

Historical Note on Computed Tomography

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Several early Russian references¹⁻³ to medical x-ray computed tomography have recently come to our attention. Since these papers were published in obscure Russian journals and have not previously been available in English translation, they seem to have been entirely overlooked in the English literature.

In 1957, S.I. Tetel'baum published a paper in the Bulletin of Kiev Polytechnic Institute² in which he formulated the tomography problem in terms of line integrals and found the exact solution, which is now usually referred to as the inverse Radon transform.

In 1958, Korenblyum, Tetel'baum, and Tyutin³ gave a detailed account of the theory, including a method of fan-beam correction, equivalent to re-ordering the data, and a discussion of a practical way of handling the singularity in the integrand of the inverse Radon transform. They also presented a block diagram of a television-based analog computing system for implementing the reconstruction. They estimate that the system should be capable of reconstructing a 100 x 100 image in 5 minutes. The paper closes with the statement that this system is under construction at Kiev Polytechnic Institute. We have not yet been able to find later references where reconstructed images are shown, but are still attempting to do so.

One of the authors (W.G.H.) has programmed the reconstruction algorithm of Korenblyum et al. and shown that it indeed performs satisfactorily. It was not computationally efficient, so only a 32 x 32 image was reconstructed, but there were no evident artifacts or other difficulties.

An English translation of Ref. 3 is available on request to
H.H. Barrett.

References

1. Tetel'baum, S.I., About the problem of improvement of images obtained with the help of optical and analog instruments, Bulletin of Kiev Polytechnic Institute (Izvestiya Kievskoga Politekhnich. Instituta) 1956; 21: 222.
2. Tetel'baum, S.I., About a method of obtaining volume images with the help of x-rays, Bulletin of Kiev Polytechnic Institute (Izvestiya Kievskoga Politekhnich. Instituta) 1957; 22: 154-160.
3. Korenblyum, B.I., Tetel'baum, S.I., Tyutin, A.A., About one scheme of tomography, Bulletin of the Institutes of Higher Education - Radiophysics (Izvestiya Vyshikh Uchebnykh Zavedenii-Radiofizika) 1958; 1: 151-157.