

AGRICULTURE

Cultivating by Fire

Agriculture now reaches into the arsenal of war to borrow a new weapon in the attack on weeds; the flame thrower has been adapted for farm's mechanized war.

By DR. FRANK THONE

► **CHEMICAL WARFARE** methods have long been used by farmers against the insects that devour their crops and the parasitic fungi that make them sick. Now agriculture reaches into the arsenal of war to borrow another weapon: the flame thrower has been adapted for use in a mechanized attack on weeds.

War against weeds is still waged with the classic, old-fashioned weapon—cold steel. The hoes and weeders and cultivators that are drawn across our fields behind tractors are different in pattern but not in principle from the primitive blades forged by Blacksmith Tubalcain for Gardener Adam's grandsons, before written history began. Not until now has it occurred to anyone to use fire instead of steel.

Flame cultivation, as the new way of fighting weeds has been christened, is the invention of an Alabama planter, Price McLemore, now a major in the Army Air Corps. It has been tested with very encouraging results in sugarcane, corn and cotton fields, and is due for trials on other crops during the 1943 growing season.

Like many another revolutionary innovation, flame cultivation is basically very simple. The idea is to hit the weeds with something that will kill them but will not materially harm the crop that is striving to make headway against them.

Weeds Are Lower

It happens that the weeds most troublesome to such plants as cane, cotton and corn are not anywhere nearly as tall as the crop itself. If therefore you can hit their leafy tops with a flame that will blight them, and that still is not hot enough to harm the thick lower parts of the crop-plant stalks, you have won the battle.

That is just what the flame cultivator undertakes to do. Using two burners of already existing commercial pattern, fed by ordinary fuel oil under pressure, it spreads a sheet of fire close to the surface of the soil on opposite sides of the

row of crop plants as the tractor tows it along.

One highly important effect of flame cultivation is the killing of weeds not only between the rows of plants, but between the plants in each row. This kind of weeding can be done now only by hand-hoe methods.

The burners are not exactly opposite each other, but are echeloned or staggered. If they were directly opposite, their flame areas would strike each other and turn up a ridge of fire, which would harm the crop plants. This is avoided by keeping them far enough apart and by directing their tongues of flame to miss each other.

The flame treatment does not instantly burn the weeds to a crisp. In fact, immediately after the cultivator has passed over, little or no effect is noticeable. But after a short time their leaves and green stalks wilt and in a few hours they are dead.

In many species, particularly in annual weeds, roots as well as tops are killed in the first treatment. In others, notably certain tough grasses, the roots survive and send up new shoots, which require repeat treatments. However, this is the experience with conventional means of cultivation also, except perhaps that with ordinary cultivators the number of return trips is greater.

There is an advantage in killing the weeds without uprooting them. The dead roots left in the soil continue to serve as binders against erosion, and the wilted tops on the surface have at least a slight mulching effect. Also, of course, the roots of the crop plants themselves are not disturbed, and the soil, left unstirred, does not begin to wash so quickly when it rains.

Effects on the crop plants are limited to slight scorching of the lower few inches of the stalk, and occasional destruction of a few bottom leaves. There seem to be no permanent ill effects to the crops on which the machine has thus far been tested. Scientists of the U. S. Department of Agriculture state that preliminary reports (*Turn to Page 108*)



FLAME CULTIVATION—The new method of killing weeds is here being used on a cane crop. Weeds are even killed between plants in the same row. This could formerly be done only by hand-hoe methods.



PARFOCAL WITHIN "One Fourth"

OF THE TOLERANCE SPECIFIED!

● Illustrated above are the elements of a parfocal ten-inch lens with a focal length of 25 feet. It was specified by the astronomical observatory which ordered it, that the lens should be parfocal for the C and K spectral lines, with a maximum difference of 1 millimeter (0.039 inch). As produced in the Perkin-Elmer plant the lens was actually parfocal within a quarter of this tolerance . . . one-fourth of one millimeter (0.010 inch).

Today the facilities of our organization for extreme precision of optical manufacturing are among the most urgently needed by our government. Therefore we are, of course, giving these needs our complete attention now. When Victory is won we shall again place our resources at your disposal.



THE PERKIN-ELMER CORPORATION
GLENBROOK, CONNECTICUT

MANUFACTURERS OF PRECISION LENSES • PRISMS and MIRRORS
OPTICAL DESIGN AND CONSULTATION

(From Page 106) from the cane-fields treated last year show no material differences in yield between flame-cultivated cane and that weeded by conventional methods.

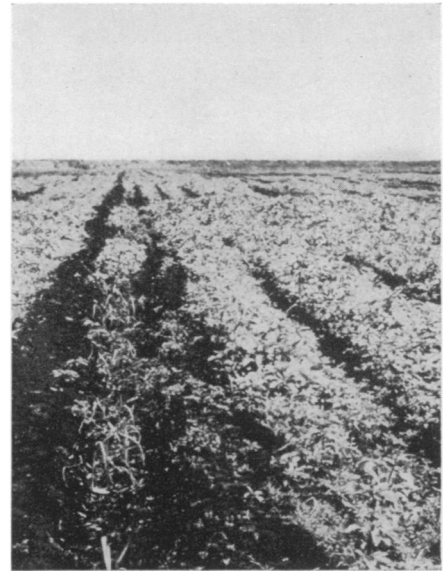
The greatest advantage claimed for flame cultivation is its great economy in cost and man-hours per acre. One man can clear the weeds from as much land in a day as 20 or more laborers with hand hoes—a matter of considerable importance when current farm labor shortage is considered. One Louisiana planter who has seen a flame cultivator in action declared recently that he intends to have at least three of them at work on his land this summer, "because they're the only things I know of that will kill weeds in the rain."

No special parts or factory tooling-up is needed for the making of flame cultivators. Any good garage mechanic can build one, using standard materials still to be had—provided necessary priorities are taken care of. All that is needed is a pair of standard-make burners, one or two small pressure tanks, a small power-driven air compressor, and necessary pipes, connections and valves. One man met the air compressor requirement by using an old Ford Model A engine, with two cylinders functioning as engine cylinders and the other two converted into compressor cylinders.

Degree of flaming is determined partly by size and type of burner, partly by the



BURNERS—The shooting blue fire has no immediate effect but soon after cultivation the weeds wilt and die.



BEFORE AND AFTER—The row on the left has been flame cultivated, showing effectiveness of the new method.

pressure employed, partly by the rate at which the implement is moved along the row. A little experimenting tells how much treatment is needed to kill the weeds and spare the crop.

A beneficial by-product of flame cultivation is the destruction of many harmful insects, especially the ones that spend part or most of their time on or near the ground. In working cotton fields by the flame method, a couple of chains are hung on the frame of the implement to disturb the boll weevils, which have the habit of dropping to the ground and "playing possum" when the bushes are shaken. This saves them most of the time, but not when the flame areas are following right along. Then it only tricks them to a fiery finish.

Science News Letter, February 13, 1943

● RADIO

Saturday, February 20, 1:30 p.m., EWT

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

Dr. Frank G. Boudreau, chairman of the Food and Nutrition Board of the National Research Council and executive director of the Millbank Memorial Fund, will discuss "Nutrition After the War."

Monday, February 15, 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.

"New Soil from Old" will be the subject of the program.