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Contents

Editorial Notes

This issue of our journal is interesting with three good papers. Alan Jennings has given us a superb account of the great Sidney Russ and an account of the development of Medical Physics in the UK.
Alfredo Buzzi has written a splendid account of the complex figure of Egas Moniz with lovely illustrations.
Do come and visit the RHHCT stand at UKRC in Manchester later this year.
Also -
Do send me material, preferably on disc/CD. Personal accounts are always welcome

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I am always interested in material for the web site. Please send me material which I will consider for inclusion.

The British Society for the History of Medicine: The Poynter Lecture 2004.

The 2004 Poynter lecture is entitled 'Experimental Lives: Medicine and the Lunar Society 1760-1810' and is by Jennie Uglow, Author of The Lunar Men.
It is to be on Wednesday 17th April 2004 at 3pm followed by tea at 4.15pm. The lecture is in the Wellcome Building, 183 Euston Road, London NW1 2BE and is in the Franks I & II rooms. The cost is £5.00 (cheques payable to BSHM) and bookings must be in advance from the Secretary of the BSHM Dr Ann Ferguson, New Barn, 39a Grange Road, Broadstairs, Kent CT10 3ER . Her e-mail is: annferguson@doctors.org.uk .

The 2005 BSHM Congress is from 1st – 4th September 2005 and is in Exeter. Do put the date in your diary and come along and present a paper!

EGAS MONIZ

Alfredo E. Buzzi, M.D. *

Neurosurgery advanced quickly after the introduction of pneumoencephalography and ventriculography by the American neurosurgeon Walter Edward Dandy (1886-1946) in 1918 and in 1919, but many neurologists were unsatisfied for the lack of precision of these methods in localizing cerebral tumors.[2,16]

One of them was the Portuguese physician Antonio Gaetano of Abreu Freire, born in November 29th,1874, in Avanca, *(Figure 01)* a small village 40 km. near Oporto, son of Fernando de Pina Rezende Abreu and Maria do Rosario de Almeida e Sousa.[2, 11,12,13,16,14,22]

Figure 1: In this house was born Moniz in 1874.

1. MEDICAL EDUCATION AND POLITICAL INVOLVEMENT

Being a boy, his uncle Abbé Caetano de Pina Rezende Abreu Sa Freire, a Jesuit priest, proposed him to use the name of Egas Moniz, an historical figure of the XII century, hero of the resistance against the Moors, of which the family had origin.[5,13,15,16] This name superseded his original one, which fell later into oblivion.

Before his initiation in university life he doubted between Medicine and Engineering, attending preparatory courses of medicine and classes of Integral and Differential Calculation at the same time. A regulation disposition prevented

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him to continue Engineering, so he decided to direct his university life towards Medicine. He always kept his interest in mathematics. He published with a schoolmate an essay on algebra, and he was devoted to private teaching of mathematics.[8,16]

He obtained his medical education in Coimbra, a famous Portuguese university at the north of Lisbon, where he entered in 1891 *(Figure 02)*. He graduated in 1899, and wrote as a doctorate thesis a book of two volumes "On the sexual life" (close to 600 pages). This book was a great success, and in the following decades reached 19 editions. [5,8,15,16]

Figure 2: Egas Moniz in Coimbra, when he was 19 year-old.

That same year of 1899 the citizens of Estarreja, a small town near his native village, elected him to the Parliament as their deputy.[5,8] He created and directed the Center Party. Later he was Deputy for the Progressive Party.[16]

He liked music, blew the trumpet in a band, and also had great attraction for theatrical performances.[5]

En 1901 he married Elvira de Macedo Dias, a pretty brunette born in Rio de Janeiro, Brazil.[5,13]

In 1902 he went to France to study neurology and psychiatry. First in Bordeaux, he studied next to Albert Pitres (1848-1928) and Louis Henri Vaquez (1860-1936). He worked later with Emmanuel Regis (1855-1918) in the study of the toxic psychoses (adhering from that time to the concept of the organic causes in the etiopathogenesis of mental diseases). Then he went to Paris, and in the Salpetriére he deepened his neurological studies with Fulgence Raymond (1844-1910), Pierre Marie (1853-1940) and Jules Dejerine (1849-1917), and especially in the Pitié, with Joseph François Félix Babinski (1857-1932).[5, 11,13,15,16,20,22]

In 1903 he returned to Portugal, and was appointed Associated Professor of Anatomy and Pathology, and soon was a Full Professor at the University of Coimbra, position that he would occupy up to 1911.[5,11,12,20]

As a young man Egas Moniz became strongly involved in politics, and he served several times in the Portuguese chamber of deputies. His interest in politics would take him away momentarily from medicine: between 1903 and 1912 he only published one scientific paper.[5,8,13]

When King Carlos of Portugal and his older son were killed in 1908, Moniz and some of his friends were imprisoned during 10 days. There were struggles between republicans and monarchists up to 1911, when the formers arrived to the government. The new government created a Chair of Neuropsychiatry at the School of Medicine of Lisbon, and Moniz was the Chairman until 1945, when he retired, sharing the educational tasks with the functions of Dean in several periods. With Flores (pupil of Oskar Vogt) he organized a Neurological Clinic in Santa Marta's School Hospital, where he finally began his clinical studies that many times faced the topic of cerebral tumors.[5,12,16,20]

In 1918 he updated in the monograph “Neurología da guerra” (“War Neurology”) the progresses at that time. In 1923 he was interested in lethargic encephalitis, and in 1925, in commemoration of the first Centennial of the Royal School of Surgery of Lisbon, under the auspice of the school of Medicine, he published “Neurological Clinics”.[16]

He was designated Portuguese Ambassador to Spain near the end of the World War I, *(Figure 03)* and in 1919 President Sidonio Pais chose Moniz to be Portugal’s Foreign Office. He presided the Portuguese Delegation in Versailles in 1919, and his signature appears in the Treaty of Peace with Germany (Treaty of Versailles), which was signed on June 28, 1919.[2,5,11,12, 13,15,20,22] In Portugal, Sidonio Pais was assassinated and Dr Afonso Costa was sent to Paris. A loud argument arose between the polite Moniz and the bully Costa, and it ended in a duel. Moniz returned to Portugal, tired and extremely disappointed. His open-minded attitude and his intellectual honesty were not suitable for the political arena.[5]

Figure 3: Egas Moniz in Madrid (1918).

Egas Moniz returned to his Chair, and reassumed the regular routine of rounds, lectures and publications of clinical cases.[5] He also pursued his interest in history and art and their relation to medicine

2. CEREBRAL ANGIOGRAPHY (ARTERIAL ENCEPHALOGRAPHY)

For that time (1924-1925) the works of Jean Sicard and Jacques Forestier with Lipiodol became known; and Evarts Graham and Warren Cole had demonstrated that using tetrabromophenolthphalein it was possible to visualize the gallbladder.[2,5, ,9,16,18]

Moniz centered his attention in problems of the spinal canal, studied by the new method of myelography, but the problem of the diagnosis of abscesses and tumors of the brain persisted. Since the subarachnoid space could be seen with Lipiodol, the cerebral ventricles with air, and the gallbladder with bromide and iodine, Egas Moniz thought that if he could find an appropriate chemical substance he could stain the brain tissue itself.[2,5,16]

He started giving 40 gm of lithium bromide orally (the usual dose was 3 to 1 gm) to patients in the hope that it would make the brain radiopaque against the ventricular system, but he obtained negative results.[5,7]

Later he thought of using arterial injections of bromide solutions, and to determine it usefulness he made experiments with different concentrations of lithium, ammonium, potassium, sodium and strontium bromide in fine glass tubes that he put behind the skull. The positive results that he obtained made him infer that the blood vessels filled with these substances would be visualized as well.[5,8,16,22]

In those days of December of 1925, Pedro Almeida Lima *(Figure 04),* a young doctor and son of a physics professor whom Moniz knew well, presented himself.[5,8]

Figure 4: Pedro Almeida Lima

Moniz's hands were severely deformed by gout (in public places, people that only knew him by his fame recognized him by his hands), so the collaboration of Almeida Lima became indispensable in trials of carotid injections, which Moniz had started to contemplate just then.[5,7,8]

With Almeida Lima's help, Moniz started vascular experimentation. If Enderlen and A. von Knauer in Germany and L. Benedek in Hungary injected drugs into the carotid arteries of neurosyphilitic patients without harm, he could inject bromides into his patients to opacify the vessels. He considered the idea of using Lipiodol, but feared that it might cause emboli.[2,11,7,8,19] He made experiences in dogs and rabbits and proved that bromides were harmless for animals.[2,5,7,11,15,16,21,22] To check the tolerance in patients, he began in 1926 to inject bromides intravenously in growing quantities (2cc, 5 cc and 10cc) and concentrations (10% to 80%). The patients, epileptics and Parkinsonians, had a hot sensation and they developed nasty headaches. He added 10% glucose, but the reactions were still appearing, and some patients developed painful infiltrates at the site of injection. He abandoned the intravenous route, and started experiments in animals injecting bromides into arteries, hoping that those be less sensitive than veins. The fifteen injected dog showed the ramifications of his cerebral arteries nicely.[5,8,15]

To get familiar with the arterial distribution of the human brain, Moniz obtained the permission to decapitate cadavers from the Institute of Anatomy and to transfer the heads to the X-ray Department of Santa Marta's Hospital, where with Almeida Lima they could inject material into the carotid or vertebral arteries.[5,8,16]

The first patients were injected percutaneously into the carotid artery with a solution of 70% strontium bromide.[2,5,16,22] In the first four cases he didn't observe contrast in the films (they injected 2 to 5 cc only.). The movement of the patient's head to the lateral position resulted in extravasations of the contrast, and Moniz decided to abandon the percutaneous approach.[5,7,8]

He asked a surgeon, Antonio Martins, to make a cut down and inject by direct vision, after the dissection of the artery.[2,5,7,8,22]

In the sixth patient, a 48 year-old man who had Parkinson's disease, some few carotid branches appeared fairly in the third film: the first reward for their persistence. However, the patient developed carotid thrombosis and died 8 hours later.[5,8,18]

Conscience tortured Moniz. He was doubtful to follow the examinations, and summoned his associates to his house to discuss whether or not they should continue. They concluded that thrombosis was probably induced by the compression of the artery during the injection that they did to prevent the blood from washing out the contrast material. The bromides could also have irritating effects in such high concentrations. Later considerations induced them to abandoned the compression of the artery during the injection, and to change the bromides for iodide.[2,5,8,15,22]

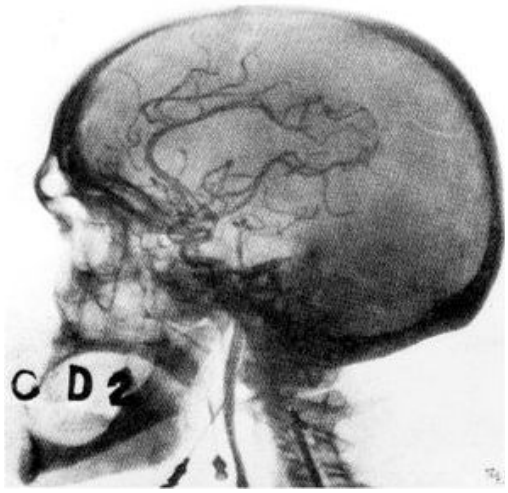
In the U.S.A., Donald Cameron, surgeon of the Minnesota Hospital, started experiments on contrast materials for pyelography in 1918. He was called to active service in the United States Navy. At Fort Wayne Hospital he obtained nice pyelograms in guinea pigs and later in patients with 25% to 50% potassium and sodium iodide.[5] In Argentina, Carlos Heuser *(Figure 05),* one of the best known radiologists by the second decade of the XX century, founder of the Sociedad Argentina de Radiología (Argentine Society of Radiology) and the first

to use Lipiodol for hysterosalpingograms in 1921, gave in 1919 an account of the use of sodium iodide in urology . Probably just letting his fantasy loose, he said: "… I injected the potassium iodide intravenously and on the film taken one could observe that the veins of the hand and forearm were made visible. In a child with hereditary syphilitic lesions I have seen on the film the iodide in the heart. Would this represent progress? I point this out to those who have a hospital service available, because it is a new way to examine the veins and the pulmonary artery".[10] It was a brilliant flash of inspiration, but no echo followed, neither in the U.S.A., nor in Europe, nor in Argentina, nor in the other Spanish-speaking South American countries. Heuser, himself, did not make anything of his own momentary vision of angiography. But iodide demonstrated to be an useful and secure contrast material.

Figure 5: Carlos Heuser (1878-1934)

Moniz started all over again. Intravenous trials were made first, and tubes containing iodine solutions of different iodine salts in different concentrations were put behind the skulls *(Figure 06).* Then, they made injections into the carotid arteries.[5,8]

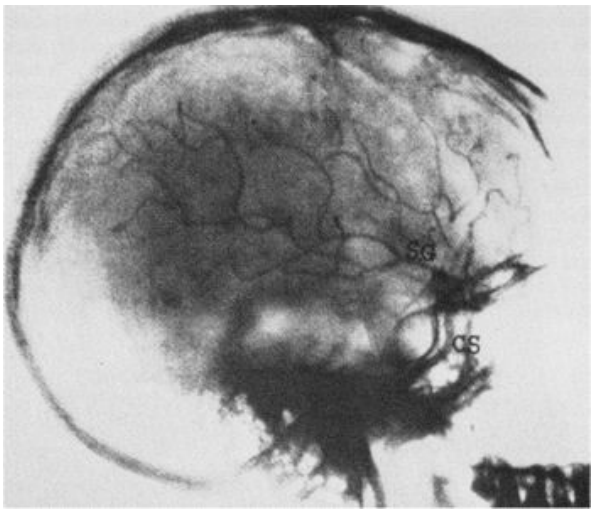
Figure 6: Injection of 30% sodium iodide in a head preserved in formalin (1927)



The new series of trials in patients began with 5 cc of 22% sodium iodine, without positive results.[2,5,8,15,22]The second case showed some contrast in the carotid, but not in the branches. Moniz and his collaborators realized that they had aspired blood into the syringe before injecting, and that this diluted the contrast material.[5]

The third case of this series with sodium iodine (and the ninth since they began the experiences) was a 20 year-old young man, who had a pituitary tumor and a Babinski-Frohlich's syndrome. Clearly defined branches became visible in the films *(Figure 07)* . It was June 28, 1927.[2,5,8, 11,16,18,22]

Figure 7: First successful carotid angiogram



He described "the carotid displaced forward, and without its normal superior curve. The middle cerebral artery, quite visible, is displaced forward and upward. The anterior cerebral artery has a different position from which we usually saw, and is very thin and not very clear". He attributes to the tumor the cause of these alterations of the position of the arteries, but, cautious, he pointed out: " ... on this point we cannot emit a sure opinion". Nevertheless, his conclusion was irrefutable: "The demonstration of our thesis is made. Radioarteriography of the brain can be obtain in living patients, and it can provide us elements for the localization of tumors".[16]

He published the first paper on cerebral angiography in pages 48-72 of the first volume of *Revue of Neurologie* (July, 1927), entitled "L'encephalographie artérielle. Son importance dans la localisation des tumeurs cérébrales" ("Arterial Encephalography. Its importance on the localization of brain tumors").[2,12,14,15,16,22] This historical article was followed by another two the same year: "Injections carotidiennes et les substances opaques" ("Carotid injections and opaque substances") in *Presse Médical*, and "La radio-artériographie et la topographie cranio-encéphalique" ("Radioarteriography and cranio-encephalic topography") in *Journal de Radiologie et d'Electrologie*.[15]

Immediately, Egas Moniz announced a presentation in the next meeting of the Society of Neurology of Paris. After another successful case, he left Lisbon on July 3rd, 1927.[5,11]

In Paris he met his old teachers and friends Joseph Babinski and Alexandre-Achille Souques (1860-1944). The morning before the presentation, he went to the Necker Hospital to visit Jean Athanase Sicard *(Figure 08)*, already famous for his studies with Lipiodol. Sicard was examining a patient, he turned to his students, without noticing the presence of Moniz, and commented: "If we could design a method for the brain analogue to the Lipiodol for the tumors of the spinal cords, the cerebral surgery would advance quickly". Then, noticing the presence of Moniz, he told him: "Oh, you are here, Mr. Moniz. Is there something that you brings us from Portugal to locate cerebral tumors"?. His lightly ironic expression change to surprise when Moniz showed him the films.[5,11,16]

Figure 8: Jean Athanase Sicard (1872-1929)

The next day, July 7, 1927, Moniz presented his paper. The films and his charisma conquered the audience. Babinski, Sicard and Souques had only words of praise.[5,8] The trip to Paris had a complete success.

Back in Portugal, Moniz proposed to his associate the surgeon Martins to made injections in the arms and the legs in order to obtain arteriograms, but due to objections of the Chief of his Service, Martins could not follow the suggestion of Moniz. Also, he could not continue helping him anymore, although many doctors of other services were interested in their work and disclosed the technique. However, others accused Moniz of causing harm in their patients. The Professor of Internal Medicine, the most important man in the School of Medicine, didn't allow the procedure to be used in the University Hospital.[5,8]

The intrigues arrived further on: some members of the School of Medicine tried to drag Moniz into political disgrace. With his usual diplomatic skill, he evaded the incident so well that his department was soon elevated academically at the level of Institute for Scientific Research.[5]

Egas Moniz made a presentation of his films with the corresponding patient at the Amphitheater of the School of Medicine of Lisbon in the summer of 1927. At the end, an Associated Professor of Surgery, Reynaldo Dos Santos, asked him: "Doesn't it seem that the method you presented could be equally well applied to the extremities"?. Moniz answered: "But certainly and with the least

apprehension. I think it would be a credit on your account. You could bring elements of diagnostic as well as therapeutic value to enrich vascular pathology of the extremities". Dos Santos commented: “This is what I believe. I will attempt the arteriography of the extremities at once”.[5,8]

Figure 9: Reynaldo Dos Santos (1880-1970)

Although Antonio Martins should have been the first in using the method of Moniz in the extremities, the limitations imposed by his superiors prevented him to did it, and a tragic misfortune that concluded early with his life (his rifle was shot while he cleaned it) preclude his name to occupies a more important place in the history of the angiography.[5] Reynaldo Dos Santos deserves the credit of having introduced aortography in collaboration with the radiologist José Pereira Caldas and the surgeon Augusto C. Lamas in 1929, and has was the first in using arteriography widely in many medical and surgical illnesses.[5,14,21] But this is another story.

In 1928 Egas Moniz was invited to give lectures to Belgium, Argentina and Brazil. In Brussels his affable character and his surprising X-rays deserved him the success, but in Rio de Janeiro and in San Pablo the victory was total. His wife was carioca, and Moniz moved in his own element, the Portuguese language.[5]

Egas Moniz returned as Member of the Brazilian Academy of Sciences, and soon learned of the first publication in Germany on the use of his method by Fedor Krause, in April 1928, and, one month later, in England, by Worms and Maio.[5]

It was Moniz’s task to join cases, to confirm the angiographic diagnosis by autopsy and histology, and to prove the validity of his method not only by design but by numbers.[5]

But carotid angiography was the center of its attention. He made injections in an opened field, obtaining X-rays in lateral projection. His studies included the utility of carotid angiography in patient with intracranial hypertension, the description of the techniques, indications and a few (surprisingly few) undesirable reactions. His emphasis, however, was about the diagnostic value of the method in cerebral tumors. Displacement of arteries, neovascular formation, and arterial-

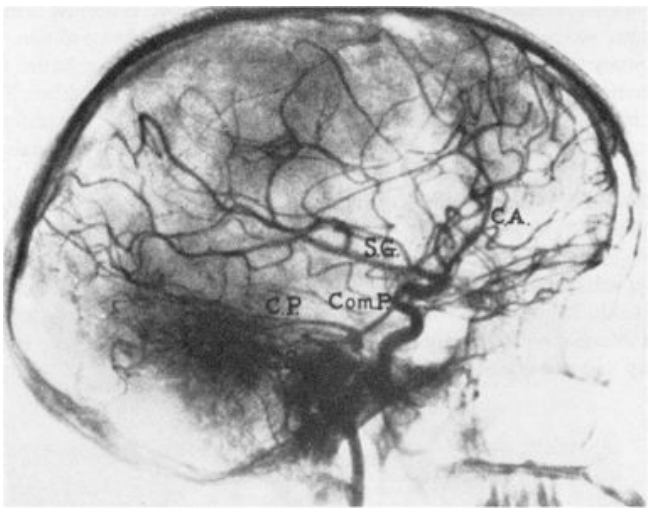
venous communications were recognized in tumors. The studies of Almeida Lima comparing the angiographic findings with autopsy specimens and postmortem angiograms were incorporated to the work. They also described aneurisms and thrombosis.[2,5]

In 1931 a seemingly more comfortable contrast medium, based on thorium dioxide and known as Thorotrast (introduced for imaging of the spleen and liver by P. Radt in 1929)[19,17], was tried in arteriography by Dos Santos. It was attempted in cerebral arteriography by Moniz, Pinto and Almeida Lima, and in aortography by Dos Santos, Lamas and Pereira Caldas. The reports about it utility were enthusiastic. Thorium dioxide produce little acute intravascular toxicity (although it was locally harmful to the tissues of the neck if it extravasated), was almost painless on arterial injection, and was intensely radiopaque. [2,5,8,7,21]

In the U.S.A. the Council of Pharmacy and Chemistry of the American Medical Association voted against the use of this contrast medium in the intravenous form because of its radioactivity and imperfect elimination, that leads to radiation-induced tumors following a latent interval of several decades.[5,7,19]

When Jesus Sanchez-Perez, Spanish angiographer and promoter of the development of several cassette changers that had stayed one year with Moniz in Lisbon, tried to travel to Montreal in order to make a presentation of cerebral angiography, he received a letter of Wilder Penfield, the well-known leader of the Neurological Institute, dated in August of 1936, that said: "The work of Moniz is open to criticism of his not knowing how much damage the Thorotrast will do his patient... An extensive paper was presented at the last meeting of the American Neurological Association, with which most of the leading neurologists are familiar. The method may be necessary at the present time in Spain. It is not however necessary to the proper treatment of the tumors in this country..."[5] Thorotrast was not abandoned completely for arteriography (especially for cerebral angiography) until late in the forties.[19] *(Figure 10)*

Figure 10: Thorotrast angiogram (Egas Moniz, 1940)



In 1929 Moses Swick introduced for urography an organic iodide (synthesized in 1926 by Arthur Binz and Curt Rath in Berlin), later known as Uroselectan, that had only one atom of iodide, with a low iodine content. New di-

iodinated contrast media such as Uroselectan B (1930) and Diodrast (1932) were synthesized, with high iodine content, but also increased osmolality. These two compounds were to become the standard contrast media for intravascular use for the next twenty years, but injected into the carotid arteries they could provoke epileptic attacks, pareses and aphasia. Experimental studies showed damage to the blood-brain barrier from these substances. It was not until less toxic water-soluble iodide-containing contrast media became available that arteriography of the carotids became a relative safe examination. [9,17,19]

Up until 1927 (in 25 years) Egas Moniz published 54 scientific works, two-thirds of them in Portuguese and one-third in French. In the four years between 1927 and 1931 he published 61 works, only one-third of them in Portuguese and two-thirds in French, with the addition a Spanish and German publication.[5]

He made two publications in Argentina: “Encefalografía arterial: A propósito de las inyecciones carotídeas" (“Arterial Encephalography: The issue of carotid injections”) in Revista Oto- Neuro-Oftalmológica y de Clínica Neurológica 1929, 4: 276, and "Nuevos aspectos de la angiografía cerebral" ("New aspects of cerebral angiography") in Revista Oto-Neuro- Oftalmológica y de Cirugía Neurológica Sudamericana 1932, 7: 425.[16]

By 1931 he compiled 90 cases (180 arteriograms) in the first book on cerebral angiography, published in France by Masson et Cie. and prefaced by Joseph Babinski: "Diagnostic des tumeurs cérébrales et épreuve de l'encephalographie artérielle" (“Diagnosis of cerebral tumor and trial of cerebral angiography”), of 512 pages, with 225 ilustrations.[2,5,16,22] All cases were followed clinically in an exemplary way, and many of them surgically. Only two patients died, both suffered severe arteriosclerosis in addition to brain tumors. All cases had carotid arteriograms made on both sides by direct cut-down in the lateral position. Anterior-posterior position required technical improvements: the low-yield generators of the X-ray equipment still did not permit a sufficiently short exposure time.[2,5,22]

Despite Egas Moniz’s publications in book form (in French) and in journals outside Portugal (including the Unites States), cerebral angiography developed very slowly outside Portugal. In 1941 (14 years after Moniz’s first article) Dyke wrote: “Its main indication, in my opinion, is to determine whether or not an aneurism or an arteriovenous angioma exists; in other words, to differentiate a mass formed by enlargement of one of several blood vessels from a true tumor”.[22] Some authors[2] think that the fact that cerebral angiography was accepted very slowly (particularly in the Anglo-Saxon countries) may have been due partly to the fact that the investigation involve making two permanent scars one each side of the neck, unpleasant stigmata particularly for an attractive woman to carry for the rest of her life (Moniz always insisted on undertaking bilateral arteriography). In 1936 J. Loman y A. Myerson reported the feasibility of direct percutaneous carotid artery puncture for cerebral angiography, “because exposure and ligation of the carotid artery constitutes a formidable surgical technique which might cause clinicians to hesitate to utilize the procedure”[2,7,11]

Egas Moniz and his colleagues published over 200 papers and monographs on normal and abnormal cerebral angiography.[13] However, Moniz's interest on angiography was not limited to the central nervous system.

3. PULMONARY ANGIOGRAPHY ("ANGIOPNEUMOGRAPHY")

The same day of his presentation at the School of Medicine of Lisbon in the summer of 1927 when he returned from France, after his historical meeting with Dos Santos, Moniz talked with a professor friend of the Portuguese surgeon, suggested him to amplify his cerebral studies with investigations of the extremities and other parts of the body. "I don't think I will do that; it would take a lifetime. I'd rather concentrate on that sector in which my studies enable me to draw rewarding conclusions", answered Moniz.[5] However he later changed his mind, perhaps influenced by Lopo de Carvalho whom that year of 1927 was designated Professor of Medical Propaedeutics and was interested in lung tuberculosis, or perhaps by the publication of Werner Forssmann, who carried out the first heart catheterization on himself in Berlin in 1929. Due to technical difficulties and surely to the low concentration of the material contrast, Forssmann didn't obtain satisfactory x-rays.[5,6,15]

With Almeida Lima, Moniz and Carvalho undertook experiments to visualize the pulmonary arteries. After in-vitro trials, they began to inject into patients 60% sodium iodide into their antecubital veins. In high concentrations the pain was dissuasive; furthermore, they could never visualize the contrast beyond the subclavian vein because of the dilution. They attempted injections in the external jugular vein (closer to the heart). In this case, there were no complaints from the patients in spite of increasing the concentration. At this point, Moniz and his collaborators took notice of Forssmann's article. Immediately they followed his suggestion, and they carried out injections in the right atrium through a catheter. They were successful in visualize the pulmonary vessels since the concentrations (80% to 100% sodium iodide) were higher than Forssmann had dared to use.[4,5]

In the session of February of 1931 of the Lisbon Scientific Academy Egas Moniz showed the first pulmonary angiograms ("angiopneumography") in man, obtained with the collaboration of Carvalho and Almeida Lima.[5,6,15] He emphasized that all his suggestions should be carefully proven by means of experimentation, but he had the idea to mention pulmonary vascular tumors, cysts and tuberculosis as experimentation fields. As Forssmann did, he also mentioned the potentialities of physiologic studies and selective therapy. Very soon they published another paper with films with fair pulmonary arterial visualization.[5]

In 1931 took a trip to give lectures in Bern, Switzerland, and in Trieste, Italy.[5]

In 1933 Moniz, together with A. Pinto and A. Alvarez studied arteriographically the cerebellum and other organs of the posterior fossa, carrying out vertebro-basilar angiographies through the subclavian artery surgically exposed.[5,15]

In 1934 his second book, “L'angiographie cerebrale; ses applications et resultats en anatomie, physiologie et clinique” (“Cerebral angiography; its applications and results in anatomy, physiology and clinical practice”).[16,22] It was published in Italian in 1938 and in German in 1949.[16]

During the twenties the radiographic documentation was limited to obtaining only one radiograph for each injection. Thanks to the development of a rapid cassette changer capable of taking films in series (“radiocaroussel”) by José Pereira Caldas *(Figure 11)*, Egas Moniz could carry out some physiologic observations on the circulation of the brain The “radiocaroussel” permitted the exposure of six films in rapid sequence to allow the visualization of the arterial, capillary and venous phases. He published his results with the collaboration of Pereira Caldas and Almeida Lima in 1934 with the title “Angiographies en série de la circulation de la tête” (“Serial angiographies of the circulation of the head”). They made significant physiological observations. They realized that the capillary barriers of the internal and external carotid arteries were different: flow through the brain was rapid, while the capillaries of the soft tissues of the head and neck offered great resistance.[5,11,19,22]

Figure 11: José Pereira Caldas (1893-1967)

4. PSYCOSURGERY AND THE NOBEL PRIZE

In 1939 a mentally deranged patient shot Egas Moniz and almost killed him. He recovered, and became increasingly interested in research on prefrontal lobotomy, which he had started to do en 1935. His constant and almost obstinate drive of find material causes to psychic phenomena (“only by an organic orientation can psychiatry make real progress”), concept to which he had stuck during his studies with Regis on toxic psychoses in 1902, prompted his interest on "psychosurgery".[5,12,13,16] He wrote: “to cure these patients it is necessary to destroy the cellular-connective bonds, and among them we consider to the most important those related to the front lobes”.[16]

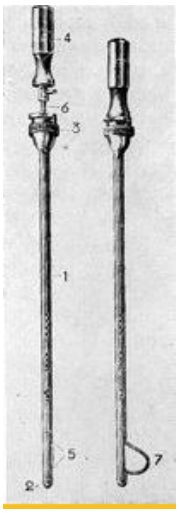
Pedro Almeida Lima, already the first Professor of Neurosurgery of Portugal, carried out in Lisbon the first injection of alcohol in the prefrontal area in November 12th, 1935, and the first prefrontal leucotomy (later renamed “lobotomy” by Walter Freeman and James Winston Watts) in December

27th.[5,12,13,16] During the decade of the forties psychosurgery was often used to treat patients with psychosis resistant to treatment with shock.[1,3,5] But later, prefrontal lobotomy fell in bad reputation, and with the development of psychopharmacology was discarded *(Figure 13)* .

Figure 13: Egas Moniz and prefrontal lobotomy (cartoon from Urol Laboratory)

In his first 20 patients, 35% were cured, 35% improved, and 30% didn't present any changes. None died, and none worsened after the operation. Besides the theoretical conception, he created with Almeida Lima the appropriate instrument ("leucotome").[16] *(Figure 12)*

Figure 12: The "leucotome"



His initials favorable results with prefrontal lobotomy suggested further possibilities in the surgical direction. To alleviate the tremor in Parkinson's disease, Moniz, always with the help of Almeida Lima, started in 1934 giving injections of alcohol into the pallidum and the striatum, but without good results.

Years later, in the U.S.A., Cooper got successes with this approach, using more advanced techniques.[5]

In 1936 he traveled to Paris to present at the session of March of the Academy of Medicine his work "Essai d'un traitement chirurgical de certains psychoses" ("Essay of a surgical treatment of some psychoses"), the first publication that would be continue with "Tentatives operatoires dans le traitements de certains psycoses" ("Operative trial in treatments of certain psychoses ").[16]

In the postwar years psychosurgery disseminated the name of Moniz. In 1949 the Karolinska Institute of Stockholm accepted the proposition arisen by Brazilian initiative in the Congress of Lisbon in 1948, and supported from all over the world by many investigators. Egas Moniz was honored with the Nobel Prize of Physiology and Medicine "for his discovery of the therapeutic value of leucotomy in certain psychoses" *(Figure 14)*, together with the Swiss Rudolf Walter Hess ("for his discovery of the functional organization of the interbrain as a coordinator of the activities of the internal organs"), who worked in stereotactic localization.[2,3,5,9,12,13,15,16,22] Moniz could not attend the ceremony, but his lecture was read by the noted Swedish surgeon Herbert Olivercrona, an ardent proponent of carotid angiography. In his preliminary speech in the Swedish Academy, in front of notables guests and the Swedish King, Olivercrona praised Moniz's works in psychosurgery, but not a word was said about angiography on that ocasion.[5]

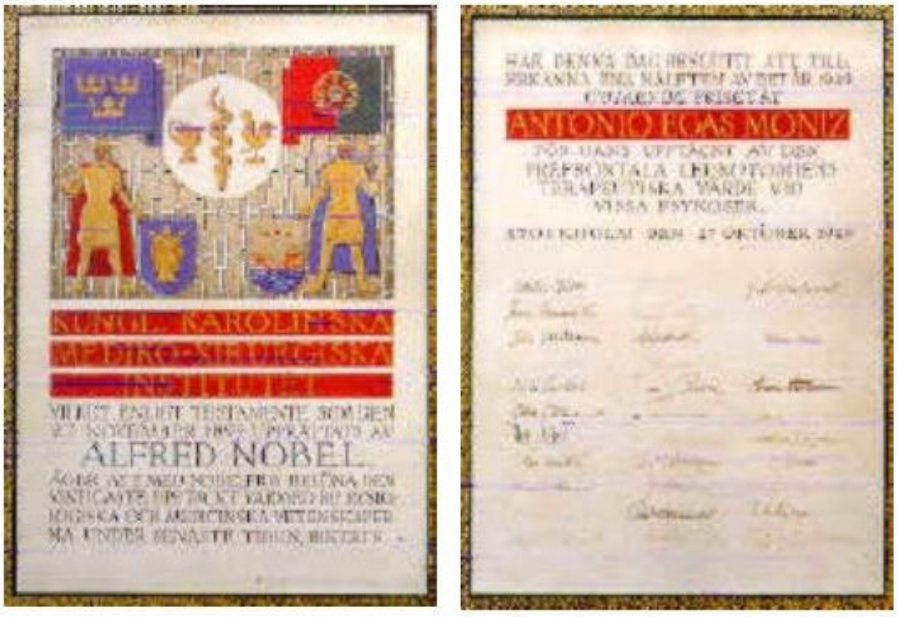
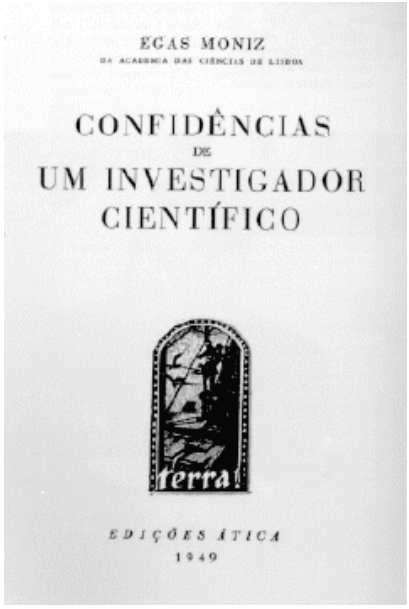


Figure 14: The Nobel Prize

After his retirement he wrote his memoirs that appeared in 1949 with the title of "Confidencias de um investigador científico" ("Confidences of a scientific investigator ") *(Figure 15)*. In "Um ano de politica" ("A year of politics") he summarized his political experience, of which he would go away definitively in 1918.[5,16]

Figure 15: Confidences of a scientific investigator



In 1951, it was offered to Egas Moniz the Presidency of the Republic of Portugal that he refused.[2,5]

He died in Lisbon, on December 13th, 1955. He was 81 years-old.[5,16] *(Figures 16 and 17)*

Figure 16: Egas Moniz at the end of his life

Figure 17: Note the deformity of his hands

5. EPILOGUE

The work of Egas Moniz granted to Portuguese medicine international fame and acceptance. He has a charismatic personality, wide culture, and brilliant intelligence. His early political career and the complete exploitation of his medical achievements were enhanced by his talent like orator and writer of elegant style.

He created two manual techniques, cerebral angiography and psychosurgery, but because of his sick hands, he was not able to perform himself none of two*(Figure 18 and 19)*. But in spite of his limitation in physical activity, his scientific and intellectual activity remained with dynamism and energy until the end of his days.[5,16]

Figure 18: Note the deformity of his hands in this homage for the 120th. anniversary of his birth

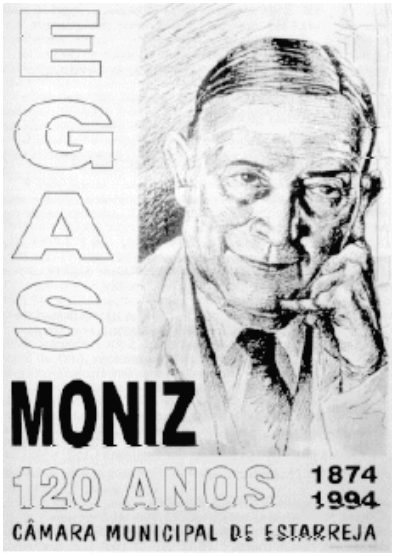


Figure 19: Note the tophi in his ear

As counterbalance of the rigid scientific discipline that he imposed himself in his hospital activity, he wrote several essays: on the only physician pope in the history, Petrus Lusitanus (Pope John XXI); on the painter José Malhoa; on the representation of madness in art; on the work of the Portuguese physician and writer Julio Dioniz; on his thoughts on Oscar Wilde; on the work of the sculptor Mauricio of Almeida. He had great devotion for the life and work of Santiago Ramón y Cajal, to whom he dedicated two lectures in the Academy of Sciences

of Lisbon. In a scientific session he commented about medical climatology and geology. He wrote obituaries on distinguished colleagues, and he also paid homage to the first circumnavigator of the globe, Fernando Magellan. He wrote an operetta titled “A nossa Aldeia” (“To our village”) dedicated to Pardilho, a small village where he moved to when he was 5 years-old.[5,12,16]

It has been said that youth with its lack of frightening experiences, which tend to inhibit the ease of associations, had advantages, but Moniz is an example that men in their sixth and seventh decades showed remarkable ingenuity.[5] He was 52 when he embarked on cerebral angiography, 61 when he pioneered prefrontal lobotomy and 67 when he launched the first surgical attack against Parkinsonism.

Moniz received the Gran-Cruz da Instrução e Benemerência (Portugal) and the Gran-Cruz de Isabel la Catolica (Spain); he was appointed Grand Officier de la Couronne d'Italie, and Commandeur de la Légion d'Honneur (France). He was Doctor, honoris causa, of the Universities of Bordeaux and Lyon; Membre de Mérite, and President at various times, of the Academy of Sciences, Lisbon; Member of the Academy of Medicine and of the Société de Neurologie, Paris; of the Societe de Oto-Neuro-Ophtalmolodie de Strasbourg; of the Academy of Medicine, Madrid; of the Sociedad de Neurología y Psiquiatría de Buenos Aires; of the Society of British Neurological Surgeons; Honorary Member of the Royal Society of Medicine, London; of the Académie Nationale de Médecine de Rio de Janeiro; of the American Society of Neurology; of the Spanish Association of Medical Writers. A 1937 Portugal stamp commemorates the first cerebral arteriogram, performed by Egas Moniz in 1927.[13,16]

There is an eponym associated with his name, the Egas Moniz’s sign: forceful plantar flexion at the ankle may result in dorsiflexion of the toes in pyramidal tract lesions.[13]

Joseph Babinski, the “Grand Master of French Neurology”, teacher and friend of Egas Moniz, prefaced the first book on cerebral angiography (published by Moniz in 1931), paid him a great homage with the following words: [2,5,16]

”Paul Valèry in one of his works remarked that a scientific discovery is less interesting because of its consequences of the results, but rather on the virtue of the intellectual analysis through which the new knowledge was acquired.”

“The work of Mr. Moniz on the arterial encephalography is if the nature to entice the eminent psychologist. But it is not the mere product of verification of facts presenting themselves by chance to be observed by an attentive researcher, from which he would benefit and which in fact has already been profitable: it is the fruit of sustained contemplation and of broad experiences pursued in a rigorous fashion.”

“Mr. Moniz attached himself to this idea, considered all aspects, anticipated all the criticism one will attempt to make a priori, he made himself consider the dangers he might be exposed to with this kind of approach. Persuaded that he will overcome the obstacles and convinced that if his thoughts are going to be realized it will present benefit for the patients, he decides to put his project into effect and launches his enterprise courageously, as another time

his countrymen Diaz and Vasco da Gama took of to cross the ocean for the route to India…".

Egas Moniz was an extraordinary man. He must certainly be the most interesting and charismatic person in the history of neuroradiology. Besides being brilliant as a physician, he was mathematician, literary and artistic critic, musical composer, historian, politician and diplomat, writer, teacher and mecenas. He has left us as example his perseverance, his never faint love to work and investigation, and the unyielding devotion to the objective search of truth. *(Figure 20)*

Figure 20:

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Recent Historical Books.

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By: Fathi Habashi

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Table of Contents

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Recent Historical Articles

The Cathode. Patrick Mitchell. Electronics World. September 2003, Vol 109, Number 1809, p 12-17
A history of the cathode in the thermionic valve. A rather obscure publication but a good article.

Historical Development of Radiological Service in Eritrea.
S. Yirgaw. ISRRT Newsletter, 2003, Vol 3, No 2, p7-8

The Nobel prize for MRI: a wonderful discovery and a sad controversy.
Paul Dreizen. The lancet, January 3 2004 363, p78
This is a very interesting letter looking at the puzzling absence of the name of Raymond Damadian in the list of Nobel laureates.

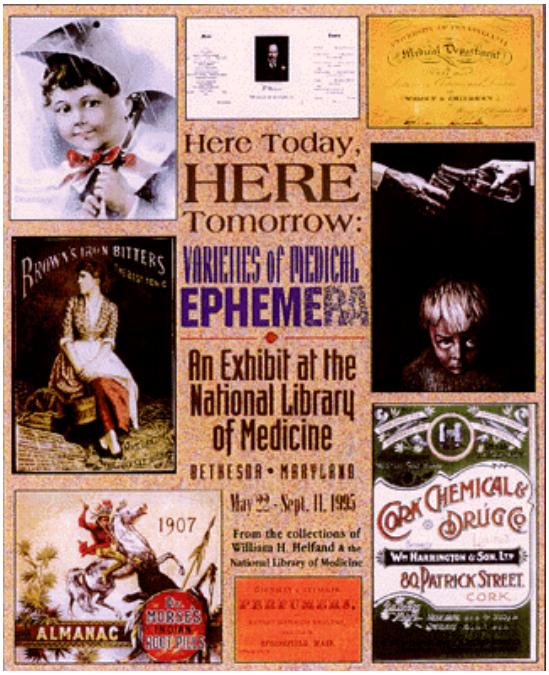
Interesting History Web Sites

Here Today, Here Tomorrow: Varieties of Medical Ephemera

http://www.nlm.nih.gov/exhibition/ephemera/ephemera.html

The Online Version of an Exhibit held at the National Library of Medicine, National Institutes of Health (May to September 1995)
Lobby, Building 38

The on-line version of 'Here Today, Here Tomorrow' shows a variety of printed medical ephemera from the collections of William H. Helfand and the National Library of Medicine. The exhibit was held at the National Library of Medicine, Bethesda, Maryland, May 22 through September 11, 1995.
The exhibit presents a very lively and colorful collection of medical and pharmaceutical ephemera, dating from the 18th century to the present and contains nearly 400 items, including posters, informational pamphlets, trade cards, handbills, postcards, broadsides, and other types of printed ephemera. Over 140 representative items are displayed in this online exhibit. The exhibit is organized around a number of themes and categories - women, children, the medicine show, public health, AIDS, tuberculosis, medical education, and addiction. Also highlighted is a rich and varied collection of medical, dental, and pharmaceutical bookplates.



'Here Today, Here Tomorrow' is designed to celebrate the importance of medical ephemera, those transitory and commonplace documents of everyday life which were not meant to survive, but surprisingly did. Tickets of admission to events long past, posters warning about unsafe health practices, advertisements for products no longer marketed, and booklets reviewing medical procedures and practices no longer necessary serve as reminders of an earlier time and offer insights to the historical past in a direct and revealing way.

Much of the ephemera displayed in this exhibit is plainly utilitarian, but certain items such as engraved trade cards or chromolithograph sheet music covers are attractive and have a certain measure of artistic appeal. Contemporary medical ephemera, such as that generated in response to the AIDS epidemic, sends a forceful reminder of this continuing public health crisis. Posters, bumper stickers, educational pamphlets, political leaflets and informational buttons are testimony to the massive outreach efforts aimed at all levels of society to inform and educate the public in preventive measures, as well as to provide hope and support for the victims of the epidemic.

Binion's Horseshoe Atomic Bomb Blast Souvenir Set
http://vegas4visitors.com/museum/exhibit/bin001.htm

The Independent's excellent Travel Section last Saturday 31st May 2003 featured Las Vegas. In the article it stated "In the fifties,above-ground atomic explosions on the Nevada Test site, north (but not very north) of Las Vegas were regarded as tourist attractions. thousands flocked to Mount charleston, 45 miles north of the city, for a radioactive picnic. Binions Horeshoe Casino produced postcards of the event, while the Sands Motel staged a "Miss Atomic 1957" parade."

In the 1950s, the United States government conducted tests of nuclear bombs in the desert just outside of Las Vegas. Apparently sensing a marketing opportunity, the people at Benny Binion's Horseshoe Club in the downtown part of Las Vegas issued this collector set of photographs of one of the explosions. According to the package they were taken from "high atop" Mount Charleston, located just east of Las Vegas.

These first two photographs are of the exterior of the envelope containing the photographs. Note the wording – “Actual pictures of dreaded atomic bomb blasts.”

It acted a self mailer and just before Christmas 1964 a Roy Banks mailed this set to Mr. J.C. Banks (his brother, perhaps?). Note the postage of 3 cents.

Not far short of Lee Canyon, the clearly signed Desert View Trail is a short, paved footpath with an unlikely history. During the A-bomb tests of the 1950s, the Mount Charleston area was designated by the Atomic Energy Commission as being the best vantage point for spectators. On eight separate days in 1957, announced far enough in advance for tourists to plan their vacations to coincide, vast crowds assembled up here to watch the explosions. Metal poles erected to hold official cameras recording the events still stand just below the viewing platform. These days, you have to settle simply for a vast desert panorama, which doesn't extend as far as Las Vegas itself.

MedHist gateway
http://library.wellcome.ac.uk/resources/hist_medicine.shtml
http://medhist.ac.uk/
Internet resources relevant to the history of medicine can now be accessed though the MedHist gateway. MedHist's searchable database of history of medicine resources includes links to sites on the Internet accompanied by detailed resource descriptions. All sites listed on MedHist are assessed according to strict evaluation guidelines, ensuring only the highest quality resources are included.

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Resources featured on MedHist include, among others, online primary source documents, electronic texts and journals, collections of historical images, databases and datasets, and electronic discussion lists.

Managing The Nuclear Legacy
http://www.dti.gov.uk/nuclearcleanup/

In November 2001, the Government announced radical changes to current arrangements for the clean up of Britain's nuclear legacy. These arrangements will be funded by the taxpayer.

The White Paper, "*Managing the Nuclear Legacy - a strategy for action*", was subsequently published in July 2002. It set out the Government's proposals, with a commitment to better management of the clean up process.

A key proposal of the White Paper is the establishment of a new body, the Nuclear Decommissioning Authority (NDA) (in the White Paper, this was referred to as the Liabilities Management Authority). This body will have to ensure that Britain's nuclear legacy is cleaned up safely, securely and cost effectively. The methods used must safeguard our environment for current and future generations. In addition, we are committed to openness, transparency and the maintenance of public confidence.

The aim of this web site is describe the changes in the clean up arrangements.

The United Kingdom Atomic Energy Authority (UKAEA)
http://www.ukaea.org.uk/
The United Kingdom Atomic Energy Authority (UKAEA) was incorporated as a statutory corporation in 1954 and pioneered the development of nuclear energy in the UK.
The UKAEA is responsible for managing the decommissioning of the nuclear reactors and other radioactive facilities used for the UK's nuclear research and development programme in a safe and environmentally sensitive manner.
UKAEA is a non-departmental public body, funded mainly by its lead department the Department of Trade and Industry.

British Nuclear Fuels (BNFL)
http://www.bnfl.com/website.nsf
British Nuclear Fuels (BNFL) is an international nuclear energy business, serving Governments and nuclear utilities worldwide, and operating within a highly focused, commercial culture.

Sidney Russ (1879-1963) Some recollections *

by W Alan Jennings

In a letter to SCOPE in 1995,[1] I endeavoured to show that Sidney Russ was the first hospital physicist in the UK, and probably in the world, as he was the first person to be appointed to such a paid post. This was in 1913 at the Middlesex Hospital in London. In 1920 he was appointed to the newly-created Joel Chair of Physics Applied to Medicine (he never accepted the title 'Medical Physicist'), which he held until his retirement in 1946.

He was a prime mover in hospital physics in many respects, as summarised by John Haggith as Editor of *'The History of the Hospital Physicists' Association, 1943-1983'* [2] To quote from that summary,

> 'having joined the Röntgen Society in 1910, he became a member of that Society's new "Committee on Röntgen Measurement and Dosage", a committee which led to the formation of ICRU in 1925, and itself evolved into the BRCU, both of which are still active today. In 1920 he played a leading part in joining (and was co-secretary of the British X-ray and Radium Protection Committee, whose documents became the pattern for all subsequent "Codes of Practice" etc. in radiological protection. In 1943 he convened the meeting which launched the HPA,[3] and was elected its first Chairman. He was prominent in the

> activities of the BECC, and of the King Edward's Hospital Fund. He was precise and autocratic, but genuinely kind and understanding, and encouraged the young'.

It is the last couple of sentences, together with a recently discovered quotation (see below) which have inspired me to put pen to paper to mention a few of my recollections relating to his powerful personality.

My first contact with him was in the 1940s when I was interviewed for a post on The King's Fund Panel of Physicists for London Hospitals, based under his care at the Middlesex Hospital. Whilst I sat on a chair, Russ paced to and fro in his office with his hands behind his back like Felix the Cat, firing questions. His initial shot was *'Just why* do you want this job?" - i.e. come clean...! I was almost duped into saying 'the money, the short hours, the women...'. I was appointed, and not long afterwards he asked me to take over one of his lectures to the medical students. 'Just cover "heat",' he said, 'conduction, convection, radiation'. - I had only an hour's notice, and the request induced a total blank in my mind on the subject. A quick visit to the library helped, but being my first-ever lecture, resulted in a pretty poor presentation, not helped when Russ himself joined the class at the back for the last twenty minutes or so!

Sdney Russ 1879-1963

As a member of the Panel of Physicists I visited various London hospitals for tasks such as calibrating x-ray tube outputs - even calibrating pastilles against an NPL-calibrated Victoreen, in the 1940s. On one occasion, Russ came with me by taxi. On arrival, he gave the driver a tip, which the driver stated was not

enough. Russ simply took the original tip back and walked away - I can still hear the driver's colourful opinion on this situation in my mind's ear!

At the end of the war, the hospital radium stock was still down a bore-hole for safe-keeping, the use of radium having been replaced by radon for treatment purposes at that time. Russ agreed to show this bore-hole to the press, providing his name was not mentioned, which was agreed. Next morning, an inch-high headline stated 'Professor keeps the key', followed by 'Professor Sidney Russ...'! I have rarely seen anyone so angry. The journalist claimed he had been overruled by his editor, and the latter said that it was now too late to change it!

Russ gave a tea-party for one of our Panel members on the eve of the latter's wedding, at which the member provided us with his honeymoon hotel phone number in case his presence was required at the hospital. Russ ceremoniously tore up the note with the said information!

On one occasion, when visiting Russ's apartment nearby, we were a small gathering in the presence of his daughter. Asking each of us in turn whether we would like tea or coffee, we all said we did not mind which, and he finally asked his daughter, who said tea. Russ then said 'I only have tea anyway, but I knew I could give you a choice that way! 'He also had a 'modern' painting on the wall of his apartment which often led to comment. 'I don't like it', he said, 'but it is there as a conversation starter'.

Following my work at the Hospitals Radon Centre near Barton, under Russ's supervision, I had written a lengthy report entitled *'Radon, Its Technique and Use'*. Russ thought this should be published as a book, but added that it would be difficult to find a publisher for someone in my position. However, as he had already been the author of several books, he stated that he need only add a chapter and have it published under our joint names. By putting his name second (+ CBE, DSc, FInstP) and my name first + BSc, AInstP), he said that readers would appreciate who had written it! It sold quite well at first, prior to sales tailing off. Years later, he kindly left me his share of the royalties on this volume in his will. I believe he meant all the royalties from the year of publication, 1948, but his executors decided he meant from then on, 1963 - i.e. virtually nothing!

His letters were terse and to the point. As an example, when I was applying for a post in 1946 (prior to the NHS) and hoping for more money, he wrote 'stick to your guns – they will respect you all the more if you do. Yrs sincerely, SR'. I took his advice and won.

As stated by John Haggith, he could be autocratic. On one occasion, I was very concerned at the way a particular surgeon was, I believed, misusing the King's Fund's radium at a London hospital, and I telephoned Russ as the person in

charge of the Fund's radium. Having listened to my report, he telephoned the consultant, ordered him to remove the radium at an early time, and return it to the Middlesex Hospital forthwith. He then deleted the consultant's name from the list of authorised users. I never dared set foot in that Hospital again for many years.

Recently, my colleague Bob Burns drew my attention to an intriguing and provocative passage in a book published in 1928 by the radiologist Bernard Leggett, one of whose appointments was at The Middlesex Hospital. The book, *'The Theory and Practice of Radiology'* [4] contains the following paragraphs:.

> A TEST AND PHYSICS LABORATORY
>
> The laboratory should be complete for all the necessary measurements of intensity and wavelength of radiation, i.e., be equipped with various forms of intensimeters and spectrometers. The subject of x-ray protection must be considered both within this laboratory and with reference to adjoining rooms.
>
> Energy supply, water, gas, etc. will be available as in any laboratory.
>
> The physicist should in all cases be subordinate to the medical officers. The young physicist-engineer of x-ray manufacturer's test rooms will be found more useful than the purely theoretical highly-paid academic physicist.
>
> Such a commercial trained physicist will be found usually to have an extended theoretical knowledge as well as considerable practical experience and, having been used to receiving orders, will be more amenable to carrying out work required by the medical staff than the theoretical physicist, who often tends to be very superior to the purely medical radiologist.

One cannot help wondering who Bernard Leggett had in mind in proffering such advice, maybe what he really needed was a PET Physicist as requested in a recent IPEM Placement Circular.[5]

References

1 Vol. 4, No 3, p 25-66
2 Published by HPA, 1983, p 126

3 Which later evolved into IPSM, IPEMB, and now IPEM.
4 Volume 3, 'X-ray Apparatus and Technology', p 477, Chapman & Hall
5 IPEM Enterprises Ltd. Placement Circular 61, p 3, Ref 98/72, 17 June 1998

* This article first appeared in the IPEM Journal 'Scope' in 1998
(Vol 7, No 4)

A Brief History Of The Evolution Of Medical Physics In The United Kingdom In The Twentieth Century

by W Alan Jennings
Founder Member, Hospital Physicists' Association

A brief mention of the position in the 19th Century is appropriate. In a paper in 'Scope' (1), Francis Duck presents the work of a number of individuals in the field of medical physics at that time, and states that the earliest reference to that topic as such was by Neil Arnott who gave talks to doctors in 1825 on physics in medicine. Michael Faraday is mentioned, who delivered a series of lectures at St. George's Hospital in 1835. Having considered contributions in France and Germany, Duck chose Adolf Fisk as the original medical physicist, a physics-based physiologist who published perhaps the earliest book on medical physics in 1850. In England, F L Hopwood was appointed demonstrator in physics at St Bartholomew's Hospital Medical School in 1906, and J H Brinkworth in a similar post at St Thomas's Medical School in 1907. The first physicist appointed to a hospital, The Middlesex, was S Russ in 1913, having been a research fellow there since 1910, transferring to the medical school in 1919. However, he continued as head of the department of Physics Applied to Medicine at the hospital for 33 years. In 1911, C E S Philips had become physicist to the Royal Cancer Hospital, but it was an honorary appointment as a 'man of means'.

Outside medical schools, the events that provided the principal stimulus for the establishment of medical physics were the discovery of X-rays by W C Röntgen in 1895, closely followed by that of radioactivity by Becquerel in 1896, along with that of radium by the Curies in 1898. The applications of ionizing radiations in medicine – radiology - led to the need for physicists in hospitals, and by 1932 there were about a dozen such appointments, primarily concerned with the use of X-rays and radium in radiotherapy, and safety measures in radiation protection. Dosimetry, in cooperation with the National Physical Laboratory, was developed.

On the professional side, there was little organisation for medical physicists outside the British Institute of Radiology where non-medical members had the benefit of equal status with medical members. By 1943, some 53 physicists were invited by S Russ to become Founder Members of the Hospital Physicists'

Association (HPA), of whom seven survive to this day, the first such body in the world. This was followed some 15 years later by the formation of the American Association of Physicists in Medicine. The histories of the first forty years of both these bodies have been documented (2, 3). Similar bodies were set up in other countries, and in 1959 steps were taken to form the International Organisation for Medical Physics, IOMP (4).

From the mid-1940s, the King Edward's Fund for London Hospitals operated a Panel of Physicists to provide a service pending the appointment of full-time physicists to the major centres. With the production of artificial radionuclides and the developments in X-ray equipment, the number of hospital physicists increased rapidly. The HPA became the forum for the exchange of ideas, including holding 3 residential meetings each year from 1944 to 1968, in different locations around the country [See (2) p 165-7]. These included visits, presentations and a business meeting, functioning essentially as a 'club'. From 1969, there was one General Meeting each year, plus other specialised meetings. By 1973, the HPA had close on 900 ordinary members.

As time passed new technologies were developed, and from the late 1960s the pattern changed. Two parallel fields evolved. In radiology, apart from the advances in the use of higher energy equipment, new technologies emerged, particularly in the field of imaging. These included applications in body-scanning techniques using radionuclides, ultrasonics, computed tomography, and magnetic resonance imaging. At the same time, the field known as biological engineering had become important in medicine. This field encompasses wide-ranging approaches - from physiological measurements of all kinds to rehabilitation and biomechanics. Biological engineers had set up their own organisation, the Biological Engineering Society (BES) and it later became evident that if all the body functions from cardiovascular to nervous and digestive systems were to be understood, the application of both physics and engineering to medicine needed to be more closely coordinated.

On the professional side, in 1993 the HPA decided to hive off its 'union' activities from its scientific endeavours, the latter becoming the Institute of Physical Sciences in Medicine (IPSM), the former retaining the name HPA. In 1995, IPSM merged with the BES to become the Institution of Physics and Engineering in Medicine and Biology (IPEMB) renamed in 1997 as the Institute of Physics and Engineering in Medicine (IPEM).* With the incorporation of the Association of Medical Technologists, the joint membership approached 3000 by the year 2003, and Science and Engineering in Health Care is now fully established in the UK. This evolution constitutes a major success story and fully merits a thoroughgoing research project to document both the developments in medical technology and the people who brought it all about. The above notes are intended as a very brief introductory guide to the subject.

* IPEM Head Office: Fairmount House, 230 Tadcaster Road, York YO24 1ES, www.ipem.org.uk

References

(1) Nineteenth Century Medical Physics, Francis Duck, 'Scope', March 1994. (IPEM)
(2) History of the Hospital Physicists' Association, 1943-1983. Edited by J W Haggith, 1983 (IPEM)
(3) History of the American Association of Physicists in Medicine, 1958-1998, J S Laughlin and P N Goodwin, Med. Phys. Vol. 25, No. 7, July 1998, pt. 2.
(4) History of the International Organisation of Medical Physics - the birth of International Organisations - with memories, J R Mallard, 'Scope' June 1994 (IPEM)
Also: www.iomp.org/jmhistory.html

It should be noted that no 'official' history of the Biological Engineering Society has yet been produced, nor has an update of the HPA - IPSM - IPEMB - IPEM history for the period 1983-2003 covering the mergers which took place.

Bibliography - radiology history

- The Invisible Light, 100 Years of Medical Radiology. Edited by AMK Thomas, Blackwell Science, 1995.
- A Century of X-Rays and Radioactivity in Medicine. Richard E Mould, Inst. of Phys. Publishing, 1993.

Anecdotal

Meandering in Medical Physics, A Personal Account Of Hospital Physics, J E Roberts Inst. of Phys. Publishing, 1998.

Another contact: The Radiology History and Heritage Charitable Trust, Chairman Prof. I Isherwood, Hon. Sec. Dr A M K Thomas, www.rhhct.org.uk

APPENDIX - Illustration of current range of activities:

World Congress on Medical Physics and Biomedical Engineering, August 24-29th 2003, Sydney Australia

Description of subjects:

- Diagnostic Physics, Medical Imaging
- Image and Signal Processing, Analysis and Visualisation
- Radiation Oncology Physics
- Hadrom Therapy Physics
- Radiation Safety and Protection
- Medical Information and Biomedical Information Technology
- Artificial Organs and Biomaterials
- Tissue Engineeering
- Cardiopulmonary and Respiratory Science and Engineering
- Cardiovascular Science and Engineering
- Neuroengineering and Neuromuscular Systems
- New frontiers in MP and BME
- MP/BME, Education, Industry and Society
- Drug Delivery and Pharmacokinetics
- Biomechanics
- Rehabilitation Engineering
- Health Technology Management
- Bioinstrumentation and Biosensors
- Signal Processing
- Special Topics

Sir James McKenzie Davidson
(a correspondence)

It has been a great pleasure to correspond with and then meet with Malcolm Davidson. Malcolm is the grandson of the great Sir James.

I am very pleased that Malcolm has presented two boxes on letters and other material to the archives of the British Institute of Radiology. The boxes contained letters from many well known physicists including JJ Thompson, Ernest Rutherford and Frederick Soddy. It's all very exciting and an unexpected treasure for the institute. I hope to reproduce of this material in due course.

The Mackenzie Davidson Medal

From: Malcolm Davidson
To: kate.sanders@bir.org.uk
Sent: Monday, March 17, 2003 7:33 PM
Subject: Blast from the Past!

Dear Mrs Sanders,

I am writing to you as the most likely person on the long list of Officers on your Website !

I am the grandson of Sir James Mackenzie Davidson and I live in Spain. Among the oddments in my possession I have a bronze medal - or rather a plaque - and am attaching a scan of both sides of it. I suppose that it is probably nearer to his ophthalmic work that ran parallel to the X-Ray, but perhaps you can tell me something about it! I may have some other things of his tucked away. Do you have a Museum?

Yours sincerely,

Malcolm Davidson

From: Adrian Thomas
To: mdavidson@interbook.net
Sent: Tuesday, March 25, 2003 11:43 PM
Subject: Sir James Mackenzie Davidson (1857-1919)

Dear Malcolm Davidson

Our librarian here at the BIR Kate Sanders passed on to me your interesting e-mail. The following are a few notes about Sir James Mackenzie Davidson (1857-1919):

He was born in Buenos Aires. His parents were Scottish. He graduated in Medicine in 1882 (Aberdeen University). In 1886 he was elected Honorary Ophthalmic Surgeon to Aberdeen Royal Infirmary. Following the discovery of X-rays in 1895 he became interested in X-ray work. In February 1896 he took a picture of a broken needle in a foot. Examples of his work appeared in the first issue of The Archives of Clinical Skiagraphy (Edited by Sidney Rowland), the journal that ultimately became the British Journal of Radiology. Whilst in Aberdeen he developed his famous localisation device (cross-thread) for localising foreign bodies in the eye. He moved to London in 1897 to continue his work in X-rays and was elected "Consulting Surgeon to the X-ray Department" and he remained at Charing Cross until he died. In 1903 he designed his own X-ray couch which was built by Muirhead and Company (they were based in Elmers End in Bromley, Kent). Davidson was very interested in the physics of x-ray work and developed apparatus including a motor-driven paddle mercury interruptor. The cross-thread localiser was used by the British Army both in South Africa and in the Great War. He also contributed to the development of

stereoscopic viewing of radiographic images. He became the leading Radiologist in the UK and many radiologists travelled to the UK to meet him. He was knighted for his services to medicine in 1912. He was a founder member of the Rontgen Society (that became the British Institute of Radiology). He was President of the BIR in 1912-1913. Following his death his library was presented to the British Institute of Radiology as the MacKenzie Davidson Memorial Library.

These brief note do not do justice to this remarkable man. His influence was central to the British Institute of Radiology and we have an annual lecture in his name. it would be of interest to acquire this medal for our archive - we could either keep it in our archive or display it in our library. would you be willing to donate it to us? The medal is of interest and certainly by 1899 he was engaged in X-ray work. The BIR was founded in 1897.

Yours sincerely, Adrian Thomas

From: Malcolm Davidson
To: Adrian Thomas
Sent: Wednesday, June 11, 2003 6:28 PM
Subject: Re: Sir James Mackenzie Davidson (1857-1919)

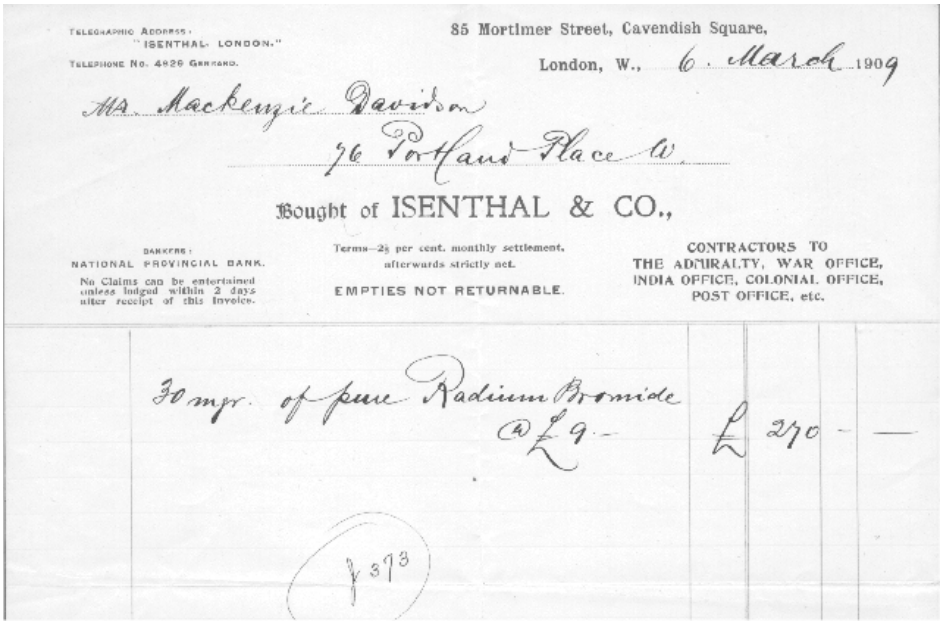
Dear Dr Thomas,

I hope that I acknowledged your long letter when I received it, bit as I can't find any record of doing so my "cheeks are mantled crimson with shame". I will dig out some facts and figures of interest and send them.

One is that he was the first Argentine born knight (my GGF went out there and prospered in the 1820s) and his grant of arms was granted after an amusing exchange with Lord Lyon. To start the ball rolling, here is a bill I have found for his purchase of Radium Chloride that may be worth framing. At todays prices the equivalent of a small house at in 1909? - maybe £20,000 now ??!! His patented wooden adjustable x-ray table is in the Science Museum, as is one of the first Crookes cathode tubes given to my by Sir Peter Kearney in his memory.

Sorry to be so brief but as the summer gets more drowsy, I'll catch up. I am, as you may not guess, in Southern Spain, across the bay from Gibraltar. I have tried to copy this to your list but can't tell if it will work!
Yours sincerely,

Malcolm Davidson



TELEGRAPHIC ADDRESS: "ISENTHAL, LONDON."
TELEPHONE No. 4826 GERRARD.

85 Mortimer Street, Cavendish Square,
London, W., 6. March 1909

Mr. Mackenzie Davidson
76 Portland Place W.

Bought of ISENTHAL & CO.,

BANKERS: NATIONAL PROVINCIAL BANK.
No Claims can be entertained unless lodged within 2 days after receipt of this Invoice.

Terms—2½ per cent. monthly settlement, afterwards strictly net.
EMPTIES NOT RETURNABLE.

CONTRACTORS TO THE ADMIRALTY, WAR OFFICE, INDIA OFFICE, COLONIAL OFFICE, POST OFFICE, etc.

30 mgr. of pure Radium Bromide @ £9 - £ 270 - —

From: Malcolm Davidson
To: Adrian Thomas
Sent: Wednesday, June 11, 2003 6:41 PM
Subject: Re: Sir James Mackenzie Davidson (1857-1919)

Dear Dr Thomas,
Part 2. I must be very dotty as I see you already covered most of what I told you! However one interesting snippet - Harold Macmillan told me that JMcD had saved his life (more probably his eyesight) during WWI. As he was going out to lunch in the Ch X Hosp he passed a lot of students examining this young Lieut with a head wound and was told that the shrapnel was too close to his eye to operate. JMcD took off his overcoat and told them to prepare for surgery and immediately set to work, I believe using X-ray and a electro-magnetic probe he had developed. The effect probably left HM more like a bloodhound than before by he told me this during the time he was researching his memoirs, because he was a great political friend of both my parents (they were consecutively MPs from 1921 to 1959, but had never connected my political father with his radiologist one.
MD

From: Malcolm Davidson
To: Kate Sanders
Sent: Wednesday, December 31, 2003 12:38 PM
Subject: Sir James Mackenzie Davidson

Dear Kate,
Happy New Year!
I have send Dr Thomas another 3 docs, c/o of you.
They are not urgent and can await collection.
I attach Sir JMDs coat of arms. Perhaps you can print it our in colour and hang it under the plaque.
Lord Lyon King of Arms incorporated an X in connection with his work on X-rays and the blue and white stripes his Argentine birthplace!!
Thanks for all you help,
Malcolm Davidson

(the coat of arms is reprinted on the front cover)

From: Malcolm Davidson
To: Adrian Thomas
Sent: Monday, January 12, 2004 8:24 PM
Subject: RE: Sir James Mackenzie Davidson

Dear Adrian,
Glad they arrived safely.
I find I have Sir James's Expo Universelle 1900 Bronze medal. For some reason there was a muddle and he nearly finished up with a gold one. The design was fully described in the V&A Art Nouveau Exhibition last year but I cant find my copy of the Friends magazine. I expect it will turn up and I'll let you have it. I also have the certificates but they are legal foolscap size and I can't scan them, so will send you photocopies.
Malcolm

"To be ignorant of what occurred before you were born is to remain always a child."
- Marcus Tullius Cicero