Temperature records are obtained by means of a toluol-filled thermometer suspended at the side within the chamber. This necessitates raising the lid and the thermometer in order to read the latter, but this has not been found to be very inconvenient and if quickly done accurate reading can be obtained.

It has been found that sufficient agitation of the liquid is ordinarily produced by the immersion of the warm cans into the very cold denatured alcohol. Agitation of the liquid can be increased by dropping small pieces of solid carbon dioxide into the liquid at the corners of the chamber. By the use of a suitable shaft and rotating clamp connected to a small motor, outside the box, mild agitation of the can contents may be provided during exposure to the very low temperatures.

In order to obtain very low temperatures in the chamber, it has been found best to load the two copper boxes during the evening preceding the day of use. The temperature drops rapidly in the liquid and it is possible to have −20 to −40 degrees F. within a few hours, but the temperature seems to become better stabilized if overnight cooling is employed, and of course, a much lower temperature level finally is reached.

With constant use, it is found that about seventy-five pounds daily of solid carbon dioxide suffices to keep the temperature of the liquid at very low levels, and of course lesser amounts suffice, as the operating temperatures are raised.

The writer was assisted in the design and construction of this freezing apparatus by Mr. C. M. Romaine, of Heiser's, Inc., Seattle, Washington.

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CELLOPHANE MEMBRANES FOR TAMBOURS

THE writer has been using a Cellophane membrane on a pneumatic recording tambour for several months and finds it very satisfactory. It seems to be at least as sensitive as the usual rubber membrane and is much more durable. The original membrane has been in daily use, recording the breathing of white rats, and is still airtight, despite much rough handling.

The Cellophane removed from cigarette packages is of the correct thickness (.001 inch) for low pressure systems. Before mounting, it should be softened by brief immersion in warm water. It may then be fastened to the tambour without danger of cracking, and secured with thread or rubber bands. Rubber cement may be used to seal the edges. If the membrane is not sensitive enough, it may be stretched by forced inflation of the tambour. A light rubber band, stretched over the writing arm near its fulcrum, will insure positive action. The sensitivity of the membrane is determined chiefly by the amount it is stretched, but the thickness of the membrane and the tension of the rubber band have some influence. This type of membrane is very sensitive in its middle range, but will stand surprisingly high pressures without damage. It continues to record at high pressures, but with decreased amplitude. This characteristic is a great advantage where sudden large variations in pressure are frequent, for it prevents the writing point from fouling other markers or leaving the recording surface. This graded sensitivity, together with its relative freedom from deterioration, makes the Cellophane membrane extremely convenient for pneumatic recording.

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SPECIAL ARTICLES

X-RAY STUDIES OF VERY COMPLEX MIXTURES OF LONG CHAIN COMPOUNDS

IT has been reported in a preliminary note[1] that solid solutions may be obtained by mixing pure fatty acids of considerable variation of chain length. This is true for any number of components. In the x-ray studies of such mixtures spacings are observed which correspond to an "average" chain length. Such results are in conflict with the general opinion.

However, we have completed this investigation in every detail, and publication (F. B. Slagle and Emil Ott) will follow shortly.

[1] Emil Ott and F. B. Slagle, *Jour. Phys. Chem.*, 37: 257, 1933.

Due to the importance of these results in connection with the interpretation of x-ray diagrams of high-polymers of a chain-like structure it seemed imperative to extend such studies to other types of long chain compounds, the results of which are briefly reported here.

The following equimolar mixtures of normal alcohols were studied: the nine alcohols C_{10} to C_{18} and the six alcohols C_{13} to C_{18}. Complete solid solution formation is evident in both cases, since only one crystal spacing (in various orders) in the direction of the c-axes is observed. Inasmuch as the usual modification of the alcohols has the chain axes perpendicular to the base it is possible in this case (con-