



#### TELESCOPING TIME

The pot at the right contains specimens of winter oats from yarovized seeds; the control pot at the left contains plants from unyarovized seeds. Both were planted at the same time. Dr. Dmitry Borodin, who is trying yarovization experimentally in this country, is shown in the insert.

#### ARCHAEOLOGY

### Iron Age Treasures To Be Sold in New York

THE "TREASURES of Carniola," a great collection of 20,000 bronze and iron objects belonging to the early Iron Age of Europe, have been shipped across the sea to be sold in New York.

The collection was amassed chiefly by excavating numerous tombs in the province of Carniola, Austria. The late Dutchess Friedrich Paul of Mecklenberg sponsored this work for ten years, by a special license from the Emperor of Austria. The collection was her private property.

The early Iron Age in central and western Europe is scientifically known as the Hallstatt culture because it is identified with Hallstatt, Austria, where a cemetery of the age first came to light. The age lasted from about 900 to 500 B.C. and was notable because iron then came into use in commercial quantities: The graves of the people contain such things as swords and helmets, pins and other ornaments, glassware, household utensils, and farming implements.

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#### PLANT PHYSIOLOGY

## Yarovization Process Turns Biennial Plants Into Annuals

Starting Germination, Then Chilling Seeds, Speeds Flowering and Fruiting; Widely Used in Russia

"YAROVIZATION," a new seed treatment to speed growth of crops, is likely to be heard of a good deal in future because of American experiments now in progress. As a word, it bids fair to become incorporated in the English-speaking vocabulary of the plant sciences and the agricultural arts.

Yarovization is the treatment of seeds before they are planted, with the artificial regulation of certain natural plant growth factors: moisture, temperature and time. Each plant species, and within the species each variety and strain, has a particular combination of these factors to which it responds best, according to the practitioners of the new technique. Most interesting claims are made by the "yarovizers." They state that in Russia properly yarovized seeds produce plants that yield their harvest in much less time than do untreated similar seeds, making possible such things as the ripening of grain from winter-wheat seed sown in spring instead of autumn, the pushing northward of the cotton and corn belts, the speeding up of plant breeding experiments in greenhouses, etc. In the United States the process is as yet only in the experimental stage.

#### Invented by Russian

Yarovization, in its special sense, is the invention of a young Russian plant breeder, Dr. T. D. Lyssenko of Odessa. In this country, experiments with the new process were carried on last summer at the Arlington Farm of the U. S. Department of Agriculture by a Russian scientist, Dr. Dmitry Borodin, who is now in process of becoming an American citizen. His status in the Department of Agriculture was that of "collaborator." In his researches, he had the cooperation of numerous scientists at various experiment stations throughout the country.

To yarovize seed, it is exposed to a given degree of moisture, for a stated period of time, at a predetermined temperature. Each kind of seed has its own

"formula." Thus, to change winter oats from a two-season to a one-season crop, which is Dr. Borodin's outstanding accomplishment thus far, the formula reads: 50:28:2; that is, 50 per cent moisture (on the basis of the dry weight of the seeds), 28 days of treatment, at 2 degrees Centigrade above freezing. Then the seeds are dried, and in this state can be stored for a few days, or shipped to the place of planting. After planting, they mature their crop much more quickly than do untreated "control" seeds. Untreated seeds of winter grains—wheat, barley or oats—refuse to bear a crop during the first season after sowing, even if sown in the spring; but yarovized seeds out of the same lot behave just like spring grains, and mature their crop during the same summer.

#### Many Plants Yarovised

Dr. Borodin applied the yarovization technique to a great variety of plants at the Arlington Farm: winter barley, winter oats, corn, millet, sorghum, cotton and others, determining the "formula" for each.

Yarovization gets its name from the old Russian word for spring, "yar." When Dr. Lyssenko first performed his experiments, he thought of the process as something analogous to what happens in nature in the spring. Literally translated, then, the word might read "springification"; an attempt has even been made, mostly by research workers in England, to render it as "vernalization," but since it is now recognized that the whole process is not strictly analogous to that in nature, an Englishing of the word is now unlikely.

Like all "new" things under the sun, yarovization has had forerunners. As early as 1857, an American scientist, John H. Klippart of Ohio, discovered that larger and earlier grain crops could be secured by partly sprouting and then chilling the seed in darkness. He published an account of his researches, but the paper was overlooked and forgotten. Then, when Drs. W. W. Garner and H. A. Allard of the Department of Ag-