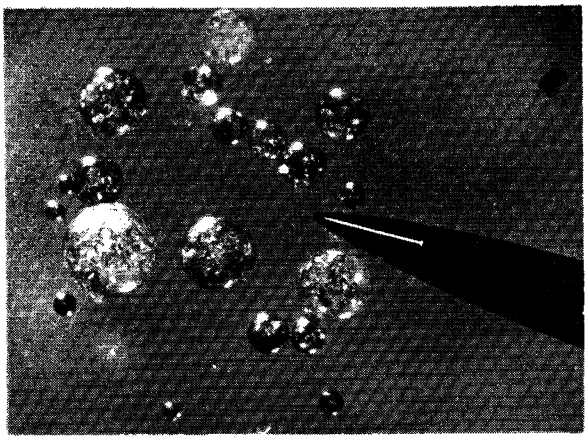

FIG. 4. Random sample of Y^{91}-containing beads and the point of a common pin (magnification × 35).

masking tape and transferred into individual capsules for measurements of radioactivity and for use.

In all these chemical and physical manipulations, radiation hazards must be considered. In most cases the work is done behind lead and/or Lucite shielding with the usual equipment necessary for semiremote-control handling (*3*).

Because of the high activity of the beads, the measurements are made with a Zeus α, β, γ portable ionization chamber that is mounted 10 in. above the measured capsules. The bead measurements are made by relative comparison with a series of Y^{91} standards ranging from 0.1 to 1.5 mc and prepared from a solution whose specific activity was originally determined by calibration against Ra DEF standards from the National Bureau of Standards. With these conditions of measurement, beads have been produced with specific activities ranging from 0.005 mc to 1.5 mc per mg, having diameters ranging from 0.05 mm to 1.0 mm, and weighing up to 1 mg.

The method of determining the radioactivity of the beads leaves some doubt of the validity of their millicurie content; however, under the conditions of measurement, and coupled with the knowledge of the expected theoretical activity of the precipitate (Fig. 1*C*), the error is probably not greater than 30%. The increasing divergence of the experimental curve from the theoretical curve with increasing bead weight might well be attributed to self-absorption.

Fig. 4 is a photograph (magnification × 35) showing a random sample of yttrium beads and the point of a common pin. An actual image of the pin is superimposed upon its enlargement for further comparison. The smaller beads are the ones that are selected for our experimental studies.

References

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Convenient Method of Mounting Sintered Glass Filters[1]

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The usual method of mounting ultrafine (UF) filters is to fit them by means of a rubber stopper onto a filtering flask with a test tube inside, or onto a test tube with a side arm. Both methods are somewhat cumbersome, and subsequent manipulations—taking the tube from the flask or transferring the filtrate into a test tube by means of a pipette—expose the filtrate to contamination. Besides, the side-arm test tubes are awkward to handle, and the breakage is usually high.

Fisher Scientific Company has put on the market a so-called shockproof condenser coupling (No. 7-702-C) to mount straight condensers for student use. These couplings proved to be very convenient for mounting medium-sized Pyrex sintered glass filters, particularly Corning Glass Company, UF30.

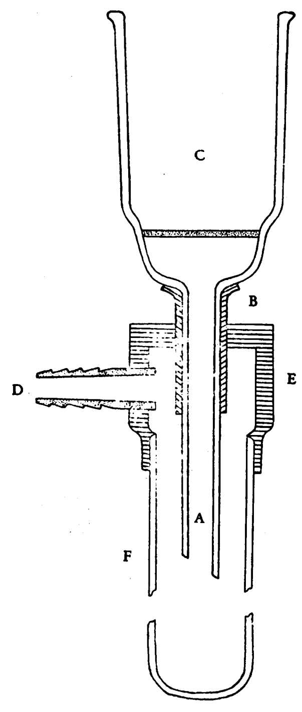

FIG. 1.

Fig. 1 shows how the device is assembled. The stem (*A*) of the UF30 filter is too narrow for the opening of the coupling; therefore a short piece (1 in.) of rubber tubing (*B*) of suitable size (5/16 in. × 3/32 in.) is first fitted on the stem and pushed sufficiently high to spread slightly at the joint of the body and the stem.

[1] This work was supported by a grant from The National Foundation for Infantile Paralysis.

The fitted funnel (C) is inserted into the hole of the coupling. The metal side arm (D) is plugged with cotton wool, the excess cotton being burned away. The coupling (E) now is fitted onto a 1-in. Pyrex test tube (F) (different lengths are available). To insure an easy fitting, silicone stopcock grease is used. The top of the funnel is covered with aluminum foil for protection, and the assembly is autoclaved for sterilization.

After filtration, the coupling and funnel are removed, cotton plug from a sterile 1-in. test tube is used to plug the tube containing filtrate, and the funnel is put on the tube from which the plug was removed.

Standard Measures and the Economical Production of Graphs and Figures

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Notes by Gutsell and by Wainerdi, respectively, in SCIENCE (*3*, *4*) emphasize the fact that standardizing of measures has not kept pace with advances in technology, and that the making of graphs continues to be a time-consuming task. This is particularly true of meteorology, where, for example, of the scales of 6 recording instruments, no 2 are alike and 6 different charts are used, whereas, by minor changes in the mechanisms of these instruments, not more than 2 charts would be necessary. The earlier meteorographs (*1*)—necessary for isolated stations and in aerological researches—were assemblies of familiar barographs, thermographs, hygrographs, etc., recording on a single chart, the 3 (or more) records occupying as many sections of the chart, all having separate time arcs and different scales. Accurate evaluation usually was a tedious process. In 1905, for work necessitating rigid economy, I devised meteorographs having a single time arc for all elements and using, for record charts, millimetric cross-section paper. Advantages possessed by this system are small cost, simplicity of operation and—of aerological instruments—small weight, but even the simple records obtained thereby are not always immediately useful, for graphs and copies must be made.

Some years ago, in a bulletin (*2*) prepared for the University of Nevada, records originally in different scales were, for ease of analysis, transposed into a common scale. Instead of the usual process of connecting reference points on coordinate paper, which would have required several weeks of valuable time, I used a form of pantograph with independent coordinates, by means of which graphs in drawing ink, ready for the engraver, were completed in one operation; the entire task was accomplished within a week. This instrument was described at a meeting of the American Meteorological Society in Boston, in December, 1946, but no description has been published.

Fig. 1 is an elevation of the instrument as it is seen by the operator, and Fig. 2 is a plan. The original figure or diagram, or a blank to receive the graph, may be attached to either cylinder (A or B) by a Richard spring clamp; or a belt of any desired length, bearing many figures, may be carried on A or B and over a separate cylinder C, which may be placed wherever convenient.

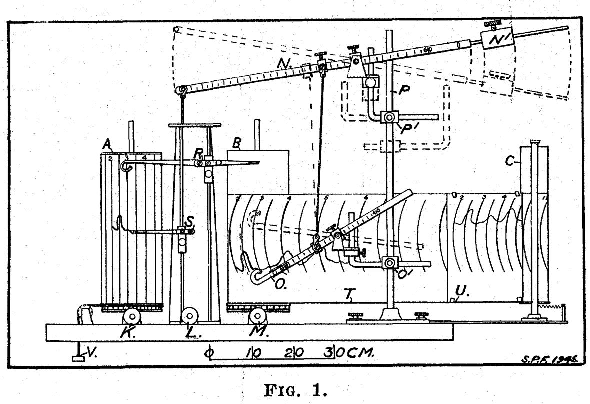

FIG. 1.

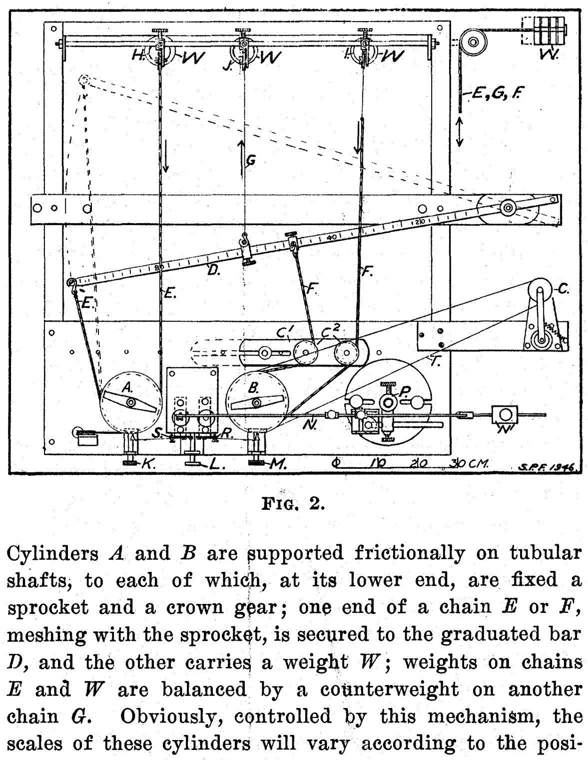

FIG. 2.

Cylinders A and B are supported frictionally on tubular shafts, to each of which, at its lower end, are fixed a sprocket and a crown gear; one end of a chain E or F, meshing with the sprocket, is secured to the graduated bar D, and the other carries a weight W; weights on chains E and W are balanced by a counterweight on another chain G. Obviously, controlled by this mechanism, the scales of these cylinders will vary according to the position of the chain F on the bar D; as shown, with F attached halfway between the axis of D and its outer end (carrying E), the time scale of B will be one-half that of A. The same scale for both cylinders is obtained by the use of the same chain over both sprockets. The cylinders are operated by the arbors K and M, on which, held by friction, are pinions meshing with the crown gears below the cylinders.

When both form and dimensions of a figure are to be duplicated, a stylus or tracer and a pen are attached to the same carrier R or S, which is clamped adjustably to

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