LABORATORY

C. C. YOUNG, D. P. H.

DESCRIPTION OF A NEW MECHANICAL DISINTEGRATOR

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INVESTIGATORS working with filtrable viruses appreciate how much time may be consumed in reducing virus tissues to a finely divided physical state, a task generally carried out by hand with the aid of a mortar and pestle. This method of grinding tissues is not only comparatively inefficient, but exceedingly monotonous and tiring. In order to overcome these objections, we designed a machine whereby the mortar and pestle could be operated mechanically. This has proved so satisfactory that we offer a brief description of it for the benefit of those interested.

Figure I gives a top and Figure II a lateral view of the machine. The machine proper is fastened to a metal base (1). It consists of a suitable cast iron pedestal (2), provided with a thrust bearing (7), into which is fitted a shaft (6), which passes through into the grinding chamber and bears at its upper end a driving disc (8) provided with several eccentrically placed apertures (9). The shaft is driven by means of worm gear (10), which engages with a worm (11), attached to the horizontal shaft (12) of an electric motor (13).

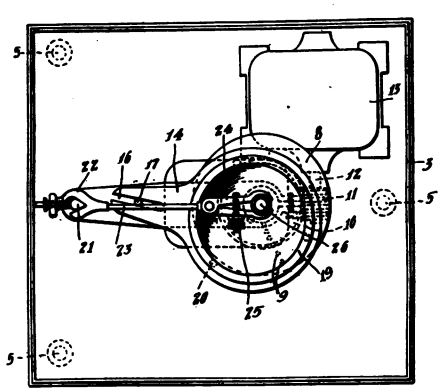

FIGURE I

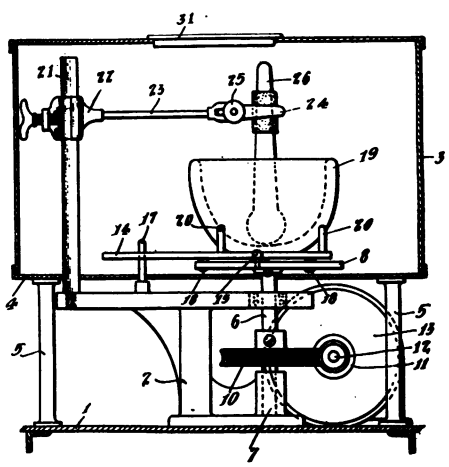

FIGURE II

Within the grinding chamber a platen (14) is movably positioned above disc (8) by means of a pin (15) which fits into one of the eccentric apertures (9). The platen (14) is provided with a bifurcated end (16), which engages with a fixed pin (17) attached to the pedestal (2). The mortar may be fixed in position on the platen by means of rubber covered metal fingers extending upward from the platen (14).

The pestle (26) is held in position by

means of a round flexible metal arm (23) provided with a clamp (24), operated with a thumb screw (25). The metal arm (23) is fastened by means of a special clamp (22) to a vertical triangular rod (21) fixed to the pedestal (2).

The mechanism described imparts to the platen holding the mortar an eccentric motion. By thus moving the mortar the pestle is brought into essentially the same operable relationship with the mortar as when the grinding process is carried out by hand. When desirable, grinding may be carried on in a closed chamber (3), which may be entered by means of a hinged lid, provided with a glass window to facilitate inspection of the material while the machine is in operation.

The machine described should not only prove useful in grinding virus tissues, but also in grinding most substances that are commonly disintegrated by means of a mortar and pestle.

The device has been patented and arrangements are being completed for its manufacture.

ELECTRIC KJELDAHL NITROGEN WITHOUT FUME HOOD

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AN electric Kjeldahl nitrogen apparatus is herein described which is very convenient and satisfactory. We have used it for nearly two years and are able to make nitrogen determinations on various kinds of waters, sewages, effluents and trade wastes accurately and rapidly.

The general arrangement of the apparatus is shown in Figure I.

The still and digester were designed and constructed at the Service Department of the University of Wisconsin. The structural frame work was built in the form of brackets from 1" x ⅛" angle iron welded together, which were then securely fastened to the wall by means of bolts. These brackets were designed to receive and hold securely the various parts of the two pieces of apparatus. The switch box supports were made from a length of heavy galvanized sheeting shaped to fit the switches and form an integral part of the brackets.

ELECTRIC EQUIPMENT

Gilmer heating units with hollowed tops are employed for heating the flasks in each piece of equipment. These were set in place on an angle iron shelf which is a part of the bracket. Each heating unit requires 0.6 K.W.H. of current. Four service leads from a service switch box were installed, each carrying 30 amperes of 110 volt alternating current. Each heating unit is controlled by an ordinary snap switch. The advantages of electric heating are even temperature, low fire hazard, and ease of operation and maintenance.

The distillation apparatus is provided with an automatic signal which rings a buzzer when the proper quantity of distillate is received in the flasks. To accomplish this the extreme right hand flask, Figure I, is counter balanced so that a given weight of distillate will make electric contact and ring the buzzer. The distillation rate is so constant that all flasks are filled at the same rate as the signal flask. Aside from the safety factor the analyst has no watching to do while distillation is in progress and is free to do other tests.

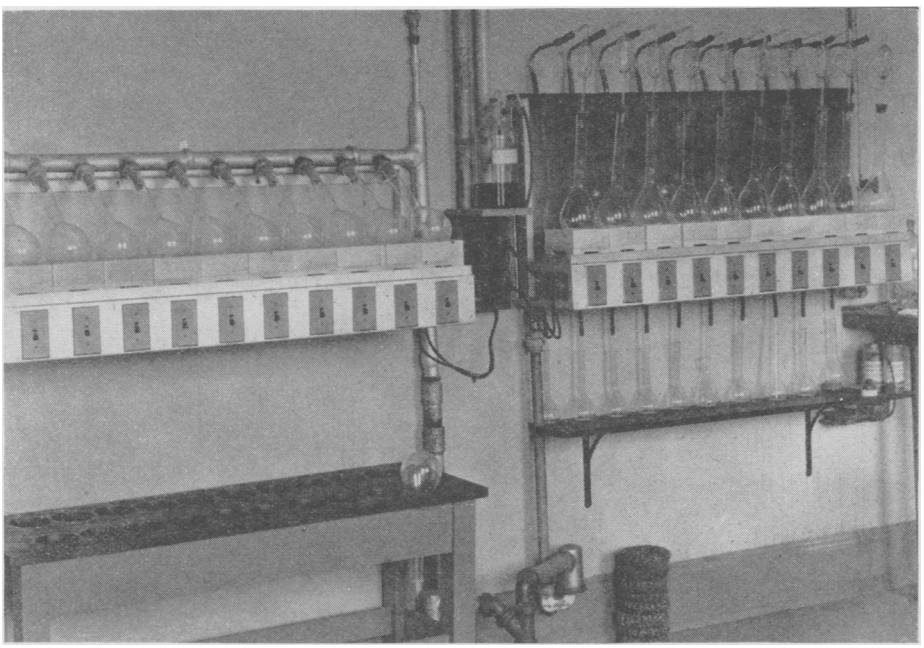

FIGURE I

THE STILL CONDENSER

The condenser was made from heavy copper sheeting in the form of a rectangular box open at the top—50″ long, 24″ high and 3″ wide. The condenser tubes were made of block tin 7/16″ outside diameter, with 1/16″ wall, each 36″ long extending below the tank for receiver flask connection and above tank for flask connection. They were soldered in the bottom of the tank and supported by cross arm at the top. Each tube at bend for flask connection was surrounded by a steel spring to prevent sharp bends. The copper tank was reinforced in the central part to prevent bulging. Water is connected for cooling to the bottom of one end, with a waste pipe connected with sewer at the top of the other end.

THE FUME ELIMINATOR

The fume suction tube is modelled after one described by Hastings, Fred, and Peterson (1927)[1] but with some modifications which we believe to be improvements. The main suction tube is of 1½″ lead pipe of approximately ¼″

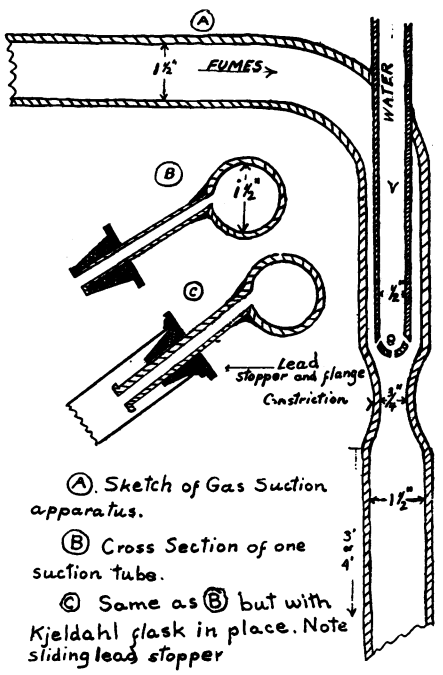

FIGURE II

wall. The essential parts of this apparatus are shown in Figure II. The construction immediately under the water jet permits the trapping of air and fumes as the water emerges from the slanting orifices. The flask connections are wiped into holes made in the main lead pipe. These side branches are of ⅜″ lead pipe with 3/16″ wall and are fitted with a sliding lead stopper as shown in (B), Figure II. In (C), Figure II, the flask is shown in place with the flange of the stopper resting on the lip of the flask. It is necessary that the flange of the stopper fit rather closely but the slight variation in the size of the neck of standard Pyrex flasks has offered no difficulty with our apparatus.

REFERENCE

1. Hastings, Fred, and Peterson. *J. Ind. & Eng. Chem.*, 19: 397, 1927.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Vital Statistics for England and Wales, 1929—The Registrar General's report of vital statistics for 1929 gave a birth rate of 16.3 per 1,000 population and a death rate of 13.4 per 1,000 population. Communicable disease death rates per 1,000 population were: diphtheria, 0.08; measles, 0.74; typhoid fever, 0.01; and whooping cough, 0.15. The birth rate for London was 15.7 and the death rate 13.8 but these rates were for civilians only.—*Pub. Health Rep.*, 45: 754 (Apr. 4), 1930.

Vital Statistics for Scotland, 1929—The Registrar General of Scotland reported the number of deaths registered in 1929 as 70,917, giving a rate of 14.5 per 1,000 population. There were 92,876 births, a rate of 19.0 per 1,000 population. Marriages numbered 32,992 and deaths under 1 year, 8,058.—*Pub. Health Rep.*, 45: 755 (Apr. 4), 1930.

Vital Statistics for Irish Free State, 1929—The estimated population of the Irish Free State in 1929 was 2,971,992. There were 58,342 births, giving a birth rate of 19.8 per 1,000 population; and 42,974 deaths, a mortality of 14.6. Deaths from principal causes of death were: cancer, 3,016; pulmonary tuberculosis, 3,034; influenza, 1,629; diphtheria, 292; measles, 134; scarlet fever, 60; typhoid fever, 78; whooping cough, 378; and violence, 924.—*Pub. Health Rep.*, 45: 755 (Apr. 4), 1930.

Age-Sex-Seasonal Incidence of Certain Diseases in Children—The records of nearly 2,500 patients from birth to 13 years of age who were admitted to the Hospital for Sick Children during the past 5 years and about 5,000 records obtained from the Toronto Department of Public Health were examined to determine the age, sex, and seasonal incidence in various diseases. A pronounced age incidence was observed in certain diseases. Thus, of 351 cases of endocarditis only 7 were in patients less than 4 years of age; of 108 patients with rheumatic fever, only 1 was less than 3 years of age. Almost 70 per cent of the 48 infants with scurvy were from 6 to 12 months old and only 2 were more than 2 years old. The youngest patient with tetany was 8 weeks old and over 75 per cent of the patients were from 4 to 12 months old. The age incidence of intussusception approximated