

The Nobel Prize in Physiology or Medicine 1979

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11 October 1979

The Nobel Assembly of Karolinska Institutet has decided today to award the Nobel Prize in Physiology or Medicine for 1979 jointly to

Allan M Cormack and Godfrey Newbold Hounsfield

for the “development of computer assisted tomography”.

An X-ray examination usually implies the passage of X-rays through an organ with a resulting image of the organ on X-ray film. The dark areas on the film vary according to the anatomy and the structure of the tissues being X-rayed.

A peculiarity of this picture is that it is two-dimensional. In the reproduction the dimension of depth is lost. This means that an overall picture of the lungs, for example, is a composite one in which all the details in the path of the rays are overlapped. In order to acquire any depth perception, one must complement frontal exposures with lateral exposures. The radiologist's interpretation of possible changes in the lungs is based on his knowledge of the normal anatomy of the lungs and of the properties of the pathological abnormalities. But the nature of the final X-ray image makes judgement in certain cases undeniably subjective. Therefore, in many situations there is a need to be able to isolate the image of a section of an organ from the overlying structures by so-called tomography (from the Greek *tomos*, a cut, and *graph*, written). Many technical solutions have been tested during the course of the years but none have been found to be entirely satisfying. For purely physical reasons one can never achieve a complete eradication of other sections of the organ, and the picture's contrast is reduced. This is true even when one allows the radiation beam to run parallel to the examined section so that the rays proceed from one edge to another. There are *other limitations to conventional radiological diagnostics*. One is that X-rays cannot be utilized to more than 25 %; another the X-ray film has a relatively low sensitivity in the reproduction of the variations in tissue density.

In computer-assisted tomography these problems have been ingeniously solved. When the method was introduced into medical care six years ago it quickly became apparent that it signified something revolutionarily new, with great repercussions with X-ray diagnostics and the medical disciplines that make use of it.