Case 1
After graduating as a biomedical engineer Peter and his girlfriend, Eva went for an adventure trip to Nepal. Eva graduated last year as a hospital physicist. In a small mountain village their pink coach broke down and all passengers had to stay with the local citizens for a few days. At the local hospital some of the technicians inform Peter and Eve how they received an x-ray equipment as aid to help diagnosing fractures.

With some assistance from the donor country they were able to make the equipment functional. Developing the x-rays films had to be manually done in a small darkroom in the basement. Cassettes were supplied with the equipment but they discovered that the images got worse when they bought new film.

A year earlier from now the equipment had stopped working after intense thunderstorms. Peter and Eve got curious and wanted to look at the apparatus. At first the nurse did not want to let them in maybe because of the mess in the investigating room. After inspection Peter and Eve found out that the fuse was blown but luckily they found a suitable spare one in the bus. They started the generator, delivering high voltage power, and slowly they dared to increase the current to the filament. The anode plate started to rotate and on a fluorescent monitor they were able to see that x-rays were generated.

Eva asked for an ionisation chamber. At first nobody understood what she was asking for but the nurse remembered an instrument with the name of Electrometer supported with something looking like a tin can. This was exactly what was needed and it worked. It showed a response as current was passing the cathode at a high voltage of 60 kV. An unpleasant thing was that the meter showed maximum already at low current levels and no calibration constant for the chamber was found. The nurse also found a small box of rectangular plates of aluminium and copper suitable to fit into the small slot in the tube housing. Eva remembered that she had used the same type of plates for determination of the HVL (half value layer) during her education.

They were now ready to take their first images but for safety reasons they used Peter's wallet as test phantom. They found some film but did not put it into a cassette. They thought it might give contrast anyway between leather and coins in Peter's wallet. The image quality was bad but anyway they succeeded to get images of Peter few coins.

Now the bus was ready for departure but Peter and Eve already had decided to come back as volunteers for the Red Cross as soon as possible. First they had to go back to Sweden to find spare parts and a test phantom to make the equipment competent. Before they went the nurse wanted to show some images on an abdomen. The nurse remembered that they used a grid for examinations of the abdomen. The images were sharp in the middle but otherwise it was uniformly grey. The image quality was much better when the doctor had put film-cassettes on top of a box at some distance from the patient instead of the grid.