Vom Mikrofilm zur Wissensmaschine

This book presents a fascinating piece of contemporary history and the history of science and technology, based on the biography of an unjustly forgotten Jewish scientist and engineer, Emanuel Goldstein.

Emanuel Goldstein, born in Moscow in 1881 as the child of an Imperial Army surgeon and court counsel, studied chemistry at Moscow University. Earlier, he had applied to study mechanical engineering at the Moscow Imperial Technical Institute, but as a Jewish applicant he had been refused. During his studies of chemistry he was already turning towards engineering problems. His electrochemical investigations (with W. Speranskii) led to new galvanizing procedures, which were so spectacularly successful that the work was accepted for publication in *Angewandte Chemie* in 1900.

A stay in Leipzig to study with W. Ostwald was of fundamental importance for his further development, and led to his doctorate for work on photokinetic phenomena. The starting point for his thesis was the circumstance that Goldstein succeeded in convincing Ostwald of the fact that photochemical processes must be temperature-independent. That was proved experimentally in his thesis research, performed under the direct guidance of R. Luther. On the evidence of these results, Goldstein can be regarded as the founder of photokinetics. A further important influence for Goldstein's future work was his contact with W. Wundt, which led to his developing an interest in the physiology of visual perception. Finally, a period of study with A. Miethe at the Photochemical Laboratory of the Technical University of Berlin led him in the direction of his future fields of activity: photography, reprography, printing, and data processing.

At that time, Goldstein was already one of the most prominent scientists in the area of photography and its technical applications. Nevertheless, it is remarkable, and speaks for his versatile ability, that as early as 1907 he was appointed as professor of photography at the Royal Academy for Graphic Arts and Book Trades in Leipzig. Among other things, the main results of his Leipzig activities are related to the introduction of a grey scale of practical usefulness in photographic densitometry.

A crucial break in the life of Goldstein resulted from the First World War. Requested by Carl Zeiss, Jena, to participate in military photographic projects, he moved to the newly founded Zeiss company Ica in Dresden (which later became Zeiss Ikon). There he was successful in a series of spectacular developments. His innovations of special importance include the first clockwork-driven movie camera (Kinamo), which was immediately used by the documentary film producer Joris Ivens, the standard setting Contax 35 mm camera, and the "statistical machine". With the appointment to a professorship at the Institute for Scientific Photography of the Technical University of Dresden, he again came into close contact with his former supervisor, R. Luther. There he developed the "Goldstein condition", the fundamental law of reprography. In turning to micro-photography he opened the way to data archiving and to the "statistical machine", which is regarded today as the first practically usable search machine before the PC era.

In April 1933 the National Socialist Workers' Council demanded the immediate dismissal of Goldstein "in order that the Jewish influence on film work can no longer expand". After being arrested, he eventually succeeded in escaping from Germany. That was the end of a great chapter of German development in science and technology, and was a further crime against a Jewish citizen. A small compensation, which pleased him very much, occurred when the Faculty for Mathematics and Natural Sciences of Leipzig University formally renewed his doctorate in 1956.

His emigration ultimately led him in 1937 to Palestine, with the aim of founding there an optical-mechanical company. He succeeded extremely successfully, and he was able to contribute substantially to the development and production of military optical instruments. Goldstein commented: "*The small Hebrew logo on the new precision instruments is my answer to Hitler.*" Highly honored by the state of Israel, Emanuel Goldstein died in Tel Aviv on September 13, 1970.

The work of this prominent Jewish personality is described in detail in this review to stimulate everyone to read this exciting contemporary document. The author presents a comprehensive picture of Emanuel Goldstein and his time. The book is descriptively illustrated and clearly written. Some minor errors do not detract from the quality of the biography, which is supplemented by a list of "Goldstein's products from the laboratory", a comprehensive bibliography of his publications, and a list of literature references.

Frank Hartmann of the Bauhaus University, Weimar, is to be thanked for having persuaded Michael Buckland to write this volume of the series "Forschung Visuelle Kultur". I look forward with eager anticipation to the publication of more surprises in this series.

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