PHYSICS

Glass Heated Cherry Red Can Be Plunged Into Ice Water

"Synthetic Quartz" Which Is "Pre-Shrunk" Makes Products With Low Coefficient of Expansion

A REMARKABLE new type of glass which can be heated cherry red and then plunged into ice water without danger of breaking is the latest advance in the science of glass making, it is announced by the Corning Glass Works.

It will be two years before vessels of this new glass can be offered to the public. In the meantime a small pilot plant will be in operation to test the commercial manufacturing problems.

The secret of the new glass is its extremely low coefficient of expansion with temperature change. It virtually rivals expensive quartz in this vital property.

The synthetic "quartz" was developed by H. P. Hood and Dr. Martin E. Nordberg under direction of W. C. Taylor, chief chemist of the Corning Glass Works.

While products of the new glass show virtually no change of dimensions when heated or cooled, because of its low expansion, it is quite a different story in the manufacture of the glass itself.

Articles made of it, for example, must be made larger than the desired final volume. Thus to get a nine-inch dish you first make one ten and a half inches in diameter. It ends up as a nine-inch dish as follows:

First, the dish is molded in the usual way but with the special glass formula to start with. Then by a series of steps, involving a final stage of leaching with dilute nitric acid, part of the structure of the glass is removed, leaving behind a "skeleton." By further heat treatment this skeleton shrinks down to a volume which is 35 per cent. smaller than the original size.

Made Porous

The acid treatment removes 36 per cent. of the body of the glass and leaves 64 per cent. behind. At this stage the glass dish feels rough to the touch but does not feel porous. Actually at this stage it is filled with sub-microscopic air spaces.

By final heat treatment the glass body shrinks just a bit more to a transparent, homogeneous state in which it is practically 96 per cent. pure silica. In this completed state it can be heated red hot and then dipped in ice water without cracking.

For all practical purposes the new low-expansion glass is equal to fused quartz and fused silica in its resistance to thermal shock.

Fused quartz is costly because it is extremely difficult to fabricate, requiring a very high temperature for melting. Further difficulties arise from lack of suitable refractory materials in which to melt it and from the fact that the melting and vaporization points are close together. The new glass surmounts these difficulties.

To give an idea of contrast between the old and the new glass, Corning scientists quote the following comparative figures for expansions: ordinary window glass 80, Pyrex baking glass ware 32, and the new glass only 8. The goal is zero expansion. The new glass, it can be seen, has dropped nine-tenths of the way to zero.

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SEVERE TEST

The new ultra-low-expansion glass receives a real test when Dr. Martin E. Nordberg of the Corning Glass Works research laboratory pours molten iron at 2600 degrees Fahrenheit into a piece of glass ware set on a cake of ice.

AERONAUTICS

France To Make Bid For Transatlantic Air Travel

WHILE Pan American Airways now has a monopoly on transatlantic air travel and Great Britain may make her bid next summer for passengers, France is planning four super-giant aerial "Normandies," weighing sixty tons each and capable of flying 6,000 miles non-stop at 200 miles an hour.

They are expected to take the air in 1942 and because of superior accommodations and speed make a serious bid for luxury transatlantic travel. As now planned they will have individual cabins with bath and carry from 20 to 30 passengers on across-the-ocean hops.

Mechanical equipment will contain much of American design including six huge Wright engines for each plane, the same type engine used on the present Clippers of Pan American Airways.

The frank utilization of American equipment and experience will be the choice of Air France, government-controlled airlines operators who are planning the new super-giants of the air. By avoiding mistakes through the adoption of American techniques, Air France expects to overhaul Pan American.

The firm of Latecoere Vaisseau, which will construct the new flying boats, has just finished experiments with two Farman landplanes designed for sub-stratosphere flight. One of these experimental planes—each with four motors—has just completed tests.

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PHYSIOLOGY

Vitamins Outgrow ABCs; Thiamin Treats Neuritis

IT WOULD be a great mistake to allow the current overemphasis upon vitamins in all sorts of advertised products to prejudice you against them. For they perform remarkable cures and give essential protection against the deficiency diseases.

The original vitamin is not A but B. It was this food factor that before the turn of the century was found to prevent beriberi. It was called "vitamine" by Funk. The final e was dropped later and "vitamin" became the general name for all such food factors. Vitamin B was