The Impinger Apparatus developed at the United States Bureau of Mines, Pittsburgh Experiment Station by George Smith and Leonard Greenburg, (Described in Reprint No. 1528 from the Public Health Reports Vol. 47, No. 12, March 18, 1932 pp. 664-675) has been employed for more than 13 years as a standard instrument for dust studies. In this apparatus samples of air are drawn into an impinger tube and flask where the dust particles are thrown or impinged on a prepared wetted glass collecting plate. The rate of air flow is fixed at one cubic foot per minute while the duration of the sampling period is dependent upon the dust concentration. The air passes through an orifice in the bottom of the impinger tube and strikes glass collecting plate which is submerged in 3 cm. depth of distilled water or some other fluid with satisfactory wetting properties. (If water is used as the fluid in the impinger, silica particles are dissolved--hence not available for counting -- unless the laboratory (counting) work is done within a few hours of taking the sample.) This affords the means for accurately determining the quantity and size of the particles. The liquid is then thoroughly shaken to obtain a uniform distribution of the particles; filtered to remove those over 40 microns in size and again agitated. Samples of approximately 1 cc. are taken by means of a pipette and placed in Sedgwick-Rafter counting cells. The use of a suitable microscope equipped with a Whipple micrometer disc to aid in counting, will permit the determination of the number of particles in one quarter of the microscopic field. From this figure, the number of particles of dust in 1 cu. ft. can be calculated. One special advantage of this apparatus is the fact that analysis of the sample can be determined by counting, by weighing or by chemical analysis. The impinger method is neither simple nor extremely complex; however, reliable results can be obtained only by well trained, competent and experienced investigators. However, owing to the wide use of the impinger in previous investigations that have been correlated with the pathological findings, an impinger should be used for any investigation which is to include pathological findings or where the results are to be introduced as evidence in court. Some state codes on dust control recognize the impinger method. The United States Bureau of Mines has practically completed the development of a "Midget" impinger which has most of the good characteristics of the impinger but lacks most of its drawbacks. This midget impinger will soon be available and will greatly simplify both sampling and counting.

Other devices are also available for sampling of dust over a continuous period, namely, the electric precipitator, the paper thimble, the electrostatic precipitator, and the hot wire thermal precipitator. The English are working on a dust sampling instrument which precipitates the dust from the air by thermal means ("Physical Methods for the Estimation of the Dust Hazards in Industry", by H. L. Green and H. H. Watson, Privy Council, Medical Research Council, Special Series No. 199, His Majesty's Stationery Office, London, (1935)). The U.S. Bureau of Mines has been using an electric precipitator similar to those described by Drinker ("Alternating Current Precipitator for Sanitary Air Analysis; I - An Inexpensive Precipitator Unit" by P. Drinker, Jour. Ind. Hyg., Vol. 14, 1932, p. 364) for collecting samples of the test suspensions used in testing mechanical filter respirators for permissibility.

A number of instruments are available for making dust determinations for control purposes. Among these is the Konimeter which calls for but little skill in sampling. It is light, simple and quick to handle, needs no power for operation and requires only a microscope for counting the particles. The Zeiss Konimeter consists of a microscope which gives a magnification of 200X, an air pump, a dust filter to remove very coarse dust particles, a sample disc and a micrometer ruled in square millimeters. The air pump drives a measured quantity of air against the sample disc which is covered with a sticky substance (glycerine jelly). This sample forms a dust spot which can be examined under the microscope for a general idea of the nature of the dust and the relative quantities present, or for an actual measure, a "dust count", which shows how many dust particles are present in one cubic centimeter or in one litre of the air samples examined. The Konimeter has been used very widely in