

Wilhelm Türk

A Prominent Hematologist of Fifty Years Ago

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THE SCIENCE of hematology, at the present time, is in a stage of rapid growth which is unmatched by any other branch of medical science. The immunobiologic point of view has led to a deeper understanding of the pathology and physiology of blood. Experiments with new drugs have brought hope that it may soon be possible to treat effectively a number of blood dyscrasias which have thus far defied our efforts.

It has been my fortune to live through both phases of hematology: to be in research during the morphologic era,* and now to be a spectator and pupil in this recent experimental stage. As we approach another high point of modern blood research, it seems appropriate to stop for a moment to remember the men who laid the foundation for the present tower of modern hematology.

... 'Tis pleasant to transport
 Into the spirit of ages past,
 To see what long ago some sage has thought
 And what great climax we've attained at last.¹

In the 1890's Ehrlich, Grawitz, and others laid the basis for hematology. Then followed a period of intensive studies, a flood of papers, and much confusion. During this early period, Wilhelm Türk was one of the most original and successful hematologists. In the United States he is known as the inventor of a counting chamber and as the describer of the "irritation forms" (Reizungszellen) which still carry this name. Some of the older hematologists know and admire his unfinished textbook: *Vorlesungen über klinische Hämatologie*.³ But Türk's contribution to the development of blood research goes far beyond these accomplishments.

Türk's life is easily related; it led in a straight line to success, even to fame. He was born on April 2, 1871, in Silesia, then a province of the Austrian monarchy. He studied medicine at the University of Vienna and was graduated in 1895. His teacher, the famous diagnostician Edmund Neusser, encouraged him to study hematology. In 1908 Türk published an important monograph on *The Blood Picture in Infectious Diseases*.² In 1907 he was appointed lecturer, and in 1912 professor of medicine at the University of Vienna. Then he became director of the Department of Medicine in a hospital in the suburbs of Vienna. In 1912,

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* It has been said that the morphologic era is finished, that the few surviving representatives of this era are just relics of a former time. However, certain modern hematologists admit that morphology with proper interpretation can still contribute a great deal to the knowledge of the pathology of blood.



WILHELM TÜRK, 1871-1916

when Neusser became fatally ill, Türk took over the lectures and examinations and all the administrative activities which were attached to the professorship.

At the beginning of World War I, Türk took charge of a department for internal medicine at a war hospital. At the same time he worked day and night on the manuscript for the second part of his textbook and on the pictures for the planned *Atlas of Blood Cells*. There is no doubt that overwork contributed to his early death. In the middle of his most creative period, he succumbed to a heart attack on May 20, 1916, at the age of 46.

It is tragic that Türk's work, the "Clinical Hematology"³ to which he devoted all his available time, remained unfinished. From the preface to the second part we know that the manuscript for the physiology and pathology of the erythropoietic system was concluded, and that printing had begun. We know that the

pictures for the thirty tables of blood cells were ready for reproduction, and that for the final part, the leukocytic reactions and leukemias, an enormous quantity of notes and observations had been collected. Everything has disappeared. Immediately after Türk's death, the family left Vienna and, following the collapse of Austria and the difficulties of the postwar era, manuscripts, notes, and pictures disappeared. I tried, unsuccessfully, to get information about Türk's papers: neither his publisher, W. Braumüller, nor the illustrator could contribute anything. His son, who is now a pediatrician in Vienna, could not find any of his father's papers.

This is a deplorable loss. Türk had planned a new type of clinical hematology, written not for experts and blood specialists, but for those who wanted to learn. It was based chiefly upon his personal observations, accumulated during fifteen years of study and observation. He often pointed out that he should not be considered as a one-sided hematologist ("Nurhämatologe") but as a clinician working in the field of blood research. "I am not," he used to add, "a peripheral hematologist. I am and remain a clinician who tries to make blood tests a part of clinical examination."³

In order to evaluate Türk's contribution to the development of the new science of hematology, one must remember what it meant to do blood studies at the onset of this century. First of all, technicians did not exist. Everything had to be done by the examiner himself, from the cleaning and preparing of the cover slides to the staining. To visualize the granulations in the leukocytes we had to use Ehrlich's triacid stain. Fixation by heat was essential. One had to put the slides in a special copper box, heat for a certain time to a certain degree, etc. Much patience and a certain degree of enthusiasm were necessary to prepare and to examine a patient's blood. Türk was such a zealot. He used to spend many hours, day and night, at the microscope. In unusual cases—as, for example, his first observation of a case of agranulocytosis—he examined every single cell, counted and sketched every single leukocyte. In his lectures he always stressed this point, that only by repeated checking and rechecking of observations and finally by surveying them critically would our knowledge of the blood increase.

Türk was an excellent lecturer and teacher: his lectures were crowded, and snapshots still in existence show Türk surrounded by American physicians. His style of speaking, accompanied as it was by vivid gestures, was emphatic. Despite repetitions and the inclusion of every small detail, his lectures were never boring. When he started to quarrel with opponents, he became very witty and sarcastic. I remember how thoroughly he destroyed Loewit's hemamebas and proved them to be dying artefacts. It is amusing to read his splendid polemic against Arneth's over-complicated and, for clinical use, worthless division and subdivision of the neutrophils, according to the number of fragments and loops of the nuclei. It is a peculiar fact, however, that Türk, the splendid teacher who had so many students for many years, did not found a school.

His most prominent achievement was the accumulation of a great quantity of exact observations and critical evaluation for clinical use. Also important was his lasting work toward the achievement of a mutual understanding concerning nomenclature. During the initial phase of rapid growth of a new science, there is always a perplexing number of names and terms. Different names are introduced

for identical cells, and, conversely, the same term may be used for genetically different types. What a tremendous confusion there was at the beginning of this century; misunderstanding and ardent discussion about the "large lymphocytes," the "great mononuclears and transition cells," etc. The exact description of every single blood cell in the first part of his "Clinical Hematology"³ laid the foundation for a mutual understanding.

Türk's first paper, a monograph on "The Blood Picture in Infectious Diseases,"² demonstrates clearly the author's tendency to combine clinical experience with observed blood alterations. This paper contains ideas very modern for a time when discussion was still going on as to whether changes in the blood picture could be of any diagnostic value. Türk stated: "The blood in infectious diseases is the result of interaction between the type and intensity of the infectant agents and the individual, i.e., the present ability of the organism to react."² In this paper we find examples of Türk's interesting and unorthodox way of thinking. The description of the blood alterations in every phase of an infection is so exact that nothing new could be added. But as soon as he starts speculating about pathogenesis, he jumps to conclusions. It may be that his temperament and the tendency to illustrate a special situation in the blood by a parable induced such circuits. For diagnosis and prognosis it was an excellent observation to recognize the importance of the disappearance of the eosinophils from the circulation during the acute phase of an infection. But then Türk declares: ". . . it gives the impression as if the eosinophiles were very sensible—so to speak—coward elements, which fly from the blood stream when a severe bacterial invasion inundates the circulation with toxic products." No doubt, this is a very plastic, well-sounding comparison. But to attribute human peculiarities to blood cells seems of no advantage for an exact science.

An excellent observation, to which Türk's name is still attached, is that of the "irritation forms." Türk had first observed that during the period of convalescence, after prolonged leukocytosis, a special cell type often appears in the blood stream. He gave an excellent description, pointed to the basophilia of the plasma and to the special structure of the nucleus, and recognized correctly that this cell looks like a lymphocyte. Nevertheless, he considered them to be "derivatives from non-granulated, pluripotent bone marrow cells, final types of an unknown differentiation, caused by an unknown differentiation."³ Later on he became convinced that some of these cells might be plasma cells, but he still believed that at least some were derived from myeloid elements.

Türk was predominantly occupied with morphologic problems: he never performed an experiment and, as far as we know, never had a chance to observe and examine a bone marrow *in vivo*.

The most important term invented by Türk and introduced into the medical vocabulary was the "lymphatic reaction." This term has influenced the thinking of generations of hematologists, caused much misunderstanding, and provoked an enormous amount of literature until, finally, it became difficult to find a way out of this maze. The fascinating history of the lymphatic reaction has been described with splendid clarity by Emil Schwarz.⁸

It started with an excellent observation. Türk was the first to correctly observe and outline the clinical and hematologic picture of agranulocytosis. His

patient was an elderly woman with septic endocarditis, severe tonsillitis, and hemorrhagic manifestations. Blood examination revealed normal values of erythrocytes but an extreme leukopenia: 940 leukocytes per cu.mm. with 93 per cent lymphocytes. It is very interesting that Türk never considered the possibility of injury to the myeloid tissue of the bone marrow by the severe infection. Again there was a jump to conclusions. He assumed the presence of a primary, weak, insufficient granulocytic apparatus, unable to react to an infection with the usual neutrophilic leukocytosis. Then, lymphocytes appear in order to support the insufficient "sister tissue," an inadequate, inferior ersatz. This is, in short, the famous case: "Septische Erkrankungen bei Verkümmerng des Granulocytensystems" (Septic Diseases with Underdevelopment of the Granulopoietic System).⁴

Some time later, Türk observed another new blood dyscrasia. Because of the excellence of his description of the signs and symptoms, blood picture, and course, we are able to recognize the case in retrospect as one of infectious mononucleosis. The patient was a 20 year old man, seriously ill, with high temperature, generalized swelling of the lymph nodes, splenic enlargement, and a diphtheroid tonsillitis. Blood studies revealed a white cell count of 16,700, composed chiefly of typical and atypical lymphocytes. This was interpreted as acute lymphoid leukemia, and a fatal prognosis was given to the family. To Türk's surprise, the patient recovered completely within a few weeks and exhibited a normal blood picture. It was again the unusual absence of a neutrophilic leukocytosis in a patient with septic sore throat which induced Türk to connect this observation with the former one, septic agranulocytosis. "Obviously there is, as in the first case, a deficient reactivity of the granulopoietic apparatus—and also a toxic damage to the lymphatic system, which acts, so to speak, as ersatz to cover the defect." For this condition, Türk offered the term "lymphatic reaction." His reasoning was as follows: lymphatic reaction consists of an unexpected appearance of lymphocytosis in infectious diseases, which are usually accompanied by a neutrophilic leukocytosis. The basis defect is a constitutional weakness or insufficiency (Verkümmerng) of the granulopoietic system. Patients with status lymphaticus could be considered as individuals with a congenitally insufficient, weak granulopoiesis: "It seems possible to explain their reduced resistance to infections in terms of a failure of the marrow to produce sufficient numbers of granulocytes."⁴⁻⁶

Some years later, Türk himself, after having studied more cases, correctly recognized the nature of the "lymphatic reaction." He stated: "It becomes more and more probable that for the appearance of a lymphatic reaction not only the peculiar disposition of the affected individual is of importance, but also—or perhaps even exclusively—the specific type of the infectant agent."⁷ This statement is a definite revocation of his former theory. In his unfinished textbook there is only a note promising discussion of the problem. Sudden death prevented Türk from formulating his ideas about leukocytic reactions.

In the meantime, however, the term "lymphatic reaction" was more and more frequently used. Unfortunately, it was such a euphonic term that it could be used, and was used, for a great variety of affections which had in common an acute febrile course, blood lymphocytosis, and a favorable outcome. There were

the "benign leukemias" the monocytic or lymphatic tonsillitis, and many others. Not until glandular fever and infectious mononucleosis were established as well-defined morbid entities did the term lymphatic reaction disappear from use.

Türk's contributions to the development of hematology are very great. Fifty years ago he taught accurate methods for examining blood and evaluating the findings for clinical use. In the early phase of hematology, it was the work of Türk to describe, classify, and name every cell, which laid the foundation for the further development of morphology. In his tendency to explain and visualize special blood pictures, Türk liked to offer parables and hypotheses, sometimes hasty or fantastic. This makes the man more interesting. I want to finish these reminiscences of a famous and original hematologist with Goethe's opinion about hypotheses: "Hypotheses are like scaffolds, which the masons erect, in order to be able to work undisturbed. One may, if necessary, remove them or substitute stronger ones—if they only serve the purpose of supporting the progress of the building."

SUMMARIO IN INTERLINGUA

Wilhelm Türk (1871–1916), professor de medicina al Universitate Vienna, esseva un del pioneros del hematologia in su era morphologic. Ille videva su function in accumular exacte observationes de valor clinic. Le precise descriptiones de omne cellulas sanguinee in su *Hematologia Clinic (Vorlesungen über klinische Hämatologie, 1904 e 1912)* contribuava multo a clarificar le terminologia del nove scientia. Le perdita del manuscripto del continuation de iste obra esseva un del effectos tragic del prime guerra mundial. Türk publicava le prime correcte description clinic e hematologic de agranulocytosis. Ille es cognoscite como le inventor de un contator de cellulas e como le originator del concepto e del termino de reaction lymphatic. In omne su activitates ille sublineava le facto que ille non esseva un specialista exclusive de hematologia sed un clinico interessate a facer del studio del sanguine un parte essential del examine clinic.

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