

HISTORY OF THE DISCOVERY OF X RAYS

PART III – RÖNTGEN'S LENNEP AND WÜRZBURG – 100 YEARS LATER

W C G Peh

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Wilhelm Conrad Röntgen, the discoverer of X rays, was born in the medieval town of Lennep in Germany 150 years ago. Fifty years later, during his tenure as Professor of Physics at the University of Würzburg, Röntgen made his epic discovery which is currently being commemorated worldwide. The author undertook a pilgrimage to Lennep and Würzburg at the beginning of the Röntgen Centenary, and attempts to describe the towns, as well as to show how Röntgen is remembered in these two places.

LENNEP

Lennep, located in the Rhine region of Germany, lies 40km east of Düsseldorf and 50km northeast of Cologne. It is easily accessible by train or by car via the autobahn A1. A well-preserved ancient town retaining its traditional architecture and set amidst peaceful countryside, Lennep is worth visiting – even for those without an interest in Röntgen.

The rights of an independent city were granted to Lennep as far back as 1230 AD. It was known initially for its skilled artisans and traders, who provided their services to communities in the surrounding area, as well as to travellers passing through. Despite being sacked by invaders and razed by fire several times over the following six centuries, Lennep managed to survive, rebuild and retain its identity. The first cloth weaver was known to be working in Lennep in 1350. In the 1400s, the town was just beginning to be recognised for its growing textile industry. By the 16th century, the weavers guild had taken over control of the textile trade from the religious groups. At the end of the 17th century, Lennep was famous for its high quality woven woollen material. When Röntgen was born in 1845, Lennep was a centre for mechanical weaving, with 36 firms operating in the city. Röntgen's father, a textile merchant, had in fact come to live there for this reason.

Today, the 'Alstadt' (old town) of Lennep still retains its medieval configuration of small squares and narrow, crooked streets. The architectural centrepiece of the town is the old church, with its distinctive spire, situated in the main square to which all the streets seem to lead. The town's present character is the result of the stubbornness of its citizens, who insisted on rebuilding the town according to the original ancient plans after it was last destroyed by fire in 1746. These old buildings were rebuilt again following heavy bombing during the Second World War. In 1929, Lennep was made to merge with the neighbouring town of Remscheid, much against the wishes of the former's inhabitants, hence today's official name of Remscheid – Lennep. The majority

of the buildings in the town have the traditional grey slate exterior, white window frames, green shutters and green doors. A good example of this type of design can be found in the house where Röntgen was born (Fig 1), which still stands along a narrow cobbled street, Gänsemarkt 1. A plaque on the outside wall of the house indicates it as Röntgen's birthplace. The layout of the rooms, the narrow staircases and the low doorways have been faithfully preserved. The house is now home to an extensive radiological library of over 10,000 radiology books and 120 journals.

Fig 1 – The house where Röntgen was born, now a library of radiology books and journals.



The Deutsches Röntgen Museum (Fig 2) is situated 150 metres away at Schwelmer Strasse 41. Memorabilia pertaining to Röntgen's personal life and his discovery are kept in this traditional-style old house, built in 1803 and bought by the city in 1930 for the museum. Modern extensions to the back of this building have enlarged the exhibition area to 2300 square metres. Despite this, only 20% of the extensive historical collection can be displayed at any one time. Many of Röntgen's personal effects can be viewed, including items like his camera, photographs taken by him, letters, his research papers, his furniture and photographs of family members. There is a full-scale reconstruction of the X ray equipment that he used in his old laboratory in Würzburg. (Fig 3)

Besides preserving the memory of Röntgen, the museum has a huge collection of historical instruments, machinery and documents. Non-medical applications of X rays are also highlighted, for example, in industry, art, criminology and astronomy. There is even a full-sized radiograph of a Mercedes Benz sports car on display! Many of the exhibits are interactive and there is a "hands-on" experimental laboratory emphasising the basic principles of physics. The museum runs courses on radiation protection and offers classes on 'radioactivity and X

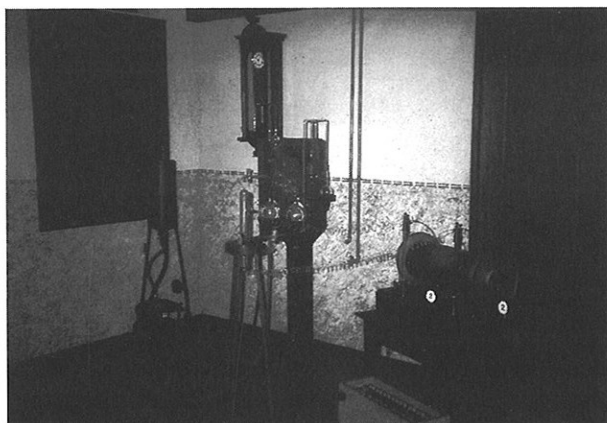
Department of Diagnostic Radiology
The University of Hong Kong
Queen Mary Hospital
Hong Kong

W C G Peh, FRCR, FHKCR, FHKAM, FAMS
Senior Lecturer and Consultant

Fig 2 – The Röntgen Museum in Lennep.



Fig 3 – Replica of Röntgen's apparatus for generating X rays, displayed at the Röntgen Museum, Lennep.



rays' for school groups. The Museum receives about 30,000 visitors each year, 40% of whom are school children.

The idea for a museum in Lennep was first mooted by Professor Paul Krause, President of the Deutsches Röntgen Society in 1909. The museum opened in 1932, and is currently run by the city of Remscheid-Lennep. The Society of Friends and Supporters of the Deutsches Röntgen Museum was founded in 1951 with the aim of supporting the Museum and instructing the public about X rays and its applications. One of the Society's important functions is to nominate candidates for award of the prestigious Röntgen Plaque. Recipients of this annual award, given in recognition of their contribution to radiology, are invited as guests of the city and are presented the plaque by the Lord Mayor in a public ceremony. Past winners have included luminaries such as Nobel Prize Laureates Arthur Compton, Max von Laue, Lawrence Bragg and Godfrey Hounsfield.

WÜRZBURG

The Baroque city of Würzburg has been dubbed the pearl of the Romantic Road, a 420 km stretch of medieval towns, villages, castles and churches running from Würzburg in the north of Bavaria to the Austrian border in the south. Würzburg is situated on the banks of the river Main, upstream of Frankfurt. It is located 115km from Frankfurt and is easily accessible by car on the Frankfurt-Nürnberg autobahn. High-speed inter-city trains connect Würzburg to Frankfurt, Munich, Stuttgart and Hamburg.

Being situated at the crossroads of two ancient trade routes, Würzburg had always been prosperous. Starting from the 10th century, Würzburg was ruled by powerful and wealthy prince-

bishops, who were responsible for building the city as seen in its present form. For 450 years, the prince-bishops lived in the 13th century Marienberg Fortress, which today still commands dominating views of the city and the vineyard-covered slopes of the Main valley. The Residenz, a spectacular Baroque palace across the river, was home to the prince-bishops after they decided to relocate from their hilltop castle. Constructed in the 18th century, the sumptuous series of buildings have been referred to as the "palaces of palaces". A trio of ancient churches, including the 14th century St. Mary's Chapel, is clustered around the Market Square, considered by many of Würzburg's residents to be the heart of the city. Largely flattened by Allied bombs during the Second World War, Würzburg has been authentically restored to its former glory.

The Physical Institute (Fig 4) where Röntgen worked and lived is situated along a main thoroughfare named Röntgenring, in honour of the discoverer of X rays. Located nearby is Juliusspital, a massive Baroque-rococo hospital complex established back in 1576 by a Würzburg bishop. The former Physical Institute and the surrounding buildings have been taken over by a regional polytechnic, the Fachhochschule Würzburg-Schweinfurt. The original laboratory where Röntgen made his discovery is still preserved, an appointment is however needed for a viewing. Inside are various pieces of equipment such as vacuum tubes, electrostatic generators and induction coils, photographs of Röntgen and his family members and a collection of books and scientific papers. A small display area is located just outside the laboratory; exhibits include the original glass tubes used by Röntgen (Fig 5), various awards presented to Röntgen and a plaster cast taken of Röntgen's hands just after his death (Fig 6). Further along the corridor, in a foyer outside a lecture hall, is a television monitor which, on touch of a button, plays a video recording relating Röntgen's life and discovery. In the meantime, young German polytechnic students pass by on their way to and from classes, curious about the nationality of the latest visitor to the campus! An inscription on the outside wall of the Physical Institute, facing Röntgenring, reads "In this building in the year 8.11.1895, W.C. Röntgen discovered the rays which were named after him". A monument to Röntgen stands in a small park to the side of the Institute (Fig 7).

The Department of Physics of the University of Würzburg is now located at the new campus on the outskirts of the city. The new Physical Institute is a low-rise, sprawling modern building set within spacious grounds. After negotiating a maze of corridors, one comes upon three display cabinets. Viewing of its contents is again made by appointment; there are few visitors probably because of the remote location of the University campus. A bronze bust of Röntgen sits upon a pedestal, it is a preliminary cast sculpted by Reinhold Felderhoff (1865-1919) for the famous Röntgen statue on the Potsdam Bridge, Berlin. Housed within the cabinets are many original items, including vacuum tubes from Röntgen's laboratory, his Nobel Prize, hunting rifle, (Fig 8) and a box of lead weights. Röntgen made radiographs, now famous, of the last two items a century ago. (Fig 9 a and b).

CONCLUSION

Röntgen's memory is still very much kept alive in Lennep, his birthplace, and to a lesser extent in Würzburg where he had, 100 years ago, discovered the rays which have made such a great impact on the practice of medicine.

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Fig 4 - Original Physical Institute, as it appears today. Note the inscription on the wall stating "In this building ... Röntgen discovered the rays which were named after him". The Röntgens lived on the top floor of the Institute.



Fig 5 - Cabinet containing glass vacuum tubes used by Röntgen



Fig 6 - Plaster cast made of Röntgen's hands just after he died.



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Fig 7 - Monument to Röntgen located in a small park adjacent to the original Physical Institute



Fig 8 - Display cabinet housing Röntgen memorabilia, including his Nobel Prize and hunting rifle, at the new Physical Institute.



Fig 9a - Original wooden box of lead weights, with lid open.

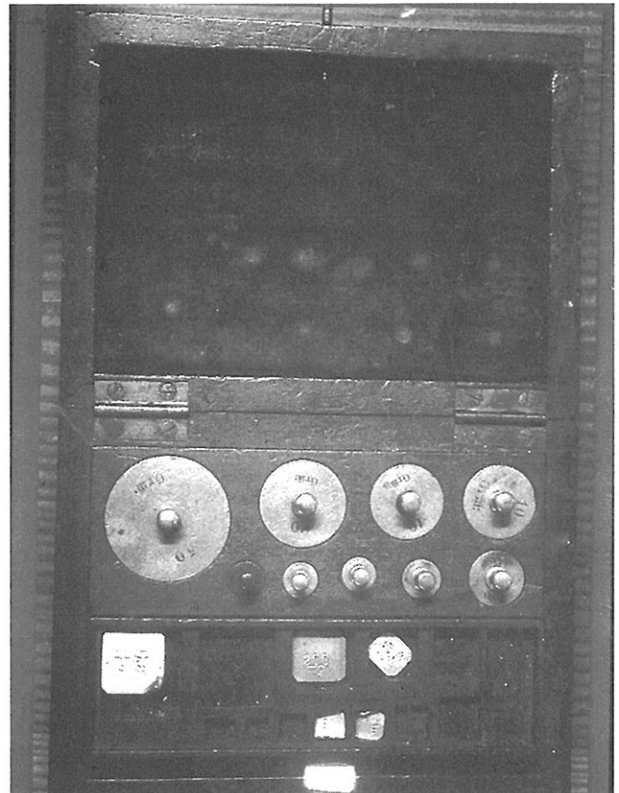
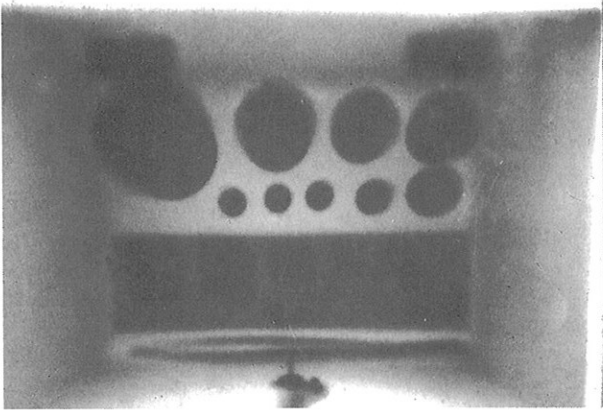


Fig 9b – Röntgen's 1895 radiograph of the box of lead weights, taken through the closed wooden lid.



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