

I'll not need to take a jug of drinkin'-water to the field with me; all my furrows will end near my pump." In his particular case this was nearly literally true, for his farm stood out on the end of a jutting hill, and he had to plow horseshoe-shaped strips back and forth.

A step advanced beyond strip-cropping is the building of terraces. These are imperative on steeper slopes, desirable on almost all slopes. Terraces, have, indeed, been used a good deal in parts of the South, but as yet have not taken much hold elsewhere. The erosion-fighters are experimenting with various soil types, in different parts of the country.

Not New

Terraces are nothing new in farming. Indeed, they are among the oldest of farming devices—so old that their origins have been forgotten. But you find them everywhere: all through the Orient, in the ancient lands of the Incas, on the steep slopes of the Rhine and Moselle where the famous vineyards are that the Romans first planted. The mysterious "lychets" of English hillsides may have been cultivated terraces in the New Stone Age, ten thousand years ago.

Terraces take time, and at least a little expense, to build. But once built, their flat tops are almost erosion-proof, and their steep sides are given to grass or other permanent vegetation, to hold them in place. At the ends, where the runoff waters must drain, wide runways are left, and long grass is encouraged to grow in these so that the water may

slide over without cutting the earth loose and starting another gully.

New Hope

With contour-plowing, strip-cropping and terraces, then, the fields may be redeemed. The gullies, hopeless-looking rents in the earth, next challenge.

Here the engineers and foresters enter the fight. In the deepest and most menacing pits, the engineers throw in dams: stone where they must, though that is laborious; earth fills, or stakes-plus-wire-plus-brush, where they can. These obstructions slow down the water, permit the silt to deposit and fill up the holes. Maybe the sides are scraped or dug in a bit. What once was a deep, angular gash presently becomes a shallow, curved swale filled with marsh-grasses and cattails—a very much friendlier place.

While the engineers block the main gully with dams, the foresters attack the flanks with roots. They plant trees along

the sides, trees with long, fast-growing roots that will hold the soil and prevent the gully from growing wider.

A favorite species is black locust. It has the right kind of spreading roots, it "suckers up," forming dense thickets, it eventually makes good post-timber (if the borers will only let it alone), its feathery foliage permits grass to grow underneath, it is a legume, enriching the soil. Plainly, a tree of many virtues.

Erosion's fight against man has gone on almost unnoticed since pioneer days. Man's fight against erosion has just begun. Whatever the future political vicissitudes this country may face, this is the one of the newer Government activities that simply must go on. If it is stopped, presently there will be no land for either conservatives or radicals to govern at all. The rest of our farmers must be converted to the Curving Furrow. In this sign they shall conquer.

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GEOLOGY

Artificial Lava Currents Show What Happens in Earth

A UNIQUE device for the study of the behavior of rocks and molten lavas in deeper parts of the earth's crust has been designed by Dr. Robert Balk, chairman of the department of geology and geography at Mount Holyoke College, and built especially for him with funds from the Carnegie Institution of Washington. Research along this line is expected to reveal interesting and hitherto unknown facts concerning the origin of certain deposits of ore minerals, especially chromium, nickel and iron oxide magnetite.

The machine consists of a series of tanks about six feet long through which flows a current of artificial magma or molten lava. Hundreds of solid particles are suspended in the magma to simulate the crystal grains that float in the real magma reservoirs forty miles below the earth's surface. Obstructions are then placed in the path of the current, so that the floating grains must converge, accumulate or diverge in the same way that the actual crystals do below the earth's crust.

The process is similar to the formation of streaks of smoke or dust behind a moving automobile or to the development of foam trailers behind a moving steamer, and is believed to have

a bearing on the origin of certain deposits of ore minerals.

In explaining the operation of his machine, Dr. Balk pointed out that the movements of molten masses, involving thousands of cubic miles of material erosion, have laid bare the surface of these enormous intrusive magmas. This is because millions of crystals that were kept afloat in the molten mixture register after erosion the directions of movement by lining up in the fashion of trailers parallel to the directions of elongation. The mechanism of this entire process is reproduced on a small scale by Dr. Balk's machine.

Another device recently built by Dr. Balk illustrates the manner in which fractures accompany folds and similar deformations of the earth's crust. Only two similar experimental devices, one at the University of Bonn in Germany and another at the Johns Hopkins University, have been constructed so far. The machine consists of a cake of wet clay stretched over a double sheet of tin. Through variations of the intensity of stretching and of the consistency and thickness of the clay mass, Dr. Balk will be able to imitate accurately a number of natural processes of rock-strata fracturing.

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The Freedom of Man

By ARTHUR H. COMPTON

Every scientist will be interested in this new book by the distinguished physicist, in which he discusses the relationships between his own scientific and religious thinking. Professor Compton argues that man is far from being a creature who fundamentally obeys inevitable laws; the universe is fundamentally unpredictable and man is fundamentally free. From this point of view he describes man's place in the universe as it is revealed to a scientist, and man's relations to the greater forces that lie beyond him. The book is based on the Terry Lectures delivered at Yale University. \$2.00.

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