI in the 1970s. For this he was very properly elected to Fellowship at the Royal Society – a rare honour for a clinician and an even rarer one for a radiologist. Many other awards were forthcoming, notably Gold Medals of the Society of Magnetic Resonance in Medicine, Honorary Fellowship of the Radiological Society of North America, the Gold Medal from the Royal College of Radiologists and the Back Pain Association. In addition to being awarded the Barclay Medal from the British Institute of Radiology, he was a life-long supporter of the BIR; he served as its President with consummate distinction in 1998–1999.

Born on the 9 June 1938, he was a very bright medical student at Guy's Hospital, gaining a BSc in Physiology *en route* to his MBBS in 1963. He won the Rohan Williams Medal for his outstanding performance in the final Fellowship of the Royal College of Radiologists (then the FFR of the RCS). He was elected a Fellow of the Academy of Medical Sciences in 1998.

His original post in Nottingham and Derby was ostensibly that of a Neuroradiologist and in the days before CT he was heavily involved with interventional techniques and nuclear medicine studies of the brain. However, he was ideally placed to become involved with the emerging technique of "nuclear magnetic resonance" and there were numerous outstanding MR scientists on the Nottingham campus. He was quick to spot potential applications outside the central nervous system, even though some of his best known papers were in the neuroradiological field. At the first meeting of the Society of Magnetic Resonance in Medicine his paper on MRI of the knee was the only venture into the musculoskeletal system! He also made numerous assessments concerning the contribution of MRI in the lumbar spine.

Because of his expertise, he was strongly supported by the Department of Health and various industrial collaborators to whom he gave freely of his time. This led to the establishment of a Professorial University Department in Nottingham and Brian assumed this mantle with great distinction. He helped facilitate the clinical studies which contributed to the emergence of Nottingham as a leading centre for magnetic resonance imaging (viz Sir Peter Mansfield's Nobel Prize). He trained a large number of radiologists from the UK and abroad and correctly instilled into them true scientific rigour. He was meticulous in his spoken and written words and expected nothing but the highest quality from those around him. This was sometimes a problem for lesser mortals whose brain did not move quite so quickly!

He was very proud of Nottingham and much enjoyed the environment and surrounding countryside, especially the Derbyshire hills. But perhaps his greatest passion was a love of Iceland and other Nordic countries. He travelled to Iceland whenever he could and became immersed in that country's culture. Extensive academic collaborations led to Honorary Membership of both the Icelandic and Finnish Radiological Societies. It was a tragedy that his well-deserved retirement with his wife, Margaret, at their home not far from Derby, was cut short by pancreatic cancer, an illness which he bore with great dignity. Radiology lost one of its true academic giants when he died on the 9 December 2007.

Adrian K Dixon, Cambridge.

Important events for UK healthcare in 2008

Integrating the Healthcare Enterprise and the British Computer Society

The Integrating the Healthcare Enterprise (IHE) organization started out by developing successful ways of using DICOM and an equivalent hospital messaging standard called HL7 to support smooth workflow within the Radiology department and the hospital. The BIR has provided an ideal base for adapting the specifications for use in the UK and informing healthcare professionals about the potential benefits of implementing IHE compatible IT facilities. In recent years IHE has developed a way to share clinical documents, such as reports, discharge summaries and clinic letters, throughout all parts of a healthcare organization. The method can be used to share existing electronic documents as well as newly created ones.

The BIR and the British Computer Society (BCS) have agreed that the BIR–IHE Steering Committee should move from the BIR to become a part of the BCS Health Informatics Forum. The BCS will provide an excellent base for developing the IHE Document Sharing facilities throughout UK Healthcare. The move will also provide a boost to the work of the BIR IHE Radiology Technical Committee. There is significant interest by BCS members in medical imaging and important joint meetings are planned. In particular a jointly organized meeting entitled "Sharing Clinical Documents and Integrating Workflow" is to take place in Oxford on 9 April 2008. This meeting is being sponsored by professional bodies including IHE-Europe, the BIR and the HL7 UK Affiliates. Company sponsorship is also being provided.

In a busy year, IHE-UK is also organizing the annual week long international IHE Interoperability testing session, the IHE-Europe Connectathon. This event will take place in Oxford between 7 and 11 April and visitors will be able to see over one hundred systems being tested. Suppliers have to show that their software applications can work with three other suppliers' software applications according to the IHE specifications. The tests are validated by user representatives including several BIR members. There is an opportunity for BIR members to visit this fascinating event during the afternoon on Tuesday 8 April or Thursday 11 April. Please contact Graham Whittal by e-mail (graham.whittal@bir.org.uk) if you would like to register.

There will be demonstrations of IHE interoperability by companies that have participated in the Oxford Connectathon at UKRC 2008 and the prestigious Healthcare Computing conference to be held in Harrogate at the end of April.

For further details please visit the IHE website www.IHE-UK.org – Look under events.

Nick Brown

Fundraising Update: Art Exhibition

We would like to thank Dr John Leslie Haybittle, Dr John Raymond Gill and Dr Kelsey Fry for their kind donations.

Following on from the last newsletter, our Art Exhibition is now confirmed for week of 16 March 2009.

The Chris Beetle's gallery has very kindly agreed to provide a series of medical cartoons. Susan Aldworth, who was featured in an article in The Times last year, has also confirmed her enthusiasm to take part. For more information, visit www.susanaldworth.com/html_index.htm

Preview of Susan Adlworth's art

We are in contact with a number of other potential contributors but would be very pleased to hear from you about your own art, or any suggestions you may have regarding budding artists who may wish to take part.

Themes we feel would be appropriate include

- medically inspired art
- radiological techniques displayed as art
- art produced by people associated with radiology

If interested please contact Paul Goddard (paul-goddard@btconnect.com) or Sophie Erpicum (sophie.erpicum@bir.org.uk).

During the art exhibition week there will be related events such as a dinner, an auction and lectures.

An inside shoe look

Figure 1: The Adrian machine, one of the shoe-fitting fluoroscopes. Donated by Purdue University, courtesy of Paul Ziemer.

It's a normal day in the 1940s in the USA. You decide to buy a new pair of shoes. After a quick walk, you find a shoe shop. A glance inside, and you spot the pair you want to buy. You ask to try them on, to see if they are the correct size. The salesman then leads you over to the strangest box you have ever seen, something called a shoe-fitting fluoroscope! Now, what is that all about?

Shoe fitting with X-ray precision

A common fixture in shoe stores in the 1930s to 1950s, this particular device consisted of a vertical wooden cabinet with an opening near the bottom into which the feet were placed. Right below the opening, an X-ray tube produced an X-ray beam directed upwards towards a fluorescent screen located above the feet. When looking at this screen through one of the three viewing ports on the top of the cabinet (Figure 1), a radiographic image of the feet within the shoes could be seen by the customer, the salesperson and a third person.

Most units also had a push-button timer that could be set to a desired exposure time, e.g. 5–45 s. The most common setting was 20 s.

Origin and purpose

The inventor of this special box is not clearly known. It is assumed that more than one person contributed to its creation.

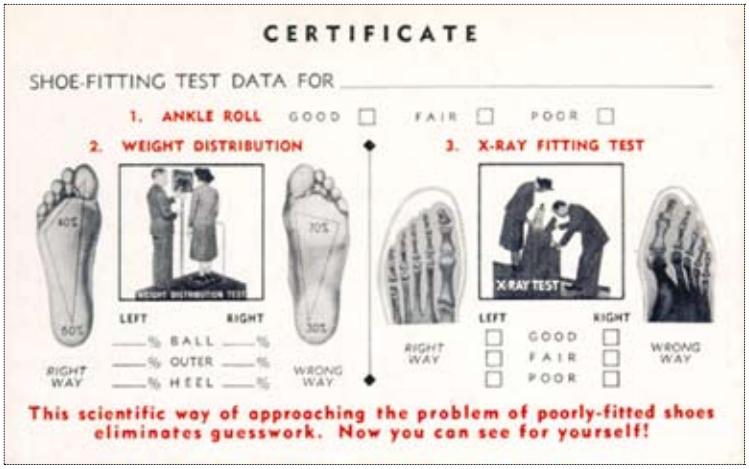
One story tells that it was built by Clarence Karrer in Milwaukee around 1924. Clarence worked for his father, a dealer in surgical supplies and X-ray equipment. After selling several such units to shoe manufacturers and retailers, he was asked by the Radiological Society of North America and other radiologists to stop because it "lowered the dignity of the profession of radiology". Clarence complied, but another of his father's employees quit the company and patented the device. This story comes from a letter written by Peter Valaer in 1978 in which Valaer recounted how he had a chance meeting with Karrer, who told him the story.

It is also said that Dr Jacob Lowe, a Boston physician, has the strongest claim to the title "inventor of the shoe-fitting fluoroscope". Dr Lowe created his first fluoroscopic device for radiographing feet during World War I. By eliminating the need for his patients to remove their boots, the device sped up the processing of the large number of injured military personnel who were seeking his help. After the war, he modified the device for shoe-fitting and demonstrated it for the first time at a shoe retailer's convention in Boston in 1920. Although he had applied for a patent in February 1919, it wasn't granted until January 1927.

At the same period, the Pedoscope – a similar device – was invented in the UK. The patent for the Pedoscope (No. 248,085) was applied for in 1924 and granted in 1926. Nevertheless, in 1925 the Pedoscope Company claimed that their device had been "in continuous daily use throughout the British empire for five years". (London Times, 31 December 1925).

End of that use, and why?

In the early 1950s, safety concerns about the radiation exposures from these devices spurred several professional organizations such as the American Conference of Governmental Industrial Hygienists, the American College of Surgeons, the New York Academy of Medicine and the American College of Radiology to issue warnings about the continued use of shoe-fitting fluoroscopes.



At the same time, the District of Columbia issued regulations that shoe-fitting fluoroscopes could only be operated by a licensed physiotherapist. A few years later, Massachusetts passed similar regulations requiring that such machines be operated by a licensed physician.

In 1957, the state of Pennsylvania became the first jurisdiction to ban the use of shoe-fitting fluoroscopes, and by 1960, these events, plus pressure from insurance companies, had led to the demise of the shoe-fitting fluoroscope, at least in the USA. In the end, the shoe stores were probably just as glad to be rid of the things – at least one survey had indicated that the machines were perceived by shoe salesmen as a sales gimmick rather than a useful tool.

Attempts to impose regulatory restrictions on the use of shoe-fitting fluoroscopes seem to have been limited to the USA. Despite considerable effort, Jacalyn Duffin and Charles Hayter, authors of the most in-depth historical study of the shoe-fitting fluoroscope "Baring the Sole: The Rise and Fall of the Shoe-Fitting Fluoroscope" (ISIS 2000;91:260–82), could not find any Canadian or British legislative action pertaining to these devices. In fact, Duffin and Hayter noted that these machines continued to be used in Canada and the UK, albeit to a limited extent, at least until 1970.

Sophie Erpicum

Acknowledgment

We would like to thank Paul Frame and Oak Ridge Associated Universities who supplied all the necessary information to write this article via their website: www.orau.org/ptp/collection/shoefittingfluor/shoe.htm

Scanning the BIR – Louise Rusha

1. What do you do at the BIR?

I work in the Events Department as an Events Officer. My role is to organize all of the BIR's scientific meetings as well as working on the ICIS Conference and completing registrations for all BIR meetings.

2. How long have you been working here?

I have been at the BIR for over 3 years now – how time flies!

3. What is your greatest strength as a person?

I am calm in a crisis and good at dealing with stress – qualities that can come in handy when working on events!

4. Who is the person you respect the most, and why?

I found it hard to think of one person I respect above all others, but the type of person I respect is one who is trying to change the world for the better and who promotes the values of equality and democracy.

5. What would you do if you had insomnia and had to find something to do to amuse yourself?

I would probably pick up a good book or settle down in front of one of my favourite films as these are two of my favourite things to do.

6. What is something you are really proud of and why?

Recently I have been really proud of organizing and running successful meetings for the BIR. It's always rewarding when something you've worked hard on is a success.

7. What three words would close friends probably use to describe you and why?

They would probably say I am loyal, happy and eccentric! As for the why I guess that it is fairly self explanatory!

8. What is your most treasured possession?

I have two, the first is an old glass paperweight which belonged to my Nan. It sounds really boring but I loved it as a child and when you look into it it's like looking underwater. The second is a silver ring which an old lady gave to me when I worked in a charity shop many years ago, it's a really pretty ring and she told me that her late husband had bought it for her when they had first started courting each other.

Sophie Erpicum

Conferences & Events

Changing Practices in Radiology

Wednesday 30 April 2008

Venue: The British Institute of Radiology, 36 Portland Place, London W1B 1AT
This meeting will look at issues dealing with the problems of running a radiology department, making new changes and introducing new services.

Evening Lecture: Does radiology have a sell by date?

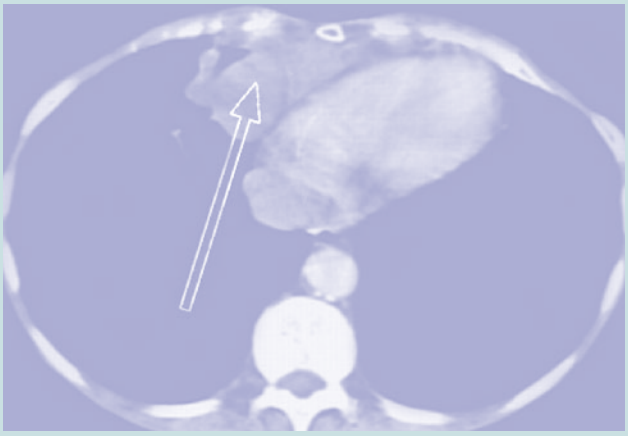
Monday 19 May 2008

Venue: The British Institute of Radiology, 36 Portland Place, London W1B 1AT
Wine and Snacks: 17.30–18.30, Lecture and **Discussion:** 18.30–19.30
An evening lecture by Prof. Andy Adam. This lecture will look at the role of the radiologist and technological developments within the radiological community.

Imaging Gynaecological Cancers: A Masterclass

Tuesday 20 May 2008

Venue: Education and Conference Centre, The Royal Marsden Hospital, London SW3 6JJ
This teaching course is for radiologists involved in multidisciplinary team meeting in gynaecological cancers. The aim of the meeting is to provide an update on the role of imaging and the clinical perspective in these cancers.



Publications

The Hounsfield Series: A new review series for the BJR

Starting with the May 2008 issue, the Editors are delighted to announce a new series of commissioned review papers for the *British Journal of Radiology*.

We will identify some of the most pertinent and topical subjects in the wide spectrum of radiological activity and commission eminent workers in the field to review their subjects. These papers will appear on an occasional basis. We are delighted to name this series the "Hounsfield Series" in honour of Sir Godfrey Hounsfield, whose invention of the CT scanner over 30 years ago, and the first publication in this Journal, revolutionized radiology. We are grateful to his family for permission to associate his name with both this review series and the Journal.

The series starts with a review of cancer risks in diagnostic radiology by Prof. Eric Hall and Prof. David Brenner of Columbia University, New York. Both are eminent authorities in this field and it is highly appropriate that a substantial component of their review deals with the dose implications of the burgeoning use of CT scanning.

The parallel development of magnetic resonance imaging will be the subject of our second Hounsfield review, to be published later this year, when Prof. Andrew Blamire of Newcastle University will address "The Technology of Magnetic Resonance Imaging – the next 10 years?" by Roger Harrison and David Pilling.

Special note to BIR members: You must now access the journal via the BIR website at:

http://www.bir.org.uk/member.html

Don't miss the first Hounsfield Review. Log on and sign up for free Table of Contents announcements today!

Boron Neutron Capture Therapy

Workshop for young researchers working in Boron Neutron Capture Therapy

Researchers working on Boron Neutron Capture Therapy (BNCT) come from a wide variety of backgrounds. They include clinicians working in radiotherapy and clinical BNCT, physicists and engineers working on neutron beam design, dosimetry and treatment planning, chemists working on boron compounds and biologists trying to understand and optimize the treatment using laboratory cell and animal studies. In September 2007 around 50 of the younger researchers in the field met in Birmingham for a workshop jointly sponsored by Cancer Research UK, the Engineering and Physical Sciences Research Council and Ion Beam Applications. A number of established members of the BNCT community were invited to give keynote presentations on aspects of this complex multidisciplinary field.

BNCT Basics

BNCT relies on the very high capture cross-section for thermal neutrons exhibited by the isotope ^{10}B. Introduction of boron preferentially into tumour cells followed by a suitable neutron irradiation can cause ^{10}B nuclei to undergo a nuclear reaction, the products of which deposit large amounts of energy into the tumour cells. BNCT is therefore a binary treatment, relying on the combined action of the boron compound and the neutron irradiation to provide the therapeutic effect. This is illustrated in figure 1 and in equation 1.

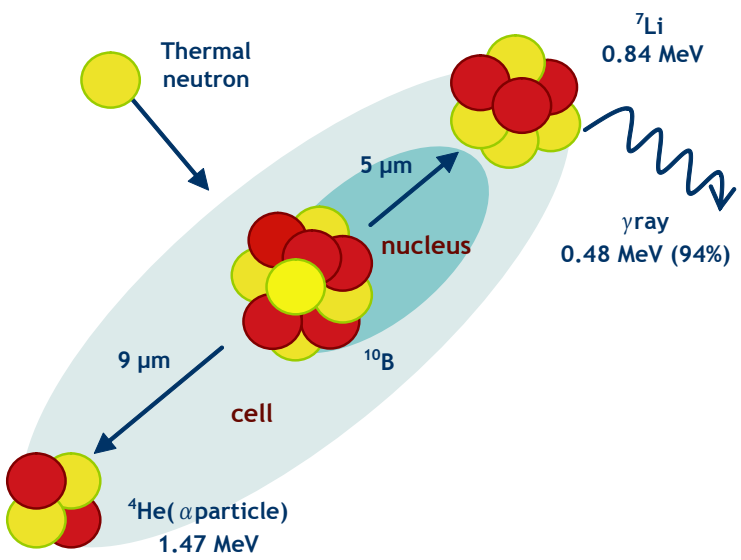


Figure 1: The BNCT reaction (from the presentation by Prof. Jeff Coderre, Birmingham 2007).

$n + {}^{10}B \rightarrow {}^{7}Li + {}_{2}{}^{4}He\ (\alpha) + \gamma\ (0.478\ MeV) + 2.3\ MeV$ (93 % of cases)

$n + {}^{10}B \rightarrow {}^{7}Li + {}_{2}{}^{4}He\ (\alpha) + 2.79\ MeV$ (7 % of cases)

Equation 1: The main BNCT nuclear reactions.

The ^{7}Li nuclei and alpha-particle reaction products have high linear energy transfer (LET), depositing their energy over a short distance in particle tracks with dense ionization. The combined ranges of these reaction products are comparable with the dimensions of typical tumour cells (around 10 µm for glioma cells) therefore achieving a very high degree of cellular targeting of the radiation dose. The energy released to the gamma-ray is not deposited locally and tends not to be a significant factor in determining tumour dose. It does, however, contribute to the dose to healthy brain tissue, as well as providing the potential for on-line imaging of the dose delivery.

Clinical experience with BNCT

BNCT is a highly experimental treatment modality. While thousands of patients have been treated with other experimental techniques such as proton therapy (around 55 000), ion beam therapy (around 7000), only approximately 600 have been treated with BNCT. In common with many experimental cancer treatments, initial clinical experience is obtained on cases with very poor prognosis. Patients with Glioblastoma Muliforme (GBM) are such a group. While traditional treatments have improved in recent years following the work of Stupp et al [1] using temozolomide administered concurrently with radiotherapy, patients generally die from uncontrolled local disease. There remains, therefore, a strong case for a targeted local therapy such as BNCT.

Clinical studies in Japan initially focused on treatment of glioma where results from around 150 patients with brain tumours have indicated that BNCT is feasible and produced long term survivors [2]. Further studies have followed in North America, Europe and Scandinavia, which have all shown efficacy and some have indicated increased longevity over what would normally be expected in these patients. Clinical programmes at reactor-based epithermal beam facilities are now underway at Helsinki University and VTT, Finland, at the JRR-4 reactor in Japan, in the Czech Republic and in Argentina. Through these studies we are learning how best to use this complex treatment modality, how to select patients who would benefit from BNCT, how to combine BNCT and conventional therapies and to explore a wider range of clinical applications.

The Birmingham Workshop

More than 50 participants came from UK, Argentina, Belgium, Finland, Germany, Italy, Japan, The Netherlands, Poland, Russia and USA for a 2-day workshop in Birmingham. The major keynote speakers dealt with areas such as boron compound development (Prof. Detlef Gabel, Bremen, Germany), treatment planning for clinical trials (Dr Tiina Seppälä, Helsinki, Finland), clinical BNCT studies (Dr Tetsuya Yamamoto, Tsukuba, Japan) and radiobiology (Prof. Jeff Coderre, MIT, USA).

There were a total of 25 oral presentations from young researchers offering a very good multidisciplinary programme with 4 talks on boron imaging, 2 on treatment planning, 7 on dosimetry of the epithermal neutron beams, 3 on accelerator development, 5 on radiobiology and 4 on clinical studies.

Very good updates were presented on the ongoing clinical studies using the JRR-4 reactor in Japan. Of particular note is the very promising work reported by Dr Nakai describing a small group of patients with glioblastoma treated by a team working at Tsukuba. The team at Tsukaba is able to offer BNCT, proton radiotherapy and conventional X-ray therapy, and perform studies comparing the efficacy and toxicity of each approach. Of interest now is the progress of this small group of patients treated with a combination of BNCT and external beam X-rays – essentially using BNCT with a combination of two boron compounds (BPA and BSH) to boost a dose of 30cGy in 15 fractions delivered with X-rays.

Figure 2: A patient being positioned for treatment at the facility in Helsinki (courtesy of Dr Tiina Seppälä).

Dr Seppälä reported the detailed work which has been performed in Helsinki. At this facility over 100 patients have now been treated with BNCT. These fall into the main categories of recurrent head and neck cancer, primary high grade glioma, and recurrent high grade glioma. The careful dosimetry and treatment planning which Dr Seppälä described has undoubtedly contributed to the success of the BNCT programme in Helsinki and the very positive experiences of patients undergoing treatment there. Their publication on treatment of Head and Neck cancer [3] received a number of positive press reports in 2007.

Figure 3: Experimental work in progress on the Birmingham BNCT facility.

Summary

In recent years, new beam facilities for BNCT have been developed and patient studies have been performed or are in progress around the World. BNCT has been shown to provide effective treatment in a number of patient groups and the recent expansion of the technique to treatment of Head and Neck cancer is producing encouraging results.

In the UK we have been active participants in the science of BNCT for many years. UK scientists have been involved in, and sometimes have led, the major studies to characterize the radiobiology of epithermal beams and potential boron carrier compounds [4]. Through the Birmingham project the UK will soon have an opportunity to contribute directly to the clinical development of BNCT [5]. An up-to-date view of the treatment room in Birmingham is shown in figure 3.

S GREEN[1], C WOJNECKI[1] and G CRUICKSHANK[2].

[1]Department of Medical Physics, University Hospital Birmingham, Edgbaston, Birmingham

[2]Department of Neuroscience, University Hospital Birmingham, Edgbaston, Birmingham

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Telecom Development Company Afghanistan

Roshan Brings Telemedicine to Afghanistan

What began as a Corporate Social Responsibility initiative for Afghanistan's largest telecom operator Telecom Development Company of Afghanistan trading as Roshan, could revolutionize the nation's healthcare industry.

Roshan launched its telemedicine project on 20 June 2007, linking the French Medical Institute (FMIC) in Kabul, Afghanistan with Aga Khan University Hospital (AKUH) in Karachi, Pakistan. At the time, just over 4 months after the project was soft launched in February 2007, approximately 40 to 48 scans or X-rays were being conducted on a monthly basis, in addition to which 10 to 15 training and continuous education seminars were occurring, according to AKUH.

Now moving into the second phase of the project, Roshan's end goal is to link all major regional hospitals in Afghanistan to AKUH through FMIC. The telemedicine project aims to deliver radiology treatment to Afghani patients who otherwise would not have access to such procedures.

After decades of civil unrest and conflict, Afghanistan has developed into a nation inhibited by a lack of resources and damaged infrastructure. Even as the country has worked to overcome its historical issues, healthcare services remain largely inaccessible due to the destruction of medical facilities and lack of qualified healthcare practitioners. Continued instability in the country has compounded the deficiency of medical talent as it remains difficult to recruit experts with specialized skills to train existing Afghan medical faculties.

In Afghanistan, one child in four fails to reach the age of five, the average adult life expectancy is about 42 years, 1 woman dies every 20 minutes from birth related complications. In light of the grim reality such statistics revealed about healthcare in Afghanistan, Roshan endeavoured to change the state of medical care in the nation through its Corporate Social Responsibility (CSR) Program.

The concept for the telemedicine project evolved during talks with FMIC and AKUH as well as the Ministry of Public Health in Afghanistan. Roshan agreed to fund and facilitate the creation of the telecom system that would make the telemedicine exchange possible. Meanwhile FMIC and AKUH determined the logistics of providing care via telemedicine.

While the current healthcare situation in Afghanistan would have guaranteed the sizable impact of any medical initiative, the decision to deliver radiology treatments through the telemedicine channel was made in response to the significant lack of qualified radiologists.

Direct connectivity schematic for FMIC (Kabul) to AKUH (Karachi)

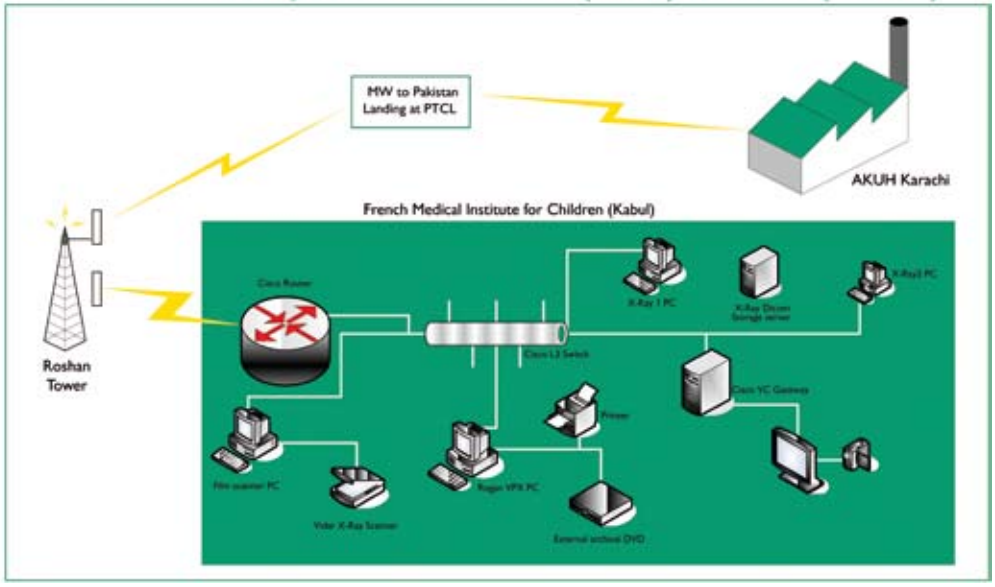

Figure 1: The French Medical Institute of Children in Kabul.

With the medical and structural components determined by Roshan, FMIC and AKUH, Roshan called upon Cisco Systems to donate the equipment. The foundation of the videoconferencing and digital image transfer systems was comprised of Roshan's existing SDH microwave network in Afghanistan in tandem with leased fibre circuits from PTCL in Pakistan.

The FMIC was linked to AKUH through a dedicated 2.048 Mbps (1 E1) data link. The facilities include the 3515 Unified Videoconferencing Multi Control Unit coupled with the Polycom VSX 5400 Presenter VTX. Donated by Cisco Systems Inc., in partnership with Al-Moayed NetLink Technologies, the system has enabled patients and physicians in Kabul to interact in real time with Karachi-based specialists.

In a nation where many regions have at best a doctor to patient ratio of one to 10 000, the immediate benefits of the videoconferencing system to patients at Kabul were obvious. What differentiated this project from other relief-focused efforts was the far reaching impact the system could have on the Afghani medical profession. Utilising the videoconferencing suite would extend beyond remote diagnoses.

Hospital administrators have already benefited from the videoconferencing technology as a means to conduct monthly administrative meetings. Additionally, Continuing Medical Education (CME) seminars will be held in videoconference format to ensure the staff of FMIC is kept up to date on the latest medical innovations and discoveries. Seminar participants are viewable on 42 inch plasma screens at each location with programs conducted in either multipoint or continuous-presence mode.

The next step in the telemedicine project will include the digitization of radiological images in Kabul, including X-rays and CT scans. Digitizion has been made possible due to discounts by Rogan and Vidar. The digitization process will enable data to be transferred directly from Kabul to Karachi where specialists can provide expert diagnoses. Sharing and transferring medical data between the two facilities will allow Karachi specialists to print images from Kabul and offer second opinions on difficult cases.

Applications of the technology will include the use of Rogan's ScanPro which will enable X-ray films to be digitized into DICOM format before being exported to the storage server. Additionally CT scans will be exported directly from the console to a storage server accessible from both Kabul and Karachi.

Over time, the telemedicine capabilities will be expanded to provide additional services. For the present, the telemedicine project's radiology focus will remain top priority as it moves into its final stages. It is anticipated that the second phase of the project, including the linkage of Kandahar Hospital and a rural hospital in Afghanistan with AKUH through FMIC, will be operational by year end.

The hospital incorporated in this phase of the project does not have a radiologist and currently all X-rays and scans are read by doctors. It serves a population of xx in a surrounding radius of xx kilometers. By joining the telemedicine network, this remote hospital's 100 X-rays per month will be able to be reported on by qualified radiologists from FMIC and, if necessary, by specialists at AKUH.

Shainoor Khoja, Director of Corporate Affairs
TDCA Ltd Roshan

BIR President's Conference - 24 April 2008

"Emergency Radiology – What you need to know to cover your on-call"

We are all becoming much more specialized in our day-to-day working. However, at night and at weekends we are expected to provide a general service to cover emergency requirement.

Most of us will have to be able to provide knowledge and skill to recognize and interpret conditions that may not fit into our normal everyday working experience. This can leave us feeling vulnerable.

This 1 day meeting is being held to discuss what is expected of us and from us, but also to explore potential different ways of working. Specialists in their fields have been asked if they can provide us with those "nuggets" of information that might help us avoid the "common" mistakes that are made by the generalist when reporting specialist work outside normal working hours.

It is impossible to cover all things for all people in a day course, but we hope this will go someway to help those who work in imaging to provide a comprehensive service outside our normal working hours.

Speakers: Dr Giles Maskell, Dr Fergus Gleeson, Dr Peter Guest, Dr Jo McHugo, Dr Tim Hodgson, Dr Madeleine Sampson, Dr Marina Easty, Dr Peter Riley, Dr Ian McCafferty.

More information and booking at www.bir.org.uk/Forthcoming_Meetings.html

Annual Dinner at the DALI MUSEUM

This year the BIR Annual Dinner will be held at an extraordinary venue – ***the Dali Museum***.

Located in the County Hall Gallery, this prestigious and innovative venue with a riverfront entrance has a direct view of "Big Ben" and is located right next to the London Eye.

We look forward to greeting you in the dreamlike labyrinth of one of the greatest surrealists and a creative genius of the twentieth century where the work of other prestigious artists such as Chagall, Picasso and Warhol are also exhibited.

To book your ticket, visit: www.bir.org.uk
For more information, contact Louise Rusha on 020 7307 1406

The Open Research Scan Archive

Creating an online archive of high-resolution CT images of museum specimens

The "Open Research Scan Archive" is a collection of high resolution CT scans of human and non-human crania. Due to recent advances in three-dimensional imaging software, detailed anatomical studies can be accomplished without ever having to rescan or handle any of the specimens again. The database is designed to continually grow and currently contains about 2500 scans. As each new scan is obtained it will be made available online in order to maximize its usefulness to researchers worldwide.

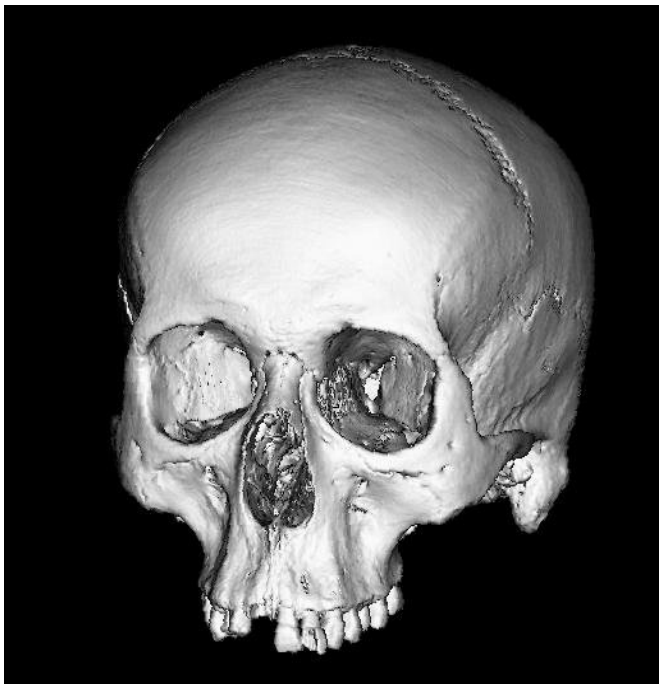

Figure 1: The rendered CT images, like this skull from the Penn Museum's Morton Collection, are useful in many areas of research. Volume, linear, and area measurements are all possible as well as many methods that allow comparison of specimens to each other.

Goals and aspirations :

The express purpose of the collection is to facilitate research in biology, skeletal biology, anthropology, medicine, and other related disciplines. It is hoped that the database will become a clearing house for CT data of all kinds, including CTs of fossil specimens. This database will allow us to better interpret such fossils by allowing us to place them in comparative perspective with other specimens.

Institutions have already contributed specimens to the collection, including:

- University of Pennsylvania Museum of Archaeology and Anthropology
- American Museum of Natural History
- Smithsonian Institution
- Columbia University Department of Anthropology

Specimens in the database :

The Samuel George Morton collection is housed and curated at the University of Pennsylvania Museum of Archaeology and Anthropology. The original Morton collection is composed of approximately 1200 human crania, most without mandibles, and collected from both archaeological and recent contexts (1820s to 1851). After Morton's death, his student, J Aitken Meigs, continued with the collection which totals approximately 1800 crania.

In addition, the database includes scans of three modern human crania along with scans of their matching plaster endocasts created by Ralph Holloway at Columbia University.

The five orangutan crania in the database come from the Harrison and Hiller's University of Pennsylvania Museum of Archaeology and Anthropology expedition to Borneo late in the nineteen century. All specimens were wild-shot, prepared in Borneo, and shipped to Philadelphia.

Most of the 20 chimpanzee (*Pan troglodytes*) specimens are from the American Museum of Natural History, from the von Lushen collection. The database also includes a few specimens from the University of Pennsylvania Museum of Archaeology and Anthropology, which were originally obtained as part of a gift from the Academy of Natural Sciences, Philadelphia. Unfortunately, no data accompanied the specimens on their age, sex, or geographic origin. All specimens date from the 1880s to 1890s.

Why CT?

The resolution possible from CT scanners is significantly finer than the degree of accuracy obtainable from direct measurements of the original specimen using calipers. Combined with currently available 3D visualization software, it is possible to take any measurement from the CT scans themselves. For most types of research this eliminates the need to touch the actual specimens again, minimizing the likelihood of damage. It also means that, given the appropriate software, research on these specimens can be done anywhere.

CT scans reconstruct internal structures that are not studied externally. Studies of the evolution of bipedalism, for example, have included analyses of the orientation of the inner ear. In the absence of CT, this would not be possible without destroying specimens.

Figure 2: The CT archive contains not only human skulls and other skeletal elements, but also comparative primate materials like this chimpanzee skull.

Recent advances in 3D image analysis for clinical research allow for new and more powerful studies of complex geometry of the skull. For example, algorithms have been developed that allow several brains to be morphed into a common coordinate system for use in functional brain imaging. This allows more accurate comparison of brain activation across individuals with brains of different sizes and shapes. We have begun applying these algorithms to create high-resolution 3D maps of individual variability in morphology.

This information is routinely discarded in functional imaging studies once individual functional scans are morphed into the same brain space; however, it is an extremely rich source of information that can be used to study shape in much more sophisticated ways than has been possible previously.

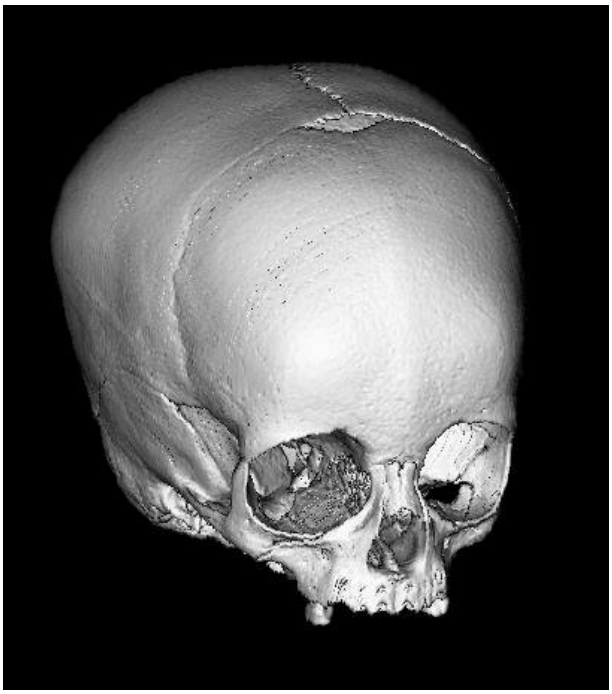

Figure 3: The archive contains over 250 CT scans of children ranging in age from 8 fetal months to 16 years of age.

Current research on this data :

Several studies have already begun on scans in the "Open Research Scan Archive" database including studies on:

- How well do handmade plaster replicas of the endocranium (inside of the braincase) match the actual endocranial surface? Are there any systematic biases introduced by a plaster method?
- How do ape endocrania differ from human endocrania? By morphing ape and human images together, the differences between the two specimens can be characterized in three dimensions, on a voxel-by-voxel basis, maximizing the chance of extracting meaningful information from fossil endocasts.
- How does the placement of the foramen magnum

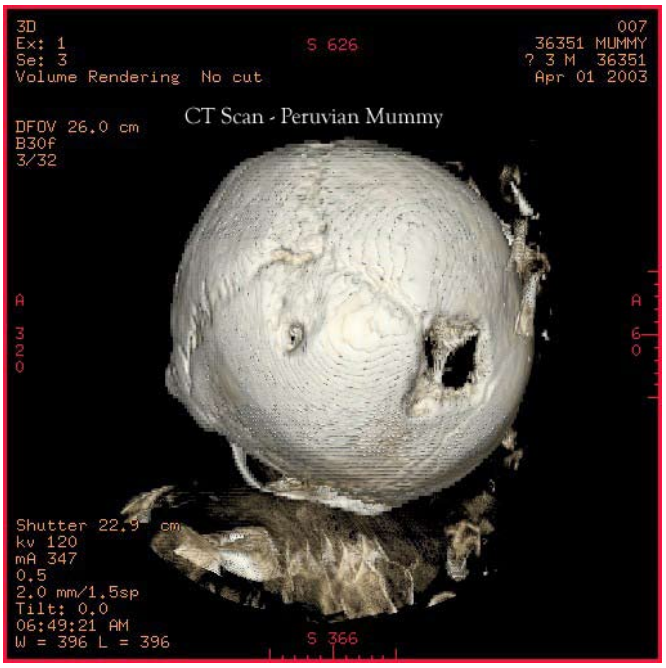

Figure 3: In addition to scanning the skeletal collections, the Open Source Archive project also images mummified remains in the Penn Museum collections. This Peruvian mummy was CT scanned and the wrappings removed virtually revealing two healed trepanations (one on the frontal bone and one on the parietal bone).

(where the spinal cord exits the base of the skull) differ with respect to other features of the cranial base in bipedal humans *vs.* non-bipedal apes?

- What is the functional purpose of large supraorbital tori (brow ridges)? By morphing a large sample of modern human crania into a common coordinate system, one can describe the variability on voxel-by-voxel basis. One can then map the extent to which variability at each point correlates with things like the size of different aspects of the masticatory system.

Access and facilities :

The CT image database is stored on computers in the "Open Research Scan Archive", which is housed in the University of Pennsylvania Museum of Archaeology and Anthropology.

An online informational database allows researchers to search the collections based on user-defined criteria. The website address is: http://jmonge01.anthro.upenn.edu/~ctdatabase/pennct/. Researchers would then either come to work on the data at our lab, or have their scans sent to their own labs on CD or DVD.

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Work[2] by other researchers has also beneficited from this archive. Markus Bastir and colleagues recent study of the anatomy of the middle cranial fossa was facilitated by scans from our archive, for example.

Reference

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2. Bastir M, Rosas A, Lieberman D E, O'higgins P, "Middle cranial fossa anatomy and the origin of modern humans: the anatomical record", 2008;291:130–140

UKRC 2008 - An invitation from the Congress President

It hardly seems like yesterday that we were listening to Stephen Horii deliver the Mayneord Lecture on PACS: Past, Present and Future at UKRC '07. Well I am pleased to announce that the UKRC 2008 programme has been completed. This year the AGFA Mayneord lecture will be delivered by Graeme Bydder on the intriguing topic of "Magnetic resonance and direct imaging of short T_2 relaxation components in tissue". We are told that the lecture will "Explain the MR imaging of previously invisible tissues using clinical MR scanners".

Professor Peter Wells, a former President of the BIR, will deliver the IPEM Mallard lecture "Ultrasonic Imaging: an Holistic view" which will include a focus on the main areas of current ultrasonic imaging research.

Adrian Thomas has once again organized a fascinating History session, including talks on "the development of ultrasound", "X-ray therapy and the early years" and a talk on Henri Becquerel. This year sees an innovation with case based interactive sessions for clinical topics covering a wide range of general radiology. Highly topical sessions on "Imaging the Fetus" and "Cardiac imaging from Birth to Death" promise to be as captivating as their titles.

Innovation is the key word at UKRC 2008 and a major initiative with industry partners will be an exciting series of satellites sessions to be held in the exhibition hall. Featured topics include the intriguing subject of "Ambient experience – a new experience for patients". Cutting edge CT satellite symposia include "applications of dynamic volumetric CT" and also "dual energy CT". All this and much more is available in the online programme at www.ukrc.org.uk.

UKRC is conscious of its carbon footprint and is going green with a series of initiatives. If you see an opportunity to go green, please let us know.

The Congress Dinner on the Tuesday night has been restyled this year and promises to be an exciting event. I am told that there will be magical entertainment… the detail is a well kept secret!
I extend a very warm invitation to UKRC 2008 and look forward to meeting you there.

Dr Stephen G Davies
UKRC President 2008/9

MAGNETOM Verio

Innovations in MRI

The new MAGNETOM Verio 3T and MAGNETOM Essenza 1.5T are trendsetting innovations that help to improve patient comfort and workflow, whilst also delivering a return on investment.

The Verio provides 3T field strength, 70cm Open Bore and Tim™ (Total Imaging Matrix) together in one powerful system, delivering high-field imaging to many patients who could not benefit from the technology before. It is the shortest 3T system available today, with an ultra-light magnet, so from the outset the capital cost has been reduced and siting requirements minimised without compromising performance. Its functionality ensures higher throughput and more referrals, which in today's competitive environment, puts you at the forefront of MRI.

The Essenza 1.5T offers high performance and a wide feature set that improves diagnostic confidence. With a much lower set up, maintenance and running cost than the industry has seen before, the Essenza is an affordable, reliable powerhouse that brings high field MR to sites where previously it had not been financially viable, and to established sites wanting to improve throughput.

SOMATOM Definition AS

Answers for Life

The demands on the modern healthcare environment continue to be felt at all levels, especially by those serving the daily needs of the patient on the clinical front line. Meeting both critical and immediate needs are the driving force behind the leading manufacturers to deliver equipment that has proven clinical benefits to satisfy the expectations of the 21st century healthcare environment.

Siemens' latest innovations in the field of MR and CT do just this, setting new standards and establishing new benchmarks in their fields. These offer advanced imaging functionality for routine and specialised clinical procedures at a much more viable cost and are valuable additions to a range of products that are already synonymous with leading edge technology, applications and workflow.

The content of this page has been contributed by and is the sole responsibility of Siemens

Advancements in CT

The SOMATOM Definition AS and AS+ set new standards in CT as the world's first adaptive scanners, adapting to any patient or clinical need in routine diagnostic work and complex examinations. Both configurations will help with patient throughput and deliver high quality images for accurate clinical diagnosis making them a prudent choice for cost efficient healthcare.

The functionality of the SOMATOM Definition AS delivers fast and efficient head-to-foot scanning with its scan length of up to 200cm with a 78cm gantry opening and its Adaptive Dose Shield, which ensures the patient is only exposed to a clinically relevant radiation dose.

The Definition AS+ takes this functionality further, combining extremely fast coverage with up to 128 slices per rotation whilst maintaining delivery of crystal-clear images, free from movement artefacts and showing the finest anatomical details. It also takes cardiac imaging into a new league offering an unequalled high temporal resolution of up to 150 ms, and introduces a new Adaptive 4D-Spiral enabling functional studies to be performed over entire organs.

Case Study: Speeding up diagnosis and minimising patient anxiety

Great Ormond Street Hospital, a national centre of excellence in the provision of specialist healthcare for children, recently opened a new state-of-the-art MR & CT Imaging Centre.

The new facility, developed to provide a high quality diagnostic imaging and interventional treatment service, is equipped with the latest imaging technologies from Siemens.

Modern technology usually means that less invasive procedures can be provided, which helps to reduce the anxiety usually experienced by young and unwell children and their parents. For example, an MRI scanner has been combined in the same room as a Cardiac Angiography suite connected by a 'Myabi' patient transfer table.

This unique hybrid solution developed by Siemens in partnership with Great Ormond Street Hospital allows two different examinations to be carried out, one immediately after the other, without needing to re-anaesthetise the patient. This is especially useful in the research and clinical application of non-invasive heart surgery using advanced catheterisation techniques.

The SOMATOM Definition Dual Source CT Scanner also forms part of the new facility. Dr. Catherine Owens, Consultant Radiologist at Great Ormond Street Hospital states, "The CT scanner provides a unique opportunity to undertake state-of-the-art cardiac CT in children without the need to use beta-blockers to slow the heart. We have undertaken 600 cardiac CTs at Great Ormond Street Hospital in the last 3 years and hope to utilise the new scanner to its maximum capacity working closely with physicists to enable significant radiation burden reduction to all of the children undergoing head and body CT, as well as cardiothoracic CT."

SIEMENS

Covered in Dust: Memento mori

The Latin phrase "memento mori" can be translated as "remember that you are mortal" or possibly "remember you will die." This remembrance of our mortality has been depicted in many ways in European art including the well known "Dance of Death". Perhaps the closest indication of our mortality was finally realised by the ability of us to see our own skulls following the discovery of X-rays in 1896. Many greeted the new images with a sense of horror.

I love old postcards. The two depicted are from the early twentieth century and both have a romantic theme. The card "Röntgen (X) Rays" shows the young couple in the back of the cab revealed as two skeletons. The other card called "L'amour of Perriot" shows the couple at a table and the whole image is forming a skull. All things pass and we are all walking skeletons.

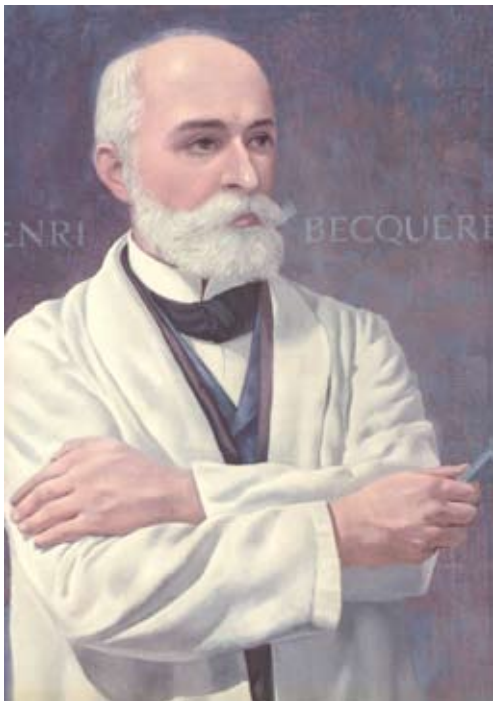
We are now so used to seeing images of the inside of our bodies that the sense of the macabre that greeted Röntgen's discovery has almost entirely passed. This is a good thing for our internal anatomy has its own beauty.

Adrian Thomas
Honorary Librarian and Archivist

Dates in Radiology: Henri Becquerel

2008 marks the centenary of the death of Antoine Henri Becquerel. Antoine Henri Becquerel was born in Paris on 15 December 1852 and died at Le Croisic on 25 August 1908.

He was a member of a distinguished French scientific family. Becquerel was appointed to the Chair of Applied Physics at the Conservatoire des Arts et Metiers in Paris taking over from his father Alexander Edmond Becquerel. In 1892 he was appointed as Professor of Applied Physics at the Paris Museum and became a Professor at the Polytechnic in 1895.



Becquerel was interested in phosphorescence throughout his career and in 1896 he discovered the phenomenon of natural radioactivity. This was subsequently investigated by Marie and Pierre Curie. For his discovery Becquerel was awarded half of the Nobel Prize for Physics in 1903, sharing it with the Curies. It was Marie Curie who coined the word radioactivity.

In spite of the many contributions of Antoine Henri Becquerel he remains less well known when compared with Wilhelm Conrad Röntgen or to Marie and Pierre Curie. As yet no full length biography has been written of Becquerel in English.

Adrian Thomas
Honorary Librarian and Archivist

President's Column

It's that time of year again! I found myself eating the last two squares of chocolate today wondering when I had eaten the previous ten or so…? It had been a very busy morning. A professor of intensive care medicine very kindly slipped a note under my door while I was participating in a teleconference for the National Imaging Board to ask if I could CT scan an ITU patient and if necessary insert a drain into any collection. The radiographers must have warned him that I had asked them to stop anyone disturbing me unless it was a dire emergency. One pigtail catheter insertion later I still had the remainder of the list to report. Most of us still have to deal with the increasingly difficult task of becoming specialists for much of our everyday work but retaining enough general skills to competently manage a wide range of pathologies. This is particularly challenging on call when we do not have ready access to other colleagues. This also applies to most healthcare professionals.

I have organized the next President's Conference with this in mind. The theme of this day is "What you need to know to cover your on call". I thank my speakers in advance. I hope that the day will help us all think about what skills we should have and what we should be prepared to undertake on call. I also hope that the speakers will share with us the knowledge that we really need to know. The date is 24 April and the venue is the BIR. Book now! I want this to be "sold out".

The reconstitution of the Branches is progressing well, and many of the current Branch representatives wish to stand for election to the BIR Council. New Branches will be formed over the coming year, and we plan to do more to promote Branch events both locally and throughout the UK. I hope that members will actively support this initiative and participate in their Branches, since one of the intentions of the reorganization is to offer a wider geographical choice for BIR meetings with multidisciplinary participation. I am looking forward to speaking at the Welsh Branch Spring meeting in Cardiff on 22 February.

A Special General Meeting was held on 14 January to approve changes to our Byelaws. Changes were necessary to encompass the Branch changes and also to simplify the process of membership application, and to reflect the increase in the number of Council meetings to six a year, which enables all the trustees of the BIR to have a greater involvement in the running of the charity. Committee Chairmen now meet three times a year with each other to enable greater communication and sharing of ideas. This will hopefully lead to joint meetings and perhaps more research collaboration. They then attend the Council meeting in the afternoon to share their ideas with trustees.

The evolution of the Institute depends upon us, its members. We all have views, ideas and beliefs about our professions. As a group of professionals we are better placed to influence our current environment and our future if we speak as the BIR rather than as individuals.

Dr Julie Olliff

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