

Henry Snowden Ward (1865–1911) Biography with special reference to X-rays in 1896

Richard F. Mould

Henry Snowden Ward was a professional photographer, Editor of *The Photogram* magazine, itinerant lecturer in England in 1896 on X-rays, and the author of the world's first textbook on X-rays, *Practical Radiography*, which was first published in May 1896 and went into three editions with the later editions, 1898 and 1901, expanded and co-authored with Adolph Isenthal (d~1910), a manufacturer in London of electrical apparatus and X-ray apparatus. Ward was a Fellow of the Royal Photographic Society and a founding member of the Röntgen Society. As with most early demonstrators of X-rays imaging, Snowden Ward left the field once qualified physicians, surgeons, physicists and engineers became more involved and took over as the prime leaders in X-ray diagnosis and therapy. Snowden Ward went on to publish and lecture on Charles Dickens, Geoffrey Chaucer's *Canterbury Tales* and William Shakespeare. He died suddenly in December 1911 in New York whilst on a Dickens & Shakespeare lecture tour of the USA. Some of the illustrations from the three editions of *Practical Radiography* are included.

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Introduction

One of the earliest groups of *experts* on X-ray skiagraphy was not surprisingly photographers: both professional and amateur. (Henry Snowden Ward was a Fellow of the Royal Photographic Society — FRPS). Another early group experimenting with X-ray imaging were physicists/electrical engineers who had already available the necessary apparatus required for X-ray imaging in their laboratories, since many had been studying electric discharge phenomena immediately before Röntgen's discovery of X-rays at the end of 1895. Of the photographers, none were more important in those early days than Henry Snowden Ward, Figure 1, Editor of *The Photogram* magazine which was published by the company Dawbarn & Ward of Farringdon Avenue, London. He published the world's first textbook on X-rays, *Practical Radiography* in May 1896, which ran into three editions with the second and third editions co-authored with Adolph Isenthal [1–3].

The first edition, Figure 2, [1] preceded the earliest American X-ray textbook, written by a physician, William James



Figure 1. Henry Snowden Ward

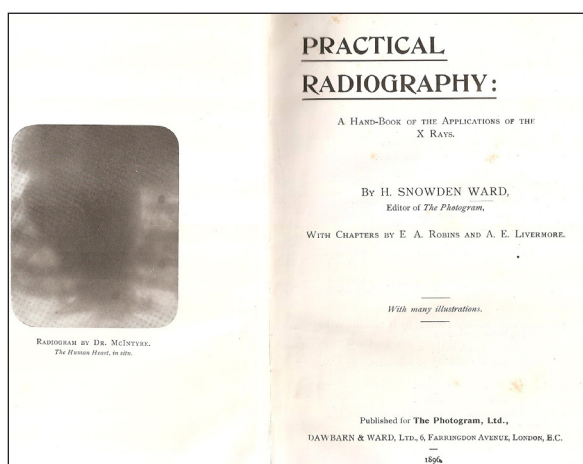


Figure 2. Frontispiece and title page of Snowden Ward's 1896 textbook

Morton (1845–1920), by only some four months [4]. It is noticeable that both Ward and Morton required assistance in writing their texts from electrical engineers: E.A. Robins & A.E. Livermore by Ward and E.W. Hammer (1867–1951) by Morton.

Imaging was so new at this time to photographers (who must have had very little medical/anatomical knowledge) that Snowden Ward published the cardiac image (the human heart in situ) upside down, as clearly seen in Figure 2. It is also noticeable in Snowden Ward's publications [1–3, 5, 6] that he hardly ever published any X-ray images taken by himself and instead acted as an editor for images taken by others. They were instead those taken by, for example, John Macintyre (1857–1928) a physician at the Glasgow Royal Infirmary; Colonel James William Gifford (1856–1930) a wealthy amateur scientist on Chard, Somerset, who had his own laboratory; and Alan Archibald Campbell Swinton (1863–1930) an engineer (electrical, mechanical & civil) who took the first medical radiograph in the United Kingdom, 13 January 1896. The only example of his own work published by Snowden Ward was of a hand with a double-thumb. This was taken in March 1896 but not published until 1905! [7]. It is likely that Ward made use of locally available apparatus, e.g., from school laboratories, when giving his X-ray demonstrations following his lectures. He did not have his own X-ray laboratory.

Snowden Ward was a founder member of the Röntgen Society, London, and served on its Council and as an editorial adviser on the *Archives of Skiagraphy*, the world's first X-ray journal, founded in 1896: as well as on the editorial board of the *Journal of the Röntgen Society* which issued its first number in 1904.

Magazines 1896

Prior to publication of *Practical Radiography* in May 1896 [1], Snowden Ward was instrumental in publishing a Special

Issue of *The Photogram* in February 1896 which was entitled *The New Light and the New Photography* [5] and in April 1896 he also wrote for the *Windsor Magazine* on *The Marvels of the New Light. Notes on the Röntgen Rays* [6]. The very popular *Strand Magazine* (which serialised Conan Doyle's Sherlock Holmes stories) of July–December 1896 published *The New Photography* by Alfred William Porter (1865–1939) an assistant Professor of Physics at University College, London [8]: but this had no input from Ward.

Photogram magazine, February 1896

The 15-page February 1896 Special Issue of *The Photogram* [5] predates Snowden Ward's textbook *Practical Radiography* [1] of May 1896 and contains three papers. {1} Notes on *Early Work on Invisible Rays* by E.J. Wall FRPS. {2} Translation by Arthur Stanton (d. 1898) of Röntgen's first communication [9] *On a New Kind of Rays*: reprinted from *Nature*; with a supplement giving a condensed report of Mr A.A.C. Swinton's experiments which had been published in *Nature*. Two illustrations of 'Shadowgraphs' by Mr Swinton were 'Metal objects in wooden box. Exposure 4 minutes' and 'Razor closed and in a cardboard case. Exposure 4 minutes.' Two illustrations of 'Shadowgraphs' by Mr J.W. Gifford FRPS were 'Metal discs through two sheets of cardboard and a sheet of aluminium. Aluminium between discs & plate. Exposure 10 minutes' and 'Shadowgram without Crookes' tube. Metal discs through cardboard box. Exposure 10 minutes.' {3} *A Comparison of Cathodic and X-Rays* by E.J. Wall. {4} *The Work of Mr J.W. Gifford* by H.S. Ward. In this same issue, *The Photogram* advertised 'Lantern slides of the work of Mr Campbell Swinton, supplied by Newton & Co., of Fleet Street, London, price two shillings & six pence each'. Mr Gifford's shadowgraphs were advertised at price one shilling and sixpence each.

Windsor Magazine, April 1896

The *Windsor Magazine* for April 1896 issue containing the Snowden Ward article (which was dated at the end as 12 February 1896) [6], commissioned a drawing of 'Professor Röntgen at Work' and also three photographs. These were of Mr Gifford experimenting in his laboratory, Mr Campbell Swinton and his apparatus used for lecturing [10], and making Crookes' tubes in Mr Cossor's workshop. The term *electrography* was used and not radiography, and the X-ray images were called *electrographs*. In the Introduction to his May 1896 book [1] Ward refers to terminology in the following manner. 'Shadowgraphy, the hybrid but popular title which was introduced to the public in *'The New Light'*, has been dropped in favour of Radiography, a name suggested by Dr Hill Norris, and commendable for its euphony, correctness, and non-committal to any theory. Radioscopy I suggest in these pages as the only possible name for the work with fluorescent screens.' Snowden Ward does not

mention skiagraphy, skiagraphs and skiagrams which were also widely used terms in 1896, e.g., *Archives of Skiagraphy*. The so-called electrographs shown in the *Windsor Magazine* included typical examples early subjects used to demonstrate the photographs obtained with the X-rays. {1} Hand with ring. It was noted that the thumb was indistinct because it was not laid flat on the plate. {2} Fish. These were good test objects for showing bony detail. A plaice and a sole were shown. {3} Foreign object in a limb: in this case a shot embedded in a boy's arm. {4} Bony deformities of a foot.

Strand Magazine, July — December 1896

The article by Alfred Porter in the *Strand Magazine* [8] shows radiographs of hands and of small animals, as do the earlier Snowden Ward articles [5, 6] but in addition also illustrate 'Radiograph of the contents of an explosive book' as well as a photograph of the book propped open. 'It is constructed on the 'bon-bon' principle. One end of the cracker is attached to the cover, the other end to a box placed in a hollow inside the glued-up leaves. When the book is opened the cracker goes off and ignites the contents of the iron vessel. If this is filled with fulminate of mercury and scraps of iron, the result can be better imagined than described. What the contents are can be in part discovered by the new photographic method.'

Practical Radiography, May 1896

The contents of the 1st edition of *Practical Radiography* [1] consisted of eight chapters with the following titles. {1} A brief history. {2} How to make an accumulator. {3} How to make an induction coil. {4} Apparatus for radiography. {5} Practical radiography: electrical. {6} Practical radiography: photographic. {7} Practical radioscopy. {8} Applications and probable advances.

Illustrations

Some examples of the illustrations in the book are now given. Figure 3 is 'an early example of a living hand'. This was typical in that many experimenters following Röntgen's example of 'the hand of Frau Röntgen with ring'. Figure 4 shows a skull with three bullets placed inside. Figures 5–6 show apparatus and Figures 7–8 show advertisements.

Surgical applications

In Chapter {8} Snowden Ward refers to surgical applications and lists the studies he demonstrated whilst lecturing in towns in England. 'In Southport there was a hand with a supernumary thumb: the radiogram enabled the surgeons to decide whether amputation was advisable. In Sunderland there was a needle lost in a child's foot which was then successfully extracted: though previously the surgeon had probed without finding it. In Dewsbury there was a young woman who claimed she had lost a piece of a needle in her



Figure 3. Living hand

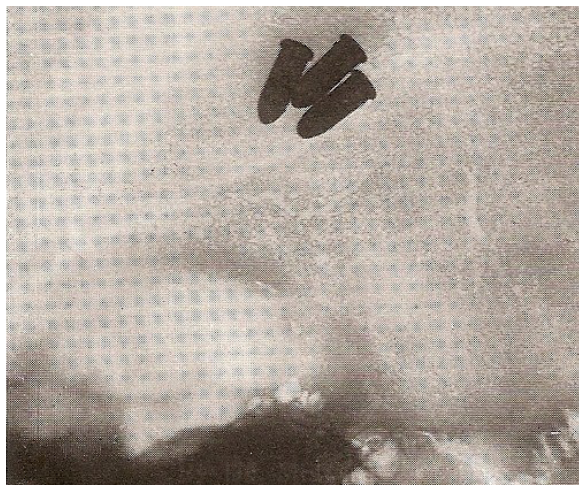


Figure 4. Human skull

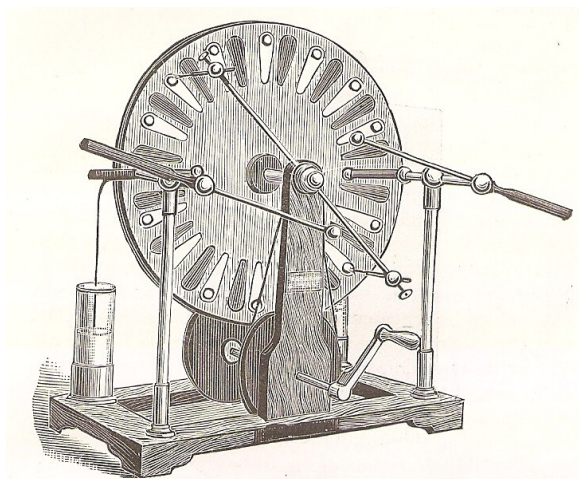


Figure 5. Wimshurst machine

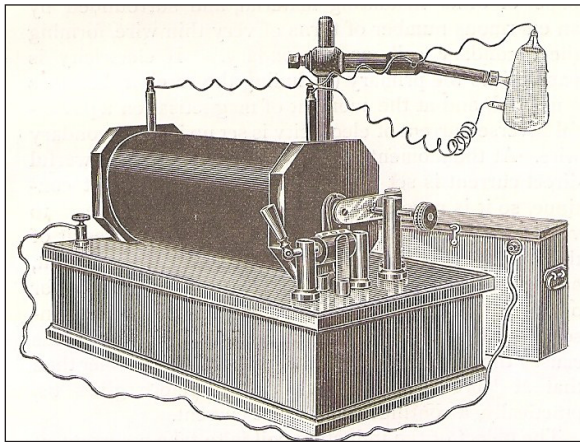


Figure 6. Coil, battery, (pear-shaped) tube & stand

The "GERYK"
PATENT VACUUM PUMP

FOR EXHAUSTING
INCANDESCENT LAMPS
RÖNTGEN TUBES

Infinitely quicker in action than any mercury pump.
Write for detailed list post free.

PULSOMETER ENGINEERING CO., LTD.,
Nine Elms Iron Works, London, S.W.

Figure 7. Advertisement

wrist and could still feel it. There was no trace of the needle in hand and wrist, or from wrist to elbow. The foreign substance had travelled painlessly, as needles in the muscles often will, some distance from the point of entry, but the nerve, slightly injured at the entry spot, still felt pain as if the needle were there.

X RAYS.

X-RAY FOCUS TUBES. Price 22s.
GUARANTEED.

INDUCTION COILS,
At a few days' notice. **2-in. to 20-in. Sparks.** Own make.
Thick Platinum Contacts. Length of Spark guaranteed

3-in. Spark ... £9 0 0. Better make ... £10 10 0.

Patent Pump and Adjunct,
For rapidly producing Crookes' Vacuum. As supplied by us
to the prominent laboratories.

HARVEY & PEAK,
56, Charing Cross Road, London, W.C.
Illustrated Catalogue, Parts 1 and 2, Sixpence each.

Figure 8. Advertisement

Medicinal value: TB & cancer cure

'Medicinal value is claimed by Dr T.S. Middleton of New York, who does not believe in the germicidal properties, but thinks that the rays consist of streams of material particles, and can be used to convey medicinal matter and deposit it at the actual seat of the disease, thus enabling consumption and cancer to be cured.'

Contents of packets

These have already been mentioned, [8]. Snowden Ward's comments were as follows. 'The Post Office and Customs Offices have found radioscopy very valuable in detecting coins concealed in letter packets, watches and other contraband articles in books, etc. The detective force, too, both in Paris and London, have found the method useful for revealing the contents of certain suspected packets, which have proved to be infernal machines. It has been stated that letters can be read by means of the x Rays — and so they can when specially prepared for the purpose; but a letter written on four sides and then folded into two or three is quite safe from x-ray prying. And besides, the opening and re-sealing of a letter is so simple that if anyone wished to pry they would be quite unlikely to trouble with the x Rays.'

Flaws in metals

'Flaws in metals and bad alloying may be detected by radiography, but hardly to any useful extent at present, because the metals we most wish to test are impervious to the rays if in any useful thickness. Still there seems no real reason why radiography should not be so far improved as to enable boiler-plates and even thicker iron sheets that these to be tested by x Rays. It is a most important field of research, and one in which, so far as I am aware, no one is working.'

False gems

'False gems may, in many cases, be detected by their x-ray transparency or opacity. Thus — diamonds are much more transparent than 'paste', and when placed side by side,

the 'paste' will throw a distinct shadow. Imitation pearls and many other gems may be similarly detected.'

Cattle food

'The value of cattle food for bone-forming purposes is being studied with the help of radiography. Sets of animals, carefully fed on different foods, are radiographed at various periods of their growth, and the radiograms or their skeletons compared.'

Radiographing the skull

'Radiographing the skull is not difficult, though radiography of the brain will probably long be impossible. When one side of the skull is laid on the dry-plate, very beautiful detail of its structure can be obtained by long exposure, for the side near the tube is so far from the plate that it casts no distinct shadow. Tesla says that when the rays are thus passing through the brain there is a sense of sleepiness; while another worker has reported that the use of the vacuum tube close to the head causes the hair to fall out.'

X-ray lecture 1896

Advertisements were included in all the three editions [1–3] of *Practical Radiography*, but in the 1st edition only there was an advert for *Lecture Demonstrations on Radiography* given by Snowden Ward. The synopsis was as follows. 'A popular lecture with full demonstration, prepared in the Spring of 1896, and delivered with great success before large audiences in London and many provincial towns. The Lecture is extremely interesting, though accurate and up-to-date. The demonstration includes the work of Crookes and others that led to radiography; with the examples of results obtained by Thermography, Electrography, etc., which have been erroneously attributed to the X rays. The exhaustion of various vacuum tubes, the use of fluorescent and phosphorescent screens, and the radiographing of various objects is shown and explained. About 50 lantern slides of the results of the foremost workers are included, and the work is on a scale that can be well shown in a hall containing 1500 people.'

By chance in the library of my home town, Southport, I found in the local paper, the *Southport Visitor*, for 24 March 1896, an advertisement for a Snowden Ward evening lecture entitled *The New Light and the New Photogaphy*, organised by the Southport Social Photographic Club and held in the Temperance Institute. The newspaper report described the audience and the X-ray demonstration.

'The audience was composed largely of medical gentlemen, professional and amateur photographers, scientific students and hospital nurses. One of the most successful radiograms of a surgical case had been made that afternoon. The patient was a little boy with a double thumb and the exposure was less than one minute. The hand was moved after 15 seconds and from that fact the image was slightly

blurred.' Ward conjectured that the vacuum tube was operating for only one-quarter to one-third of the supposed exposure time. During the evening he tried to take another radiogram of the boy's hand, but the experiment failed.

The image, Figure 9, was published about a decade later in the *Journal of the Röntgen Society* [7]. When Ward commented that it was important 'for the fact that it was one of the first radiograms upon which a successful surgical operation was based.' He also remarked that the exposure was cut short because the child moved his thumb long before the intended exposure had been given.

X-ray demonstration 1897

Figure 10 is from the 2nd edition [2] of *Practical Radiography* and shows an X-ray demonstration set-up on 22 February 1897 before the Royal Photographic Society. Snowden Ward is seen *left* with his hand on an X-ray plate, and on the



Figure 9. Hand with double thumb, March 1896

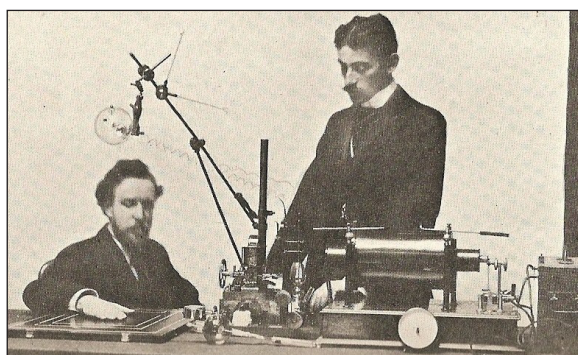


Figure 10. Set-up for an X-ray demonstration in 1897

right is Adolph Isenthal. It is seen that the glass bulb of the X-ray tube is spherical, which soon became the geometry of choice for an X-ray tube, rather than the original pear-shaped geometry.

Obituaries of Snowden Ward

Röntgen Society

The *Journal of the Röntgen Society* published the following obituary of Snowden Ward in January 1912 [11]. 'We regret to record the death of Mr H. Snowden Ward, which took place very suddenly in New York, on 6th December 1911, where he was conducting a series of lectures on Dickens. Mr Ward was one of the original members of the Society and a very energetic member of Council. In the early days of Prof. Röntgen's discovery he took great interest in the 'new photography' and in collaboration with Mr A.W. Isenthal, produced *Practical Radiography* of which a 3rd edition was published. Of late years his many other duties have prevented him from continuing his work in the Society, although he took a keen interest in its proceedings, and was always ready to give advice when appealed to in connection with literary matters. The series of photogravure portraits of past Presidents which the Society publishes was originated largely by his advice and arrangement.'

British Journal of Photography

Snowden Ward's obituary was published in the *BJP Annual Almanac* for 1913 [12]. 'The death of Mr Snowden Ward took place suddenly in New York on 7 December 1911. Mr Ward had left England at the end of October to fulfil a series of lecturing engagements which, in the ordinary course, would have been completed within 5 months. In addition to appearing in his private capacity, he represented the Dickens Fellowship as a Commissioner, and was to have taken part in a number of functions arranged by members of this body in the United States. He was found unconscious in bed at the National Arts Club, New York, (his headquarters in America) on 5 December, and after an unsuccessful operation succumbed 2 days afterwards. He was interred at Albany on Saturday 9 December 1911.

During the year or two previous to his death Henry Snowden Ward had largely withdrawn himself from the photographic journalistic world, in which for many years he had been a leading personality. His interests and inclinations had gradually led him into literary fields and he had found the Lecture Platform a welcome change from the Editorial Chair. Yet it is not too much to say that the news of his sudden death aroused a more widespread sorrow and sense of personal loss than would that of any contemporary of his in photographic circles. Few men in any walk of life had his natural quality of charming all classes of people..'

'He was born at Great Horton, near Bradford, in 1865, and thus was only 46 at the time of his death. His father's business of stuff manufacturing did not attract the literary bent of the boy. At 18 he edited and published a magazine *The Practical Naturalist* and in 1884 became connected with the firm of Percy Lund & Co., at that time publishers and stationers catering especially for photographers. For them, Mr Ward founded and edited *The Practical Photographer* and by his active conduct of it did much from 1889–1893 in the interests (technical, commercial & social) of professional photographers. In 1893 he married Miss Catherine Weed Barnes, daughter of Mr William Barnes of New York, and herself a most enthusiastic amateur photographer in the days when amateur photography was a more serious pursuit than it is now.'

'Mr Ward severed his connection with the Bradford firm, and with his wife founded the monthly magazine *The Photogram*, Their direction, which was one of great energy and originality, speedily caused the publication to take a leading place in photographic journalism, though its success, as a commercial property is open to doubt. The sister magazine, *The Process Photogram*, now *The Photo-Engraver's Monthly*, was founded in 1894, and the pictorial annual *Photograms of The Year*, in the same year..'

'Though these publications made great demands upon his personal attention, yet he took a most active interest in photographic institutions, among them the Royal Photographic Society, the Photographic Convention, of which for many years he was a member of Council and President at the Canterbury meeting in 1909, the Photographer's Benevolent Fund, and many photographic societies at whose exhibitions he was in great request as a judge. Nevertheless he early embraced every fresh opportunity of the technical journalist. For example, on the discovery of X-rays, he was one of the first experimenters in England, wrote the first handbook on the subject, and was one of the founders of the Röntgen Society. He threw himself into the propagandist work of photographic records and with Sir Benjamin Stone, was one of the first to draw attention to the use of photographs in Press Illustration, and was ahead of his time in establishing a Bureau for the supply of photographs to the Press.'

'For some year past Mr Ward with his wife, had taken a keen interest in the application of photography to Literary Topography. The first outcome of their work in this field was the book on Stratford-on-Avon, dealing with the life of Shakespeare, and illustrated by the photographs of Mrs Ward. This was followed by a volume dealing with the wider subject of the life of *Dickens* and the scenes of his novels, by the *Canterbury Pilgrimages*, and by a photographically illustrated edition of *Lorna Doone*. A natural step from the preparation of these books was lecturing on the subjects. For several years past Mr Ward had visited the United States

on a lecture tour round the chief cities — a strenuous life, which, it will be remembered, led to the collapse of Dickens.'

New York Times

The obituary in the *New York Times* gave a detailed description of Snowden Ward's final illness [13]. 'Henry Snowden Ward of Hadley, Kent, England, Fellow of the Royal Photographic Society and husband of the former Miss Catherine Weed Barnes, the sister of William Barnes Jr., of Albany, died under unusual circumstances early yesterday morning in Miss Alston's private hospital at 26 West 61st Street, where had had been taken from the National Arts Club in Grammercy Park on Tuesday night.'

'Mr Ward had lectured on Shakespeare, Thackeray, and Dickens both in this country and Europe. He came from England 6 weeks ago to lecture in connection with the Dickens Fellowship, to the Secretaryship of which he was appointed some months ago in England. He was accompanied by his wife. Mrs Ward went to visit her brother and sister-in-law in Albany, while Mr Ward went on a tour of the cities lecturing on literary subjects. He had made several lecture tours in this country before.'

'Mr Ward lectured in Buffalo about a week ago, and caught a slight cold there, but didn't think much about it. He was scheduled to lecture last Tuesday night before the American Institute in the Berkeley Lyceum. His abilities as a lecturer were well known and many members of the Institute gathered in the rooms of the organisation at 8 o'clock on Tuesday evening for his lecture on the subject of *Dickens, Thackeray and Shakespeare*. Mr Ward, however, did not appear.'

'The audience waited until almost 9 o'clock, and was then dismissed. Several of Mr Ward's more intimate friends hastened down to the National Arts Club in Grammercy Park, where Mr Ward had been staying. Failing to find him anywhere on the main floor of the Club, they went up to his bedroom on one of the upper floors. Mr Ward was unconscious on his bed. When aroused, he seemed dazed and complained of a severe pain in the ear. Dr William Seaman Bainbridge and Dr Cleveland Cady Kimball, both of 34 Grammercy Park were summoned. Mr Ward was able to tell them that he had caught cold in Buffalo 2 weeks ago and that he had a bad earache. Then he became unconscious. He did not at any time complain of any cough or pain in the lungs. He was removed under Dr Bainbridge's direction to Miss Alston's hospital and when Dr Duel of the Manhattan Eye & Ear Hospital was summoned, he found a slight abscess in the patient's ear.'

'Symptoms arousing suspicions, the physicians made tests of his spinal fluid, and of the result Dr Bainbridge said this yesterday to a *Times* reporter: 'The man's spine was literally swarming with pneumonia germs. It seemed as though they were actually devouring him.' Seeking to drain off the

germs, Drs Duel & Bainbridge then performed the mastoid operation, making an outlet on the left side of the skull from the brain. The pneumonia germs increased as fast as they were drained off, however, and Mr Ward died shortly after 1 o'clock yesterday.'

'Mr Ward was 46 years of age. He was the Editor of *The Process Engraver's Monthly*, of *Photograms of the Year*, and of several series of technical handbooks. He was born in Great Horton, Bradford, and was the son of a manufacturer named William Ward. He married Catherine Weed Barnes in 1903, she being the daughter of William Barnes of Albany and Nantucket, and the granddaughter of Thurlow Weed.'

'After being educated at the Bradford Technical College, Mr Ward edited successively *The Photographers' World*, *The Practical Photographer* and *The Photographic Monthly*. He was one of the founders of the Roentgen Society, was a Past-President of the Photographic Convention, and an Organizing Secretary of the Legion of Frontiersmen. He had written many works on literary and technical subjects and was a member of the Authors' and the Camera Clubs.'

Röntgen's shotgun 1896

Figure 11 is the frontispiece of the 3rd edition of *Practical Radiography*. It is described by Isenthal & Ward as 'Radiogram through a double-barrelled gun, showing penetration and

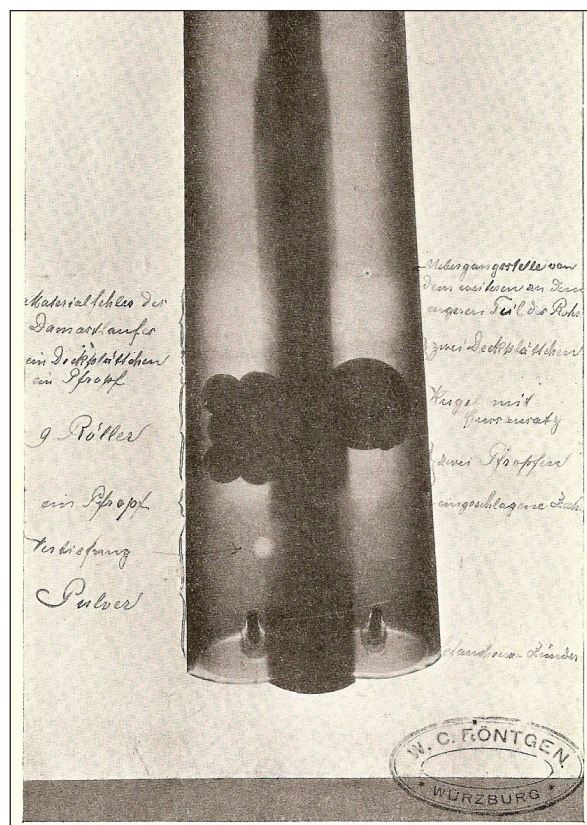


Figure 11. X-ray image of Röntgen's shotgun. He was reputed to have enjoyed hunting and to have been an excellent shot. This X-ray image was made in the summer of 1896 and sent with marginal notes to Franz Exner in Vienna

differentiation of rays. (Reproduced from Prof. Röntgen's original, presented to one of the authors). The author was Adolph Isenthal, not Snowden Ward. The oval stamp reads W.C. RÖNTGEN on the top and WÜRZBURG on the bottom.

Adolph Isenthal met with Röntgen in 1898 and a description of this event exists in the British Institute of Radiology archives [14]. 'In April 1898 I was asked by my colleagues on the Council of the Röntgen Society, to arrange, if possible, for an interview with Röntgen at Würzburg University. Obtaining Röntgen's consent I called on him at his laboratory in the Physical Institute, where he explained to me the set up of his apparatus when he was led to the discovery of a new form of radiation. Röntgen was a very tall man, with a scholarly stoop, his face somewhat pock-marked, stern but kindly, and very modest in his remarks upon his achievement. I felt, of course, greatly elated at being in the presence of this world-renowned scientist. I became even more so when he asked me to accompany him to his private residence, offering me tea and chatting to me about 'this English Röntgen Society' which I represented. He could, however, not accept my semi-official invitation to come to England, owing to so many previous engagements.

In the course of our conversation he enquired of me whether we, in England, knew of the biological effects of the X-rays, and from a large portfolio produced some telling photographs of skin affectations, and asked me to make the facts known over here.' Isenthal concluded his report with: 'On my return to England, I reported to the Röntgen Society, however, without evoking much interest regarding Röntgen's warning... as for myself, however, I immediately took what precautions were then possible.'

Figure 12 shows Röntgen's shotgun and its X-ray image in 1995 in the museum of the Physics Department of Würzburg University.



Figure 12. Part of the Röntgen exhibition in the Physics Department, Würzburg University. The shotgun and its X-ray image can be seen on the right. In the centre is the Certificate for his 1901 Nobel Prize for Physics

Conflict of interest: none declared

Richard F. Mould, MSc, PhD

4, Town End Meadow
Cartmel
Grange-over-Sands
Cumbria LA11 6QG
United Kingdom
e-mail: manorroadsouthport@yahoo.co.uk

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