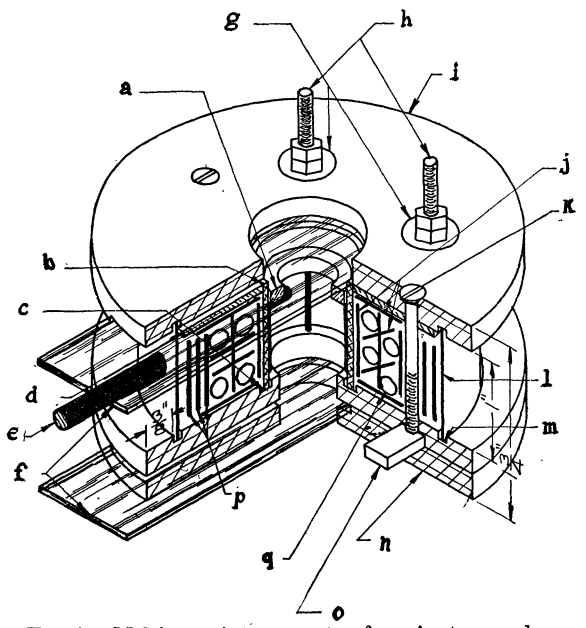

FIG. 1. Melting point apparatus for minute samples.
a—Tripod, made by press fitting three $\frac{7}{8}$″ steel pins into a brass ring $\frac{7}{8}$″ diam.
A thin $\frac{5}{8}$″ disk of glass, which supports the crystals, is placed upon the tripod.
b—Copper tube $1\frac{1}{8}$″ long, 1″ diam., set in
c—a groove, and flanged and pressed at the top into
d—a brass disk 2″ diam.
e—Thermometer.
f—Ordinary microscope slides.
g—Brass washers.
h—Brass binding posts.
i—Transite top $\frac{1}{4}$″ × $3\frac{3}{4}$″ with 1″ hole drilled at the center.
j—Mica insulation.
k—Brass bolts.
l—Nickeled iron, 21 gauge, set in
m—a groove in the transite.
n—Base of two $\frac{1}{4}$″ × $3\frac{3}{4}$″ layers of transite riveted together with a $\frac{5}{8}$″ hole at the center of the base.
o—Brass strip 1″ set into transite base.
p—Sheet asbestos.
q—Heating element—110V, 1.25 amp., formed by winding 15 ft. of 30 gauge chromel wire on a 5/32 in. rod.
All space around the insulation and heating element, filled with fireproof cement. This apparatus was connected in parallel with a 50, a 75, and a 100 watt light bulb which were used to vary the amount of current passing into the apparatus.

The instrument is inexpensive and easily constructed. It is essentially a short copper tube wound with chromel resistance wire as the heating element and insulated on the top and bottom with transite. The heat is concentrated around the copper tube, thus decreasing greatly the heat lag from the heating element to the center of the copper tube. The upper and lower windows of the tube are snug-fitting glass slides which can be moved horizontally in and out of the transite insulation. This arrangement, therefore, permits of a shifting of the upper glass window when the field of vision becomes befogged by steam or sublimate. The crystals are placed on a thin coverslip which rests upon a brass tripod. The coverslip is close enough to the upper glass slide to permit the use of a 16 mm objective. Because of the arrangement of the heating element, the instrument may be placed on an ordinary microscope without fear of injury to its hard rubber stage. A rheostat, or simply a number of lamps in parallel, connected to a 110 volt A.C. line, will permit easy regulation of the temperature up to 300° C. The instrument has a low heat lag and therefore heats rapidly and cools rapidly. This is of advantage in shortening the period of observation.

The reading of the thermometer is not that of the melting point of the crystals except below 100° C. A calibration curve is constructed for the thermometer, using pure crystals of known melting point. The approximate melting point of the unknown crystal is first determined. A crystal of known melting point is selected in this immediate melting point range, and placed on the same coverslip with the unknown. The melting points of both are then observed simultaneously.

There is no advantage in using a thermocouple in place of a thermometer. A thermocouple arrangement, as Linser[8] has shown, requires that the apparatus be heated up in exactly the same manner each time, otherwise the heat lag of the apparatus will produce a considerable error in the reading. The reading can therefore only be an approximation of the true melting point.

Professor F. G. Gustafson has given his kind suggestions and advice in connection with planning the apparatus.

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LABORATORY STIRRERS

I HAD occasion to do some research work on clay plastics at one time and had to rig up a set of agitators in a hurry. The general arrangement is as shown in Fig. 1. A small grinding motor was used for power, though almost any sort of motor would do. I procured a ten-foot length of $\frac{1}{2}$-inch steel rod to use for a shaft. I found out that the bearings, pulley and collars could be obtained as parts of the home workshop sets found in hardware and department stores. These fittings are all for $\frac{1}{2}$-inch shaft. Small lengths of shafting can also be obtained at these places. I needed a longer shaft and picked it up at a machine shop. I had four agitators connected up at one time. The speed could be regulated by using different-sized pulleys on the top of the vertical shafts of the agitator. Ordinary grooved pulleys were used with a round leather belt. It is unusually hard to find pulleys in the store of much more than 6 inches

[8] H. Linser, *Mikrochemie*, 9: 253, 1931.

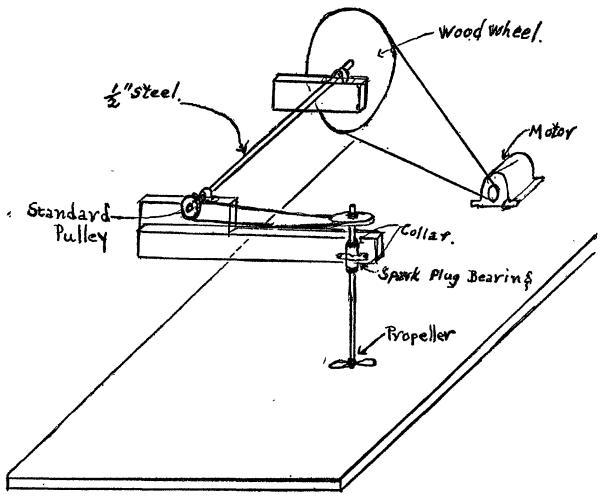

FIG. 1

in diameter. I had some turned out of wood of 12- and 16-inch diameter with a groove along the edge. By using a standard pulley 4 inches in diameter and drilling holes through the web, I made the hub for the larger pulleys. The wooden pulleys were bolted on to the smaller one which could be clamped by means of set screws to the shaft. Sometimes an old sewing machine wheel can be used, but they are rather heavy and unwieldy.

I was somewhat stumped for a vertical bearing to use on the vertical agitator shafts. I finally found that by taking out the center of an ordinary spark plug, placing a shaft in it and then filling it up with lead, thus forming a bearing, I had a very good bearing which would stand up for quite some time. The shaft and agitator bearings were fastened to ordinary two by fours and securely braced. The use of standard home workshop parts which are usually easy to procure in any city makes for a very flexible arrangement, especially where rather heavy materials in fairly large batches are to be mixed for long periods of time.

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SPECIAL ARTICLES

THE BIOLOGICAL EFFECTS OF THYMUS EXTRACT (HANSON)[1]

FOLLOWING the continuous administration of thymus extract to successive generations of parents, marked acceleration in the rate of growth and development has been observed during the early life of the offspring, particularly of the third and later generations. Thus the rate of development encountered in the fifth generation of young rats born of four generations of thymus-treated forebears is almost beyond belief.

A small colony of white rats was secured from the Wistar Institute on June 16, 1933. These were divided into test and control groups. The test animals have been subjected to date to intraperitoneal injection of 1 cc of thymus extract (Hanson) daily, even during the periods of pregnancy and lactation. Litter mates born to these rats have been mated in pairs and these have likewise been so treated and the effects on parents and on the offspring noted. Thus original test animals of the first generation (F_0) have undergone continuous treatment since June 16, 1933; the F_1 generation since September 10, 1933; the F_2 generation since September 25, 1933; the F_3 generation since January 19, 1934; and the F_4 generation since April 15, 1934. In the young treatment has usually been begun from the 16th to the 20th day after birth in the prepubertal group and from the 40th to the 60th day in the mature group.

The extract used in these experiments was prepared by Hanson[2] in 1930 briefly as follows: The thymi from 2 to 6 weeks old calves were extracted in 0.5 per cent. HCl solution with the aid of heat. This extraction differs from the extraction from parathyroids by Hanson simply in the degree of acidity used in its preparation. This preparation is extremely stable and is entirely potent and satisfactory for injection in rats even after being kept at room temperature from 2½ to 4 years. The extract was golden yellow in color and resembled bouillon in taste and smell. It has a pH of about 5.0 and is non-toxic in relatively large doses and non-irritating locally on injection.

In summarizing the results of treatment in the second generation (F_1), it might be said that treatment of the parents with thymus extract (Hanson) apparently results in an increased number of litters, an increase in the size of the litters, an increased birth weight and a decreased infant mortality compared with our controls. In later litters born to such parents, evidences of precocity appear, *i.e.*, increased birth weight, earlier eruption of the teeth, appearance of fur, opening of the eyes, descent of the testes and opening of the vagina.

The accruing precocity in successive generations of rats of the third, fourth and fifth generations is shown in the accompanying table.

[1] From the Philadelphia Institute for Medical Research (the Samuel Bell, Jr., Laboratory) in the Philadelphia General Hospital, the Laboratories of the Philadelphia General Hospital, Philadelphia, Pennsylvania, and the Hanson Research Laboratory, Faribault, Minnesota. With the technical assistance of Arthur Steinberg, B.S.

[2] *Jour. American Medical Association*, 94: 653, 1930.