as "a colorless personality, with little force or energy." Superficially, this may have been true, for conditions at the frontier college were enough to sap the energy and destroy the vitality of a Paracelsus. Certainly, his record at Mississippi State College and at the University of Arizona would not bear out such an estimate. To me, these two men—Curtis and Gulley, pioneers of agricultural teaching in Texas—were casualties to the indescribable conditions then obtaining in some of our pioneer educational institutions.

A Gage Laboratory for Southern Methodist University

E. H. Flath

On March 1, 1946, Major General G. M. Barnes, Chief of Research and Development for the Army Ordnance Department, and President Umphrey Lee of Southern Methodist University, announced plans for the establishment of a precision gage laboratory in the School of Engineering. The decision to install the laboratory was made at the request of the Lone Star Post of the Army Ordnance Association, membership of which includes executives and engineers for a large number of industrial firms in the Dallas area.

Industries in Texas have for many years felt the need of a standards-laboratory for checking the precision gages required in mass production of interchangeable parts. In discussing plans for the laboratory, General Barnes said: "We discovered during World War I that it is not production lines that make mass production, it is *gages*, the instruments for measuring accurately the thousands of machined parts that must fit together." During World War II the Ordnance Department acquired instruments for checking gages in Texas plants and saved time which would have been lost by sending them to far-distant laboratories.

The Army through its St. Louis Ordnance District, commanded by Colonel H. C. Morgan, is now turning over to the School of Engineering a large amount of costly technical equipment. This will be used for checking the master-gages of industry in this area, and in the training of engineering

students and certain employees of industry. Some of the apparatus will also find use in industrial research and development work. The laboratory will consist of four groups or divisions, namely: a standards laboratory, production gage laboratory, gage shop, and industrial X-ray laboratory.

Standards Laboratory

This division will contain all of the high-precision instruments and reference standards used in checking and setting master-gages and production-gages. Included in the list of high-precision instruments are a toolmaker's microscope, measuring machine, several electrical comparators, thread lead testing machine, electrical indicating height gage, and a profilometer or surface analyzer. The most accurate of the electrical comparators is capable of giving readings in units of one millionth of an inch (0.000001″).

The reference standards will include five sets of gage blocks, measuring-rolls and toolmaker's buttons of various diameters, several optical flats, surface plates and accessories. Gage blocks or standard measuring blocks (formerly known as "Johannsen blocks" after their first maker) are usually accurate within five millionths of an inch (0.000005″). Optical flats are accurate to two millionths of an inch (0.000002″).

Because of the change in length of metals with change of temperature, it is necessary to maintain all standard measuring laboratories at a constant temperature. The standard temperature used in this country and Europe is 20 degrees Centigrade. This part of the gage laboratory, therefore, will be air-conditioned, and provided with sensitive automatic control of temperature and humidity.

Production Gage Laboratory

Those measuring tools and production gages usually considered as "non-precision" will be kept in this division of the laboratory. Their accuracy is in the order of from one ten-thousandth to one thousandth of an inch (0.0001″ to 0.001″). This part of the laboratory will be most useful for study and practice, and will have available almost every type of gage and measuring instrument now being used by industry. Included in the list are inside- and outside micrometer cali-

pers, vernier calipers, feeler gages, plug gages, snap gages, dial indicators, reed gages, electric gages, electrolimit gages, and air gages.

One interesting exhibit will be a complete set of gages required for the inspection of a single manufactured product. Other unusual and interesting gages will be those of the multiple type for simultaneous measurement of five or more separate dimensions on a single piece.

Engineering students registered for courses such as Industrial Plants, Shop Methods, and Time- and Motion Study will use this part of the laboratory to familiarize themselves with modern inspection equipment and methods. Night-school courses will probably be offered for those employees of industry who have need for a knowledge of gages and their use in inspection.

Gage Shop

This shop will be fully equipped with the hand-, bench-, and machine tools required in the manufacture and maintenance of gages. Machine tools included in the list of equipment are a universal grinder, internal grinder, surface grinder, toolroom and toolmaker's lathes, sensitive drill presses and a milling machine. There will be furnaces and control equipment for hardening and tempering gages, also a Rockwell hardness tester.

X-ray Laboratory

The X-ray machine, once used almost exclusively by physicians and dentists, is now being used in industry to detect the presence of flaws or other imperfections in metal castings and forgings. It is more economical to find a flaw by X-ray rather than uncover it after costly machine operations have been completed. To obtain penetration of considerable thickness of metal in a short time requires a high-voltage X-ray tube. The instrument to be located in this laboratory operates at 1000 kilovolts. At present the Department of Electrical Engineering has an industrial type of X-ray rated at 150 kilovolts. Both instruments will be housed in a room having concrete walls 16 inches thick in order to confine stray radiations. An adjoining room will contain the controls for both instruments and the equipment for processing films and prints.

It is planned to arrange all divisions of the gage laboratory in a group, as far as this is feasible. The Department of Mechanical Engineering will direct the work of all divisions except the X-ray, which will be under the Department of Electrical Engineering. Professor C. H. Shumaker has been appointed to collaborate with officers of the Army Ordnance Department in collecting and installing equipment. Acquisition of the gage laboratory and provision for its use by industry and students will serve to carry on the policy of close cooperation between industry and the School of Engineering.

Dr. Ernst Kapp, Early Geographer in Texas[1]

S. W. Geiser

Because of its geographic position midway between Mexico and the old Louisiana Purchase, Texas has a fauna and flora that show in many respects transitional forms. The further fact that Texas was for ten years an independent republic, open to free immigration, brought into the new country citizens from diverse European lands, with their old cultures, who mixed with the preponderating immigrants from the United States. As a consequence, Texas came to be known to scientific men the world over as a new and interesting country to be explored.[2]

Such men as the French-Swiss Jean Louis Berlandier; the Scot Thomas Drummond; the Germans Ferdinand Lindheimer, Ferdinand Roemer, Julius Fröbel, Ottomar von Behr, Ottfried Hans von Meusebach, and Ernst Kapp; the German-Swiss Jakob Boll; the Frenchman Julien Reverchon, and numerous other men, foreign to the American continent, came to Texas. The occupation of Texas by American troops after the Mexican War, and the establishment of Army posts and forts, each with a well-trained surgeon; and the surveys across Texas for a Pacific Railroad in the 'fifties, bringing surveying parties with expert naturalists, made Texan natural history known to the world.

[1] *Preprint* of Invitation Paper, presented at the St. Louis Meeting of the A.A.A.S., Section L, March 29, 1946.

[2] *Cf.* S. W. Geiser, Special Texas Issue of "Book News" of the Dallas *Times-Herald*, Oct. 7, 1945, p. 16.