

American Diabetes Association was a first step in the care of patients in Ankara, and it is hoped that this system will be more widely used. Incidentally, when explaining a diet to a Turkish patient, no attempt is made to use quantification by household measures. No uniformity of such household equipment exists in Turkey. However, kitchen scales are used widely by housewives and cooks, and approximate weighing is successful even among ignorant patients.

There are no peripheral vascular clinics, chiropodists, or others to conduct what Joslin has called "beauty parlors for diabetic feet."

Enough insulin seemed to be available at a modest price for those taking a little trouble to obtain it. In use are varied types and concentrations of insulin from many foreign sources. Insulin is not manufactured in Turkey, although there are enough cattle to provide the raw material. Crystalline insulin was prepared in Professor Aras' laboratory in Ankara, and an approximate assay indicated that the insulin content of Turkish cattle is similar to that of American.

Education of both physicians and patients concerning diabetes is generally less advanced than in America. Intelligent diabetic patients are well regulated, mostly from their own efforts, and physicians have an undue

fear of insulin because they have not accepted the responsibility of using it. In this connection it is well to remember that Turkey has overcome malaria and trachoma, is rapidly bringing tuberculosis under control, and has made enormous strides in public health. As their most serious problems are solved, their good physicians will turn to the care of chronic disease as we are doing in the United States.

Now and in the future, the first need for progress in diabetes will be a group of physicians to spearhead the campaign of education in this field. The Turkish Diabetes Association, centered in Istanbul, should become truly national in scope. In conclusion, visiting a country where nothing exists that is comparable to the American Diabetes Association is one of the best ways to appreciate our diverse activities at home.

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Friedrich von Müller 1858-1941

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A sincere friendship based on mutual respect and appreciation existed between Friedrich von Müller and Sir William Osler. The personalities of both were entirely different, but their main endeavor in advancing the teaching of medicine was the same. Müller was basically stern by nature while Osler's outgoing, winning personality at once captured the attention of everybody.

The father and grandfather of Dr. Müller were physicians. His mother was from a family of patriarchal merchants in Augsburg. The architectural and monumental beauty of his hometown of Augsburg, the town of the Fuggers and the birthplace of Holbein and Mozart's father, influenced his intellectual development. The impressions a young boy absorbs on his way to school may stimulate his imagination and inventive tal-

ents more than several courses of humanities.

Friedrich von Müller started his studies in the famous laboratories of the chemist Adolf von Bayer at the University of Munich. Here he met Emil Fischer, the pioneer of protein and carbohydrate chemistry. A lifelong friendship with E. Fischer resulted from this rather short episode as a chemistry student, as Müller soon changed to a medical curriculum. Carl Voit, Professor of Physiology, attracted at this time many students (e.g., A. Rubner, Graham Lusk). He also influenced the training and ideas of young Müller—"A correct figure is better than interesting but unproven speculations."

Dr. Müller, having finished his medical curriculum in Munich, became Assistant (Resident) in 1882 to Carl Gerhardt, Professor of Medicine at the University of Wurzburg. With his chief, he published during this

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time, in the Bulletin of the Würzburger Clinic, interesting bedside observations on protein metabolism of cancer patients, emphysema of the mediastinum, and the behavior of the muscles of the larynx during paralysis agitans. In Würzburg he also became interested in jaundice and especially in the formation of urobilin, subjects which later led him to fundamental experimental observations.

One of Dr. Müller's most important contributions to the teaching of medicine had its beginning in Würzburg. In 1886 there appeared the first edition of his *Taschenbuch der Medizinisch-klinischen Diagnostik*, published together with O. Seiffert, who wrote the minor part on the examination of the larynx. Characteristic of Müller's loyalty to his friends was the fact that he kept Seiffert's name as co-author despite the fact that Seiffert had nothing to do with the writing of the *Taschenbuch* in later editions. The first edition contained only 100 pages, the fortieth edition almost 600 pages. The *Taschenbuch* was translated into many languages (Ralph Major translated several editions into English). The influence of this precise and skillfully condensed manual on the development of technics for clinical examination was universal before the first World War.

During his whole life, Dr. Müller's task was to teach clinical medicine as a unit. He believed that one should not teach details of specialties to masses of students in the auditorium. The professor should have a comprehensive knowledge of medicine together with a sense of values and a feeling for tradition. Müller indeed exemplified these characteristics to perfection. He always maintained a balance between bedside teaching and laboratory investigations. His ability to draw simultaneously with both hands on the blackboard with dexterity made it possible to picture the anatomical relations in neurological diseases as well as to sketch histological findings of diseased organs during a clinical demonstration of a patient.

Müller next moved with his chief, Professor Gerhard, as senior assistant to the Charité Hospital of the University of Berlin. In 1889 he was given his first independent position as Chief of the Poliklinik of the University of Bonn, and in 1896 he became Chief of the Poliklinik at the University of Breslau. There his study of neurology was strongly influenced by Wernicke.

The next station of his academic career was the Poliklinik of the University of Marburg. H. H. Meyer, A. Kossel, V. Behring and F. Marchand together with Müller were stimulating members of the Marburg faculty. A few years later, in 1899, he accepted the invitation of the University of Bâle to the chair of Medicine,

which he occupied until 1904. The faculty of the University of Munich offered him the position of Chief of the II Med. Clinic and of Professor of Medicine, an office which he kept until he became professor emeritus in 1937.

The scientific activities at the Munich clinic and Müller's lectures soon attracted young physicians from all over the world. The wards of the clinic viewed historically were among the first where diagnostic activities at the bedside were integrated with those of the chemical laboratory. There were, however, no chemical technicians for routine chemistry available. The resident physician had to carry out every determination himself. The residents with the help of a few clinical clerks had to work until late into the night to satisfy the stern chief at the ward rounds the next day. The personal relations of the chief and his co-workers were friendly but always involved a certain restraint. He liked the expression of independent opinion, but one had to find the right words in formulating it.

Beside the bedside work, the residents had to carry on research on basic problems. In Marburg, the chemical test for blood in the feces was worked out (by H. Weber). At this time Dr. Müller found that glucosamin was present in the phlegm of sputum. In Bâle, working with O. Simon, he demonstrated that the fibrinous exudate in the alveoli in pneumonia during the "lysis" was disintegrated by enzymatic fermentation of leucocytes and not reabsorbed before disintegration to amino acids. Erich Meyer and O. Neubauer also demonstrated, while still residents with Dr. Müller in Bâle, the significance of homogentisinic acid in alkaptonuria. O. Neubauer and E. Meyer accompanied Müller to Munich as senior residents. Here leukemia, polycythemia and other blood dyscrasias were investigated by Meyer and W. V. Domarus. Dr. Müller's early studies of urobilinogen and jaundice were continued by Neubauer and the urobilinogen reaction with Ehrlich's reagent was first described. The chemical constitution of the porphyrines was elaborated in Müller's laboratory by Hans Fischer, later given the Nobel prize for the synthesis of porphyrines.

Dr. Müller coined the name "nephrosis" for a group of kidney diseases in his famous paper at a meeting of German scientists in Meran (1905). H. Heinecke as well as P. B. Monakow and O. Neubauer tried to elaborate on Müller's ideas of kidney function with experiments on animals and studies of patients. W. J. Stauffenberg took up Müller's observations on cortical blindness in an extensive study of localization of cerebral function. In fundamental papers, Stauffenberg also described the

diseases of the extrapyramidal tracts. The clinical importance of the so-called "protein minimum" was investigated by Erich Kraus and S. Lanter.

It was my task to investigate purine metabolism in Dr. Müller's laboratory. These studies later led to the isolation and crystallization of mononucleotides (adenylic acid) from yeast nucleic acid (RNA) and from desoxyribonucleotides (DNA). Studies of lipid metabolism, especially of cholesterol, were also started by me and co-workers in Dr. Müller's laboratory. Studies of the effect of intravenous sugar infusion on blood sugar curves of normal and diabetic subjects were published from Müller's laboratories in 1913.

One of the main topics of Dr. Müller's research was the investigation of the basic physical principles of percussion and auscultation and their objective registration by elaborate physical instruments. W. Selling, E. Edens, George Fahr and finally the excellent work of Paul Martini helped the master in this thorny task. Enthusiastically he returned from his second American visit in 1926, telling us that Campbell in Rochester had demonstrated the newest electric resonators and sound filters. Until the end of his life the registration of clinical sound phenomena with electronic amplifiers and filters occupied his mind.

The greatest attraction of Müller's teaching activities was the daily discussion of patients before the students in the large auditorium of the hospital. Each morning at 9 a.m. the master entered the auditorium behind a movable bed with the patient. The attention of several hundred students was centered on this stocky "Bajuvarian" figure. With his head bent forward, rocking his heavy body in oversized shoes, he read the history himself. He interrupted the reading only for highlights of his own choosing. His interpretation of the patient's complaints was of great didactic value. He examined the patient meticulously or let the student take part, remembering Goethe's words, "The most difficult of all is that which you consider the easiest, namely to see with your own eyes what is in front of you." Dr. Müller explained that he diagnosed disease of the patient from symptoms, which are the expression of the deranged functions of organs. Thus he enabled the listener to build up a diagnosis by his own reasoning. He never attempted to force his students to a rigid scholastic interpretation by quoting questionable percentages of symptoms in similar cases. Through the simplicity of his diction and his sincerity, combined with an unusual knowledge of medical literature, Müller created in the lecture room an atmosphere which made him a great medical teacher.

The present-day methods of teaching in our medical schools are different. The chief of the department organizes the teaching schedule of his department. He himself selects only a few topics of his own preference. He delegates the main teaching to the younger instructors, who train the students systematically in small groups. There is no question but that a more detailed study is accomplished and greater factual knowledge acquired by the average student. Such a method is not unlike training a football team. The multiple variations of the "plays" and the details are called by the coaches (instructors) and then applied in the field. There is no question but that the medical student acquires with this type of training much factual knowledge, culminating in good marks in the final examination. One cannot be so sure whether a medical student of Dr. Müller's lectures would be able to produce as good marks in the state boards as a student trained by our medical schools. But the students of Dr. Osler and Dr. Müller, impressed by their masters' handling of the sick and by their constructive reasoning, did carry away example-setting experience which is just as important to the life of a physician as factual knowledge.

Friedrich von Müller visited the United States twice. He gave lectures and held clinics at different universities and towns. On his second visit he was invited to deliver the dedication address of the new University Hospital in Rochester, New York (1926). He admired Abraham Flexner and W. H. Welch in their task of reforming American medical schools. Müller himself was not a convinced supporter of a rigid full-time system. He thought that the professor should have the opportunity to see private patients in his office. In a letter to his friend, Graham Lusk, Müller quoted the New Testament: "Thou shall not muzzle the mouth of the ox that treadeth out the corn."

Dr. Müller always welcomed American co-workers at the Munich clinic and in its laboratories. American physicians who worked with him later became outstanding clinicians in their country.

Only a few may be named: George Fahr, L. Rowntree, Kenneth Robinson, George Draper, D. Van Slyke, W. McCann, Ralph Major, E. DuBois, D. Barr, and Cecil Watson.

Müller never imposed a theme for scientific research upon an investigator. He liked to quote K. Piloty, the famous head of the Royal Academy of Painting in Munich: "I can teach you how to paint, but the painting you must do yourself." Such an attitude made Friedrich von Müller the great personality his pupils will never forget.