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that they were not rated as highly, either by the Indians or by the settlers of Massachusetts Bay Colony, who adopted Indian money. There was even monetary legislation in early New England, fixing the value of wampum and providing penalties against the racketeering count-

erfeiters who had the audacity to manufacture wampum out of inferior kinds of shell, or even out of pottery, bone and wood. For at so early a date as this, "sound money" was an agitated issue!

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Science News Letter, February 23, 1935

MONEY NO LONGER

One of the most famous pieces of wampum-work in the world: part of the great "Treaty Belt" made by the Indians to commemorate their agreement with William Penn. Wampum so used assumed so high a symbolic value that it was no longer considered to be money.

measurements, too, the speaker pointed out. He showed a picture of a microscopic section of a piece of balloon cloth for which the Bureau had to set a thickness measurement. On such a large scale, it looked as rough as a chunk chopped out of a doormat. Yet by acceptance of a convenient agreed-on fiction a satisfactory measurement was possible.

As with length and thickness, so with other measurements: time, weight, electromagnetic units, temperature. The importance of accepted fictions can hardly be better demonstrated than by trying to make out the meanings of estimates of heat and cold dating before the invention of thermometers, Dr. Tuckerman pointed out. Just how hot, for example, he asked, was the fiery furnace seven times heated, into which Nebuchadnezzar ordered Shadrach, Meshach and Abednego to be cast?

He also cited the case of one of the earlier thermometer scales, that began with zero at the boiling point of water and measured downward for "degrees of cold," to 100, which was placed at freezing point. Inverting this curious scale gave the world its present Centigrade scale, used by science everywhere

PHYSICS

Measurements All Fictions, Valid Because Agreed On

DISTANCE and height, weight and temperature, all measurements soever, have no "real" existence in any absolute sense. They are all fictions. They work in everyday life simply because we all agree to accept the same fictions.

To become a bit Gertsteinian: A foot is not a foot because it is a foot; it is a foot because nobody will say it is not a foot.

Upsetting ideas on "Fiction in Measurement" were tossed before the members of the Washington Academy of Science by its retiring president, Dr. L. B. Tuckerman, physicist at the National Bureau of Standards.

There is nothing immoral about these agreed-on fictions, though they affect our lives in dozens of ways, and even bear on such almost-holy things as international boundary lines, Dr. Tuckerman emphasized. On the contrary, they are most convenient—indispensable, in fact, if we want to maintain any kind of a civilization. Only, for the sake of keeping our thinking straight, we should not forget that they always are fictions.

As striking example of what he was talking about, Dr. Tuckerman showed photographs on the finer-than-hair lines on the U. S. standard meter bar kept at the Bureau of Standards. Every accurate measuring device used in this country is

calibrated by the distance between that pair of thin lines. They were ruled on the bar by the most exact method known, fifty years ago, and have never been touched since. Magnified thirty times, they still appear beautifully even and smooth.

Then Dr. Tuckerman flashed on the screen a photograph of the same lines, magnified 300 times. They looked like rough plow furrows.

Obviously, something for mutual agreement rather than absolute determination. Yet this mutual agreement results in accuracies as close as one or two parts in ten million, far beyond any of today's technical needs.

Agreement, convention, acceptance of a fiction must rule actual commercial

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and for everyday purposes in most countries. Once a proposal to return to the earlier "upside down" way of measuring temperature set Dr. Tuckerman to speculating that "Instead of marveling at temperatures of millions—or is it billions?—of degrees at the centers of stars, we should be wondering how nearly those temperatures could come to the Absolute Zero of hotness!"

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METALLURGY

"Popcorn" Method Used To Crush Mineral Ore

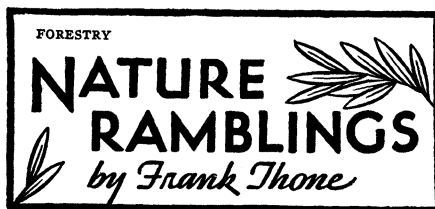
A "POPCORN" method of crushing mineral ores, wherein the ground rock blows itself apart by internal explosion, was described by R. S. Dean of the division of metallurgy, U. S. Bureau of Mines, before the meeting of the American Institute of Mining and Metallurgical Engineers.

In a process quite like that used in making the familiar "puffed grain" cereal breakfast foods, ore is placed in a strong container and steam at from 150 to 250 pounds pressure forced into it. The high-pressure steam seeps through cracks and crevices of the ore.

Suddenly a valve is opened and the pent-up steam escapes. Steam imprisoned within the ore particles exerts such force on its way to freedom that it blows the ore apart.

So cheap is the method of crushing by steam explosion that a ton of ground ore can be crushed for a power cost of 1.6 cents. This is less than one-fifth present crushing costs.

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Streamlined Plantings

PLANTINGS in the experimental demonstration strips of trees in the Great Plains shelterbelt zone are to follow a plan not familiar in older farm shelterbelts of the West and Midwest.

Instead of solid phalanxes of trees all of the same species and therefore of the same height and appearance, the new ten-rod strips are to be built up of trees varying in height from margin to middle. The strips will not be abrupt walls, but sloping ridges.

Down the middle of each strip, according to Forest Service plans, the tallest, fastest-growing species, such as elms, will be planted. Flanking these will be trees of slower growth and less height, perhaps burr oaks. Finally, like light-armed auxiliary troops on the flanks of the heavy battalions, the outer margins of the strips will be "tied down" with plantings of small trees like hawthorns and shrubs like sumac and buckbrush.

Such a graded structure will have a considerable advantage in the primary object of the shelterbelts, it is expected. If the trees were all of the same species, they would, after a few years, lose much of their usefulness in turning the wind.

Their tops would, to be sure, break the force of blizzards at roof level, but the wind could rush through among their branchless trunks with little hindrance. But a wind encountering a forest edge that thrusts massed twigs against it all the way from ground level to the highest tops will be deflected upward.

The new shelterbelt design is as much an advance on the old as are the new automobile bodies in their contrast to the vertical-lined designs of four or five years ago.

Mixed plantings of this kind are less

artificial, too, than are the old one-species belts. In any natural woodland, especially those venturesome groves that strive against grasses for a place on the prairies, one finds anywhere from three to eight or ten species of trees, and the margins are almost invariably fringed with small trees and bushes.

It is this marginal zone of shrubs, indeed, that gives natural timberland a great deal of its charm, for many of its components have lovely flowers in the spring and bird-enticing fruits in summer and fall. In such thickets many of our best-beloved small birds nest, in preference to the taller trees above, and on the ground beneath their concealing low branches lurk bobwhite and rabbits. It is not unlikely that some of the best dividends from the new plantings will be harvested, by nature-lovers and sportsmen, from these marginal shrubs.

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GENERAL SCIENCE

Science-Based Industries Seek R. F. C. Support

NEW industries, based on recent developments in science and technology as yet untried on a commercial scale, may seek funds for their establishment through appropriations made available through the Reconstruction Finance Corporation bill which has just been passed by Congress and signed by President Roosevelt. The R. F. C. regulations surrounding loans for this purpose have not been prepared, but they are among the matters now under consideration in the R. F. C. legal department, and issuance of a ruling is expected in the near future.

If it is decided that such new industries, upon the posting of the "reasonable security" required by the new law, are entitled to the aid of Federal loans, a number of applications will probably be made within a very short time. Among the projects whose backers are watching the outcome of present discussions with interest are:

A proposal to manufacture newspring paper from pine, in the South.

A process for obtaining starch for laundry and other purposes from sweet potatoes, also held out as a new possibility for Southern agriculture.

The proposal to turn surplus grain into alcohol for mixing with gasoline motor fuel, which has been revived in the legislatures of several Grain Belt states.

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