DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

HGB:GDM

WASHINGTON, D. C.
(June 23, 1926)

Letter
Circular
LC 201.

SUGGESTIONS FOR A TRIP THROUGH THE BUREAU OF STANDARDS.

South Building.

(1) Room 209. Length measurements. In this laboratory length measuring instruments of all kinds are checked against the working standards of the Bureau. These in turn have been compared with the National standard, meter bar No. 27, which is kept in the vault on the first floor of this building.

(2) Room 218. Time section. Watches and clocks are here compared under controlled conditions with the standard clock, which is installed in a special room in the basement. The clock does not vary more than two one-hundredths of a second per day.

(3) Room 114. Interferometry. Measurement of length by interference of light waves. A demonstration apparatus is arranged in this room which shows the bending of a 5-inch steel bar under the pressure of one finger. Optical methods are employed by the Bureau in making all sorts of precision length measurements.

(4) Room 119. Radiometry. Standards of radiation are maintained by this section. Quality of radiation from various light sources is determined. Special apparatus has been devised to measure the heat of the stars and planets.

(5) Room 101. Mass section. Weights of many different classes are sent here to have their accuracy determined. The balances used in this work include several of the highest precision. One of these will determine the error in weights of about one kilogram with an accuracy of one part in 100 million.

West Building.

(6) Room 306. Optical testing of sugar. The standard test for purity of a sugar solution is made on an instrument known as a saccharimeter. This instrument measures the rotation of a beam of light passing through the solution. The Bureau also carries out research work on the properties of sugar.

(7) Room 203. Testing of thermometers. Mercury-in-glass thermometers are compared with the Bureau's standards by immersing both instruments in a bath, the temperature of which can be kept at any desired point.

West Building.

(8) Room 212. Pyrometry. Very high temperature measuring devices are tested in this laboratory. These include thermocouples, optical and radiation pyrometers.

(9) Room 102. Engineering instruments. Pressure gauges, water meters, anemometers, and fire extinguishers are among the instruments and appliances tested in this laboratory. A standard test for elevator interlocks was developed by this section.

Low Temperature Building.

(10) Room 11. Plants for producing liquid air and hydrogen. Hydrogen has been frozen in this laboratory, the temperature being -438°F. Liquid air boils at -310°F. At this low temperature the characteristics of ordinary substances are entirely changed. Soft rubber becomes as brittle as glass, lead makes a good bell or spring, while mercury freezes solid and makes a very good hammer.

Wind Tunnel Building.

(11) Main laboratory. One of the three wind tunnels at the Bureau, used for investigating models of airplanes, dirigibles, bombs, buildings, chimneys, etc. This tunnel is 54" across at smallest section, and in it a wind speed of 75 miles an hour can be obtained.

Dynamometer Building.

(12) Main laboratory. Investigation of performance of airplane and automobile engines. Airplane engines are tested in special laboratories in which the conditions encountered during an actual flight, such as low air pressure and temperature, can be duplicated. Automobile engines are tested in the laboratory and on the road.

Northwest Building.

(13) Room 202. Testing of precision gauges used for controlling the dimensions of machine parts. Optical methods are largely used in testing gauges, so that their lengths can be determined to one millionth of an inch.

(14) Room 105. Microstructure of metals. The structure of metals and alloys is studied in this laboratory. The effect of work, heat treatment, corrosion, etc. can be determined.

Northwest Building.

(15) Basement. Experimental foundry and metal working equipment. Actual mill processes can be studied by using the Bureau's rolling mill, draw bench, etc.

East Building.

(16) Room 307. Life tests of incandescent lamps. Several thousand lamps, representing Government purchases of from 1½ to 2 million lamps per year, are tested to see how long they will burn.

(17) Room 314. Integrating sphere for determining the mean, spherical candlepower of lamps. This sphere measures the average illumination from a lamp in all directions.

(18) Room 317. Tests of radium. Practically all radium produced in the United States is tested in this laboratory. The rate of emanation is compared with a standard sample.

(19) Room 111. Resistance measurements. The special oil bath in which standards of resistance are immersed during test includes a special stirring arrangement and temperature control.

(20) Room 109. Heavy current testing and tests of electrical measuring instruments.

Radio Building.

(21) Front hall. Radio direction finder. Model of apparatus developed by the Bureau by which ships can determine their position in fog through signals sent out from two sending stations on shore. Various pieces of radio apparatus tested and developed by the Bureau are shown.

Chemistry Building.

(22) Room 210. Analysis of platinum. Platinum of the highest obtainable purity has been produced in this section. This laboratory in its general arrangement is representative of others in this building.

(23) Room 202. Testing of gas appliances. Domestic burners for natural and artificial gas are tested to determine the efficiency of combustion and safety from production of carbon monoxide.

Industrial Building.

(24) Room 319. Leather. Samples of leather made from various kinds of hides, including sharkskin. Machine for measuring the durability of sole leather. Work on tanning solutions.

(25) Room 227. Rubber. The work of this section occupies several laboratories on this floor and in the basement. Automobile tires are tested for power loss and endurance.

(26) Room 106. Textiles. The equipment includes a complete cotton mill and representative machines for special work. Tests of textiles are made in a room in which the humidity and temperature are automatically kept constant.

(27) Room 107. Paper. The Bureau has a complete paper making plant with which improvements in processes and the use of new materials can be studied.

(28) Basement, center. The large testing machines for structural materials. The vertical machine on the left, the largest in the world, has a capacity of ten million pounds in compression. On the right is a 600,000-pound beam testing machine. In the room next to this machine on the right is the Emery high-precision testing machine with a capacity of 2,300,000 pounds.

(29) Basement, west. Cement and concrete testing equipment. Samples of all cement which the Government buys are tested by the Bureau.

Kiln House.

(30) West end. Rotary cement kiln and ball mills for grinding cement.

(31) Center. Furnaces for ceramic material, enameling of metals, etc. Fire tests of wall panels.

(32) East end. Optical glass plant. The Bureau produces the only optical glass now made in the United States. All good glass made here is used by the Navy Department for officers' binoculars, gun sights, periscopes, and similar instruments. Equipment includes machinery for making pots, melting and annealing furnaces, and instruments for determining quality of glass.