

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 prac-

tically 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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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



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.

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

found to have a multiple chemical personality, but the anti-beriberi is number one of the B complex.

Vitamin B₁ is now called thiamin since it has been isolated, identified and synthesized. In fact, the old ABC nomenclature of vitamins is being abandoned as their chemical compositions are being discovered.

The first gram (1/30 ounce) of thiamin must have cost more in labor and money than any other biochemical substance, probably several hundred thousand dollars. While dozens of American, British and other biochemists worked on the problems, a great share of the credit for thiamin goes to Dr. Robert R. Williams, chemist of the Bell Telephone Laboratories and Columbia University.

When the A.T. and T. was investigated not long ago, some congressman was somewhat puzzled as to why a tele-

phone company chemist was working on a vitamin. Perhaps he will be happier at the news that thiamin may help some cases of deafness, which assuredly concerns the telephone company.

Thanks to Dr. Williams and international chemical cooperation for nearly two decades, thiamin can be bought in the form of little white tablets. It completely cures beriberi, which is not very common in this country. More important, thiamin deficiency has been charged with causing neuritis of various sorts and doctors prescribe it frequently.

Strangely enough this vitamin which is particularly effective in treating neuritis from alcoholic overindulgence (so much so that mandatory addition of it to all liquors has been seriously urged) is necessary for the production of alcohol by fermentation.

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better record with 94 per cent. cures for chronic cases.

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Difficulties Beset Campaign

GONORRHEA, number two of what were formerly the "hush-hush" plagues, is proving more stubborn against eradication efforts than its deadlier fellow-ill, syphilis. Dr. R. A. Vonderlehr, assistant surgeon general of the U. S. Public Health Service, speaking before the meeting of the American Association for the Advancement of Science, told of some of the problems that beset the attack.

"The disinterested attitude of the medical profession mitigates against the development of control measures," he said. "Authorities in charge of clinics and dispensaries too often consider diagnostic and treatment methods for gonococcal infections as being of little importance.

"The public, while willing to talk about it, has not quite made up its mind to do something about gonorrhea, and infected people are inclined to consider the disease lightly. The public still tolerates the prostitute, either professional or clandestine, and public opinion permits the charlatan and the drug clerk to take advantage of infected individuals and ply their nefarious trade."

There has, however, been a considerable amount of progress, despite all obstacles. The various health services are obtaining better and more complete records of cases, and the number of treatments per patient has been steadily increasing. The number of clinics in which venereal disease treatments are given has more than doubled, although even yet not all of them give treatments for gonorrhea.

One problem still unsolved is the effect of some of the newer chemotherapeutic treatments. There is evidence that in many cases these result in the more or less complete suppression of symptoms but leave the former patient still a carrier. Better means for detecting slight infections and symptomless carriers must be developed.

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MEDICINE

Sulfanilamide May Be Menace if Self-Administered

Improper Dosage May Bring Ill Effects and Improvement May Be Mistaken for Cure, Making Patient a Menace

SULFANILAMIDE becomes a menace instead of a modern medical miracle when bought over drug store counters and used without the supervision of an experienced, reputable physician, warned medical scientists at the meeting of the American Association for the Advancement of Science.

The danger becomes especially acute when self-treatment for gonorrhea is attempted, and it is to sufferers from this "hush-hush" disease that most of the over-the-counter sales of sulfanilamide are made.

Ill Effects

Unsupervised self-dosage often brings on headache, dizziness, a drunk feeling, nausea, and more severe ill effects such as anemia and an allergy-like sensitization to the drug itself. Worse still, the drug may work a quick apparent cure, clearing up the symptoms and relieving the discomfort due to the malady, but leaving some germs still lurking in the victim's body. Lulled by a false sense of security, he may consider himself cured, and still remain a "carrier" and thus a menace to his family and the community.

Some of these difficulties are present

even in well-organized clinics, it was pointed out by Dr. Rogers Deakin of the Washington University School of Medicine, St. Louis.

Among the very poor, malnutrition renders the disagreeable side-effects of sulfanilamide more pronounced, and when the patient is ignorant as well as poor he is very apt to discontinue his visits as soon as the immediate symptoms have been relieved and not persevere in the treatments until he is really cured.

Also warning against sulfanilamide's over-the-counter sale was Dr. W. A. Brumfield, Jr., of New York State's Health Department, who urged regulations to make gonorrhea a reportable disease in every state and to prevent quacks from using sulfanilamide.

Brilliant Success

Sulfanilamide's brilliant success in curing gonorrhea was shown by the report of Dr. Ruth B. Thomas of Dover-Foxcroft, Maine, indicating 75 per cent. cures for mild cases, 67 per cent. cures for acute cases and 65 per cent. for chronic cases. Sulfapyridine had an even

● RADIO

Dr. Vern O. Knudsen, Professor of Physics and Dean of Graduate Study at the University of California at Los Angeles, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, July 10, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.