ed, in the opinion of these scientists, are those that tend to increase the secretion of the stomach juices or the acidity of that organ. Smoking, especially of cigarettes, alcohol, and the use of condiments with food are to be avoided.

Frequent small feedings were advised to neutralize gastric acidity in persons subject to ulcer. Sodium bicarbonate is not an efficient neutralizing agent for this purpose. Calcium carbonate is better, it was stated.

All foci of infection should be removed because they tend to stimulate the formation of ulcers both directly and indirectly. Roughage in food should be avoided in order to lessen the possibility of injuring the digestive tract.

The complications for which Dr. Ochsner considers surgical treatment valuable are mechanical obstruction of the digestive tract, perforation of the stomach wall, repeated hemorrhages, or danger of cancer.

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ASTRONOMY

Billion Degree Heat Needed To Explain Stars' Radiation

UNLESS the interiors of stars are almost entirely made of iron, their internal temperatures must be as much as 1,000,000,000 degrees Kelvin (about 1,800,000,000 degrees Fahrenheit), Dr. T. E. Sterne, astrophysicist of Harvard College Observatory, told the Electrochemical Society.

The outside surface of the sun, the hottest matter at which science can get a good look, is by comparison only about 6,000 degrees on the same temperature scale, Dr. Sterne indicated. The estimated outside temperature of other stars range from 1,650 degrees for very red stars to 35,000 degrees for those known as Class O.

These new estimates of internal star temperatures, Dr. Sterne pointed out, come from the theories of Prof. E. A. Milne of Oxford University. They exceed by a factor of 100 times the previously-held concepts of Sir Arthur Eddington of Cambridge University that the inside temperatures of ordinary stars were "merely" about 10,000,000 degrees.

Only in the case where a star is very dense, as in the baffling "white dwarf" type like the companion of Sirius, is the extra high temperature not needed, Dr. Sterne indicated. The white dwarfs have an average density 61,000 times as great as water and at their center matter probably weighs as much as five tons to the cubic inch. For such dense stars the theory of Prof. Milne yields a central temperature about like the theory of Prof. Eddington's—tens of millions instead of billions of degrees.

The staggering problem of internal star temperature is an essential part of one of the most important problems of astrophysics—the question of determining a reasonable mechanism which would create the enormous amount of radiant energy that the stars have been wastefully pouring out into interstellar space for at least 100,000,000 years.

In view of the findings of recent experiments on artificial transmutation of the chemical elements in laboratories, transmutation of elements from one to another within the centers of stars appears to offer the most reasonable explanation of great outpouring of stellar energy, Dr. Sterne indicated.

While the outsides of stars are constantly radiating energy into space, and consequently are not in equilibrium with their surroundings, the interior of stars might present a situation of approximate statistical equilibrium which is essential for a starting point on even the most fragmentary theory of star energy, said Dr. Sterne.

At temperatures of billions of degrees transmutations conceivably would be completely reversible with the elements changing from one to another in millionths of a second and liberating vast quantities of energy in the process.

Eddington's estimates of 10,000,000 degrees for internal star temperatures would not be sufficient for such reversible transmutations to be maintained, said Dr. Sterne. A billion degrees, and more, are needed to explain the energy output, unless the stars consist almost wholly of iron atoms which, theoretically, cannot be transmuted into other elements, without absorbing energy instead of liberating it.

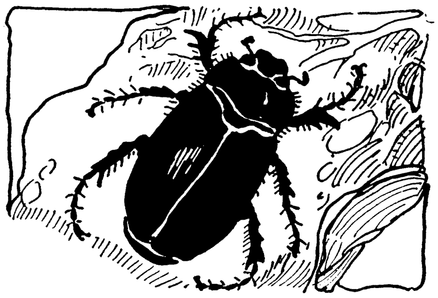
Science News Letter, November 16, 1935

A New York State experiment station points out the importance of completely filling bottles when bottling grape, apple or cherry juice, because air in the top affects flavor and color.

CHEMISTRY

NATURE RAMBLINGS

by Frank Thone



Chitin

MILADY now wears dainty hose made out of wood, and drives a car painted with a preparation of cotton. Tomorrow she may be shod with beetles' wings, and serve party refreshments off a lobster-shell tray.

Rayon, synthetic lacquers and a thousand other things made from wood and cotton cellulose are now chemical commonplaces. We no longer even stop to wonder at them.

But chitin, the animal analogue of cellulose, is still a neglected possibility. This stuff, which is found practically throughout the invertebrate animal world, forms such things as the wings and body-shells of insects, and the thick crusty armor of crabs and lobsters. It contains carbon and hydrogen in about the same proportions as they are found in cellulose, but it has less oxygen than cellulose has, and it also contains nitrogen which cellulose lacks.

But it is as susceptible as cellulose to chemical manipulation, and if industrial chemists were sufficiently interested could doubtless be converted into many of the same things that now are born by the shipload from cellulose: synthetic fabrics, lacquers, plastics, transparent wrappings. Little has been done with chitin (pronounce it *KY*-tin), even by laboratory chemists; nothing, apparently, with a view to possible commercial applications.

There is no lack of raw material. The lobster, crabmeat, and shrimp packing industries turn out mountains of discarded shells every season, which are now just plain waste, to be got rid of. These would have to be treated with acid, to extract the lime they contain, before they could be used, but that would not present any serious difficulty; acids are cheap.

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