Godfrey Hounsfield
"Each new discovery brings with it the seeds of other, future inventions"

By Iwona Sudoł-Szopińska (radiologist) and Marta Panas-Goworska (culture expert)

28 August was the 100th anniversary of the birth of Sir Godfrey Newbold Hounsfield.

Godfrey Hounsfield was born on 28 August 1919 in Newark, England. His parents were farmers, and it was at their family farm where the talents of this Nobel Prize laureate showed for the first time. On his own, he mended various machines and even constructed a glider, which he did not forget to mention in his speech at the Nobel Prize gala in 1979:

I made hazardous investigations of the principles of flight, launching myself from the tops of haystacks with a home-made glider; I almost blew myself up during exciting experiments using water-filled tar barrels and acetylene to see how high they could be propelled.

It would seem that these skills would surely make him an outstanding student and later scientist. This, however, never happened. He was only average at school, and before World War II he enrolled voluntarily on the Royal Air Force (RAF), where he fathomed the arcana of electronics. After the war, owing to the support of his superiors from the army, he was accepted at the Faraday House Electrical Engineering College. This was not, however, a higher school of engineering as we understand it today, but rather a specialist school bridging vocational education with polytechnics that would appear later in the 1960s. This means that genius Godfrey Hounsfield was never formally an engineer and, although he worked in the area of broadly understood information technology, he would speak of his educational shortcomings with these words:

You've got to use the absolute minimum of mathematics but have a tremendous lot of intuition.

Intuition was not lacking in his subsequent employers from Electric and Musical Industries, i.e. EMI, who made him the team leader of constructors working on the first transformer computer in the United Kingdom. After the year 1967, Hounsfield was given a free hand and began working on computed tomography, the name of which derives from Greek *τομή*, *tomé* meaning *section* and *γράφειν*, *gráfein* meaning *write*. It is worth mentioning that EMI also released albums of The Beatles, which made the company very rich, and, legend has it, some of this money was used to pay for this very research. As to computed tomography, however, Hounsfield had a budget of 25 thousand pounds, which would today be almost 450 thousand pounds, and a three-member team: a programmer, a mechanical designer and an electronics engineer. With these means, he constructed his first prototype computed tomography scanner. Apart from him, American physicist Allan McLeod Cormack (born in the South African Republic) independently developed calculations needed for computed tomography but was forced to abandon his studies due to the difficulties with obtaining funds. For these

inventions, Hounsfield and Cormack received a Nobel Prize in physiology and medicine in 1979. It should be mentioned here that the original mathematical theory used in the computed tomography software was developed in 1917 by Johann Radon, an Austrian mathematician. Cormack, on the other hand, based his studies on the method (algorithm) of solving linear equation systems with a large number of variables (iterative algorithm), which was created in 1937 by a Polish mathematician, Stefan Kaczmarz.

Until the end of his life, Godfrey Hounsfield worked on perfecting the CT scanner, directing his interests towards magnetic resonance imaging. His co-workers remember him as a humble, quiet and very helpful man. When he took part in the celebrations opening a library in his former school in 1983, he said to the students gathered there:

Each new discovery brings with it the seeds of other, future inventions. There are many discoveries, probably just around the corner, waiting for someone to bring them to life".

Could this be possibly by you?

Iwona Sudoł-Szopińska and Marta Panas-Goworska

Images

Fig.1. X-Ray scanner with the team from L/R Godfrey Hounsfield (The inventor of the scanner), Tony Williams (Mechanical Designer), Peter Langstone (Electronics expert), Steve Bates (Computer Programmer), Chris Lemay (Mathematician who worked out the technique for the computer). April 1975. https://www.historybyday.com/inventions/the-man-behind-the-cat-scan-sir-godfrey-newbold-hounsfield/img/catScan03-66435.jpg
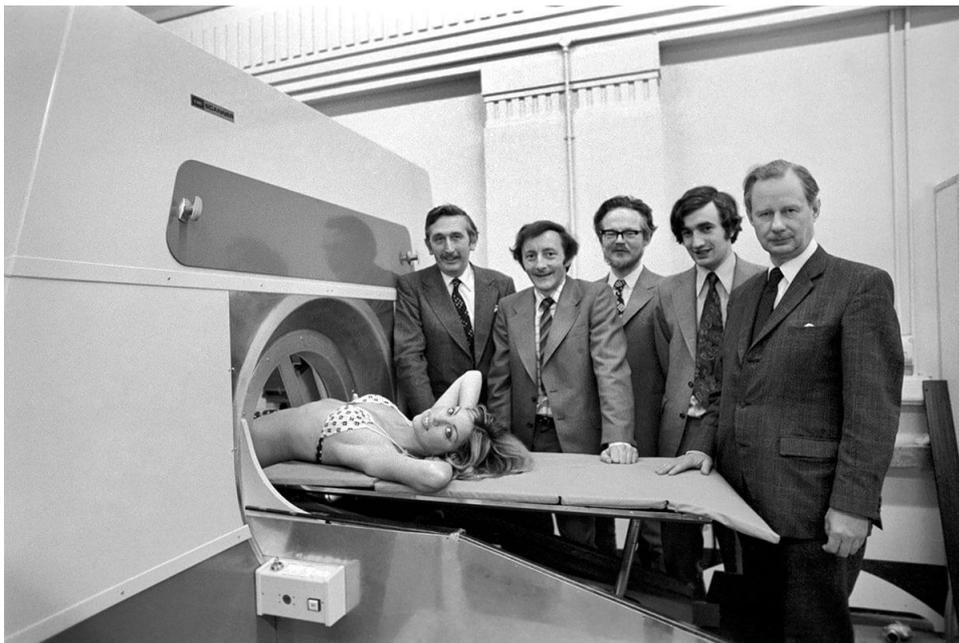
Fig.2.Hounsfield at the tomography scanner

hounsfield/img/catScan05-46343.jpg

Fig.3.Hounsfield's sketch of the prototype CT scanner
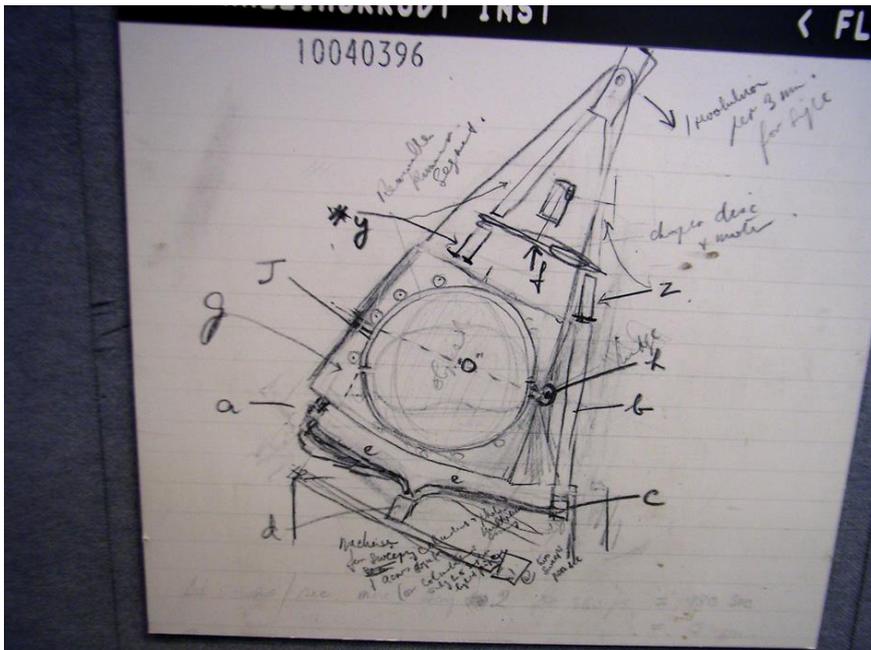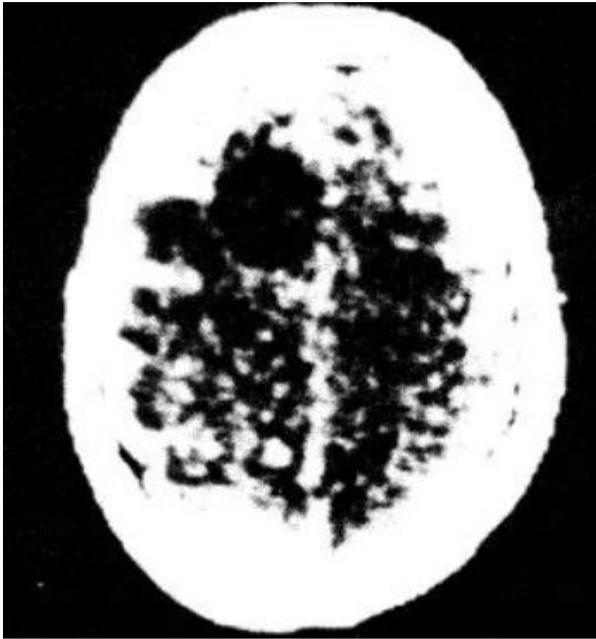https://en.wikipedia.org/wiki/Godfrey_Hounsfield#/media/File:Housefields_Sketch_2005.JP
G

Fig.4.The first image of the brain from Hounsfield's CT scanner. The patient was a woman with suspected brain injury. A visible pathological lesion, a dark region indicating a cyst in the patient's brain. https://www.nobelprize.org/uploads/2018/06/hounsfield-lecture.pdf

References:

1. Hounsfield GN. Computerised transverse axial scanning (tomography): Part I. Description of system. Br J Radiol 1973;46:1016–1022 http://qmxmt.com/scans/dave/other/papers/general%20tomography/hounsfield_1973.pdf

2. Hounsfield GN. Computed medical imaging. Nobel Lecture, 8 December 1979 https://www.nobelprize.org/uploads/2018/06/hounsfield-lecture.pdf

3. Godfrey N Hounsfield Biographical. From *Les Prix Nobel. The Nobel Prizes 1979*, Ed. Wilhelm Odelberg, Nobel Foundation, Stockholm, 1980 https://www.nobelprize.org/prizes/medicine/1979/hounsfield/biographical/

4. Wells PNT. Sir Godfrey Newbold Hounsfield KT CBE, Biographical Memoirs of Fellows of the Royal Society, 2005, vol. 51.

5. Bhattacharyya KB. Godfrey Newbold Hounsfield (1919–2004): The man who revolutionized neuroimaging, Ann Indian Acad Neurol 2016; 19(4): 448–450

6. Isherwood I. In Memoriam: Sir Godfrey Hounsfield. Radiology 2005; 234 (3): 975 Bates S, Beckmann L, Thomas A, Waltham R. Godfrey Hounsfield: Intuitive Genius of CT. The British Institute of Radiology; 2012. 276

7. S. Kaczmarz, Angenaherte Auflosung von Systemen linearer Gleichungen. Bull Acad Poln Sci Lett 1937;35:355-357