RADIOLOGY (In arduis fidelis) 1898—1948

BY

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The Jubilee of the Royal Army Medical Corps is coincident with the jubilee of the discovery of X-rays and consequently these notes cover the history of X-radiation from its beginning. The early days of X-rays (the all-seeing rays) were noteworthy for a widespread distrust but this apparently did not spread to those in the R.A.M.C. whose duty it was to develop this discovery. Evidence of this is shown in an early record of 1897 that X-rays were used with success by Colonel Beëvor in surgery during operations on the Indian Frontier just one year after their discovery.

Some quite simple apparatus energized from batteries along with primitive tubes and photographic plates were the means of successful practical radiography. The examinations made were mostly for location of gross foreign bodies and the determination of the site and position of fractures. It is thus evident that X-ray help was accepted then as now in the Field where surgical administration calls for it. During one of these examinations conducted in a tent, several bullets from enemy marksmen penetrated the tent, fortunately without causing damage to staff, patients or apparatus. It needed much courage to continue under these conditions when each X-ray exposure took many minutes instead of the fraction of a second needed to-day.

Passing on to the South African War 1899—1902 a record of X-ray experiences during the siege of Ladysmith which was read at a meeting of the Röntgen Society in February 1901 will show the work of that period (Journal of the Royal Army Medical Corps, August 1903). Lieut.-Q.M. F. Bruce, R.A.M.C., in writing his experiences laid much stress on the necessity for independent generation of electricity as the use of charged batteries or cells had not been a success. He made several successful efforts to link up bicycles and small dynamos and during the siege made 200 X-rays and screened a large number of cases.

In the early part of the 1914–18 War, power supplies were still meagre and primitive as for example in No. 7 Indian Field X-ray Section which I brought from India to France (September—October 1914), a small 3/4 horse-power oil engine with blowpipe ignition to charge the accumulators was the only source of power. It is interesting to note that the large casks of H₂SO₄ for the accumulators were carried on deck during the voyage under protest by the captain of the transport. This independent unit, such as it was, compared more than favourably with the units that were sent out with the original hospitals of the Expeditionary Force. The constant chase after independent power supplies suitable for X-rays has continued ever since, accompanied by many hopes and bitter disappointments in spite of frequent representations that this is a dominat-
ing essential. The absence of suitable power supplies was in no way due to industrial laxity but on account of the fact that the use of suitable alternating current was not developed by the technical branches of the service.

In 1940 I found that exactly similar conditions pertained in the French Army Medical Service.

At the beginning of the 1939–45 War the same handicap meant that we had to rely in many cases on local supplies within the B.E.F. and those who knew the French system of transmission were despondent. The Army X-ray Advisory Committee (see later) made many recommendations but no funds were ever available to permit of their realization. These conditions as they existed caused an overwhelming demand at the outbreak of war and we had to face priorities and compete with other Services demanding similar equipment. Delays followed in consequence, but credit is due to the adaptability and energy of the British X-ray industry and somehow we were just able to obtain sufficient to keep going until bulk supplies became available in spite of setbacks such as the total losses in France and the calls made upon us to help Allied Forces. When new generators were sent to operational areas they had not been listed in authorized stores with the result that in many cases they drifted into other units or were filched for lighting purposes in offices instead of reaching their rightful places in the big hospitals. Forceful removal from the unwilling holders caused "gloom" in their offices.

In the small space at my disposal I cannot attempt to enumerate outstanding incidents in the many military operations both British and foreign in which X-rays were used successfully or describe the advances from coils to oil-immersed transformers; from the vagaries of the green gas tube to the reliable rotating anodes; from slow plates to super speed films; from laborious dangerous trial and error to high power and speed in comparative safety due to the adoption of the British Protection Committee's internationally accepted regulations; from the early and simple clinical deductions to the many certain diagnostic investigations and therapeutic treatments.

The R.A.M.C. has always been in the forefront in organizing X-ray teaching and there has been some form of Army X-ray school since about 1903. The teaching of X-rays up to the end of 1914 was the province of the X-ray attendant under the control of the Professor of Military Surgery there being no specialists until a later date. Among the many distinguished early teachers in the Corps the following are outstanding, Lieut. and Q.M. Bruce, R.A.M.C., prominent in Egypt and the South African War; later Mr. Worrad and then Mr. Henry. Amongst N.C.O. students who later became teachers were A. J. Walton (the first official Army X-ray instructor), J. Levey and W. Cairns. The three latter finished their Army service in X-ray work and have now retired after completing another career of equal length in civil X-ray work. Among the 1914–18 post-war N.C.O. students and teachers were Mr. Kenny and Mr. T. Longmore both well known in Civil Radiographic Science to-day.

The advent of the Army radiologist and systematized clinical training in radiology commenced with the establishment of the diploma in radiology of Cambridge University and the introduction of specialists in radiology in the
R.A.M.C. promotion courses from 1920. The Cambridge diploma and the college courses were not, however, the first opportunity for Army officers to study X-rays as the Indian Medical Service established an X-ray Institute at Dehra Dun in 1909, under the able direction of the late Major Walters, I.M.S., and awarded a specialist qualification in electrical science after a short but very intensive and complete course. I had the opportunity of taking this qualification in February 1910 and was employed as a specialist in electrical science in India until 1914, in which year I proceeded with No. 7 Field X-ray Section to France. This was probably the first time that X-ray units had functioned outside India as independent self-supporting units and survived without being merged into the hospitals with which they worked (I do not think this was a really good system as the units were far too small to self-support). In 1921 I had the opportunity of qualifying as a specialist in radiology after the promotion course at the College and coincidentally obtained the Cambridge Diploma. I was then posted to the Queen Alexandra Military Hospital, Millbank, as the first Army specialist in radiology to be employed as such.

From that time onwards Army X-ray teaching was conducted on specialist lines by the radiologist at Millbank, nominally under the Professor of Military Surgery. Many distinguished officers and other ranks qualified as radiologists and radiographers and they usually took the corresponding qualifications D.M.R.E., or M.S.R., and filled appointments at other large hospitals at home and abroad. Radiology progressed rapidly between the wars and close liaison was kept up between the Army X-ray School, the Röntgen Society and later, the British Institute of Radiology. Two of the Army specialists have occupied the Presidential Chair of the Institute.

In 1926 the War Office formed the Army X-ray Advisory Committee consisting of civilian and military members—radiologists and physicists—under the chairmanship of the consulting surgeon to the Army as it is a War Office rule that all chairman of official committees must be serving officers. All aspects of radiological preparedness for peace and war were periodically reviewed. Home hospitals were regularly visited and inspected but this committee really failed throughout its life in its objective because no funds were made available by the Treasury either to establish or test the main technical proposals put forward.

In September 1939 the committee was disbanded as the Director-General decided to place radiology in a definite position by appointing a full-time adviser, later Consultant, in Radiology at the War Office to advise and correlate all matters concerning the speciality. I had the honour of being given this appointment and of carrying it through the war during which a very successful collaboration was instituted with A.M.D. 1 (Personnel), A.M.D. 2 (Accommodation) and A.M.D. 3 (Medical Supplies) as the principal co-ordinating executive offices. The enormous expansions in equipping new hospitals after Dunkirk was carried out by standardization of main equipment, the adoption of any worth-while development and the ordering of bulk supplies. The supply of radiologists and radiographers never failed as when qualified intake from civil
life ceased to be available the Army X-ray school taught selected officers and men by intensive courses. Some 60 officers and 1,000 radiographers, along with many allied officers and men, passed through the school.

Each operational area had an Adviser in Radiology appointed to its staff and he formed the link between the consultant at the War Office and the specialists in his area. These Advisers correlated the clinical, technical and administrative problems locally on the one hand, and with the Consulting Radiologist at the War Office on the other. Numerous visits were made by the Consulting Radiologist to the Advisers and their areas so that first-hand knowledge of all happenings were seen as well as read. The work of the Advisers was very successful in spite of many local obstacles, frustrations, limitations of movement—some avoidable, some unavoidable.

The most interesting new development during the war was the result of an experiment in X-ray servicing tried out at first with the B.E.F. in France in 1939-40. This resulted in the organization of an X-ray Service and central X-ray Service store at the Royal Army Medical College under the supervision of the officers of the Army X-ray School. The service had the technical assistance of a highly qualified X-ray engineer and provided a shuttle service of urgent replacements—“new lamps for old”—for home hospitals and, later, overseas. In fact, the system was so successful that it led later to the organization of a similar type of unit known as surgical workshops. This further experiment finally led to the Army X-ray Servicing being engulfed by the bigger body and later taken over by the Technical Corps, R.E.M.E., etc.

This story does not touch on the many clinical and administrative advances in mass radiography and superficial therapy, that were undertaken but these and other omissions are dealt with in detail in the radiological section of the Medical History of the War.

Since the end of the war a consultative body (Army Surgery and Allied Subjects Advising Committee) has been set up and at the first meeting thereof the following radiological proposals were unanimously agreed and recommended for acceptance:

(a) To continue the radiological teaching centre at the R.A.M. College under the Adviser in Radiology.
(b) To care for the catalogued library of X-ray films, there illustrating war radiology and a corresponding library of slides of same.
(c) To develop clinical photography, black and white, and colour, mass miniature radiography and cinematography.
(d) To care for the museum of X-ray and auxiliary apparatus used in the Army Medical Service.

The successes of radiology in the late war were not confined to the efforts of any person or any group of people but were contributed to by all, the officers etc. successively of the Army X-ray School (1940-45), the Area Advisers, radiologists, radiographers and technicians of the Army Medical Service, the staff and technicians of the firms in the X-ray industry and the photographic film manufacturers.
It is with great reverence that I acknowledge the willing help and wise counsel that was received at all times by the X-ray Services of the Army from the Consulting Adviser in Radiography to the Emergency Medical Service, Dr. A. E. Bardey, O.B.E., D.Sc., F.R.C.P., etc., and from the Senior Consultant in Radiology of the American Army Medical Corps, Colonel Kenneth Allen, M.C., M.D. The wide scientific experience and camaraderie of both these consultants made our work of liaison an easy and very pleasant task. I deem it an honour to have worked with them and to have travelled with the latter on many exciting and extensive tours of inspection of both the British and American Armies.

Finally I trust that the many personal experiences and reminiscences enumerated will be considered as justifiable merely to make the story as complete as possible.