

Whatever you do, be absolutely sure that your tomatoes get plenty of sun, even if it has to be at the expense of some other crop. Tomatoes, it cannot be emphasized too often, are the most valuable single vegetable crop you can raise. You cannot do them too many favors.

As a rule, it is better to plant your garden in long rows from end to end or side to side, rather than in neat, blocked-off individual beds. The row arrangement is most economical of space, and saves labor when the long job of weeding and hoeing comes on with warmer weather. If you have a relatively large plot and plan to work it with a wheel-hoe, of course row-planting is obligatory.

Most varieties of garden seed are available in sufficient quantities for a big gardening season, the U. S. Department of Agriculture advises. It is a touch-and-go situation, for we formerly imported a very large proportion of our seed from northwestern Europe, which, of course, is out of the market for the duration;

so we have to grow our own seed now—and even produce a lot for shipment to our overseas allies.

For this reason, both federal and state authorities advise very strongly that each Victory Gardener use the contents of each packet of seeds he opens with an eye to the utmost efficiency. It is a common mistake for first-year gardeners to plant too thickly, perhaps on the naive assumption that since each seed can grow into a plant, that is the way to get the most plants. But overcrowded plants become spindly and must be wastefully thinned if they are to produce a useful crop instead of spending all their strength in futile competition.

Plant, therefore, as if each seed were a cartridge in this critical year's campaign—and you know the ammunition supply is no more than sufficient. Make each seed count. If anything, plant rather more sparingly than directions on the packet call for, and then prepare to weed and tend each individual plant for the highly valuable little ally that it is.

Science News Letter, March 20, 1943

PHYSICS—MATHEMATICS

Einstein Idea Unworkable

Harvard Mathematician finds famous theory of gravitation unsatisfactory because it does not fit into good explanation of the universe.

► EINSTEIN'S FAMOUS theory of gravitation, although it provides a satisfactory explanation of gravitational phenomena is "essentially unworkable," Prof. George D. Birkhoff, mathematician of Harvard University, told a scientific audience at the University of Cincinnati in a lecture which is also being delivered before local chapters of the honor society Sigma Xi throughout the country.

All the newer theories of quantum physics are found inadequate by the the mathematician because they cannot be fitted into a satisfactory explanation of the universe, Prof. Birkhoff indicated.

To the physicist, this larger view of nature seems unnecessary. It is sufficient if he can by means of his theory calculate results that can be verified by scientific experiment.

The mathematician, on the other hand, wants to understand how each theory fits into his whole knowledge of nature. When the theories were not developed from the simple aspects of nature—objects, sequences of events, or geometric

forms that can be recognized—but have been created by the human mind, then the mathematician wants to be able to build a physical model to fit the theory.

It is not possible, Prof. Birkhoff indicated, to build any such tangible model from the modern theories of quantum mechanics. It may be true, he said, in some mystical sense that God thinks multi-dimensionally whereas men can only think in a series of logical steps along a line. We need a satisfactory mathematical theory to remedy our deficiency in this respect.

The way mathematical concepts and theories have been developed from simple experiences of nature was described by Prof. Birkhoff:

"A child puts its hand too near the fire and is burned," he said, "and thereafter remembers that this A (touching fire) will bring about this B (pain and burn). The chain of association fixed in his memory is essentially of the propositional type 'A implies B.' He has learned a physical fact!"

This is the basis of logic.

● RADIO

Saturday, March 27, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Floyd S. Daft, senior biochemist at the National Institute of Health, will discuss "What Are the Chances of Finding New Vitamins?"

Monday, March 22, 9:15 a.m., EWT; 2:30 p.m., CWT; 9:30 a.m., MWT; and 1:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Races and Nations" will be the subject of the program.

"The boy playing with a pile of pebbles on the seashore is dealing with a universe of distinguishable objects just as was the shepherd in ancient times who counted his flock by means of stones. In this simple process of one-to-one correspondence lies a basic difference between man and all other animals."

This is the basis for the concept of number.

Geometry arises from the idealization of physical bodies which are taken to be rigid forms and is practiced by the use of such simple "rigid bodies" as the ruler and protractor.

With only these three examples before them, mathematicians have set out to generalize and to modify. More recently they have added the concepts of time and a system of forces. From these have been built the framework of the universe of space and time.

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INVENTION

New Method Casts Rotating Bands on Shells

► A NEW METHOD for applying the copper rotating bands to artillery shells has been invented by Roy T. Hurley of Dobbs Ferry, N. Y. (patent 2,310,915).

In present practice, rotating bands are made big enough to slip over the base of the shell, and are then squeezed into the groove cut to receive them by a hydraulic or other press under very high pressure. This tends to distort the metal, and may cause failures in action.

In Mr. Hurley's method, the base of the shell is placed in a metal mold that holds it firmly. An annular space in the mold permits melted copper to be poured in, thus casting the rotating band right on the shell itself.

Rights in the patent have been assigned to the Bendix Aviation Corporation.

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