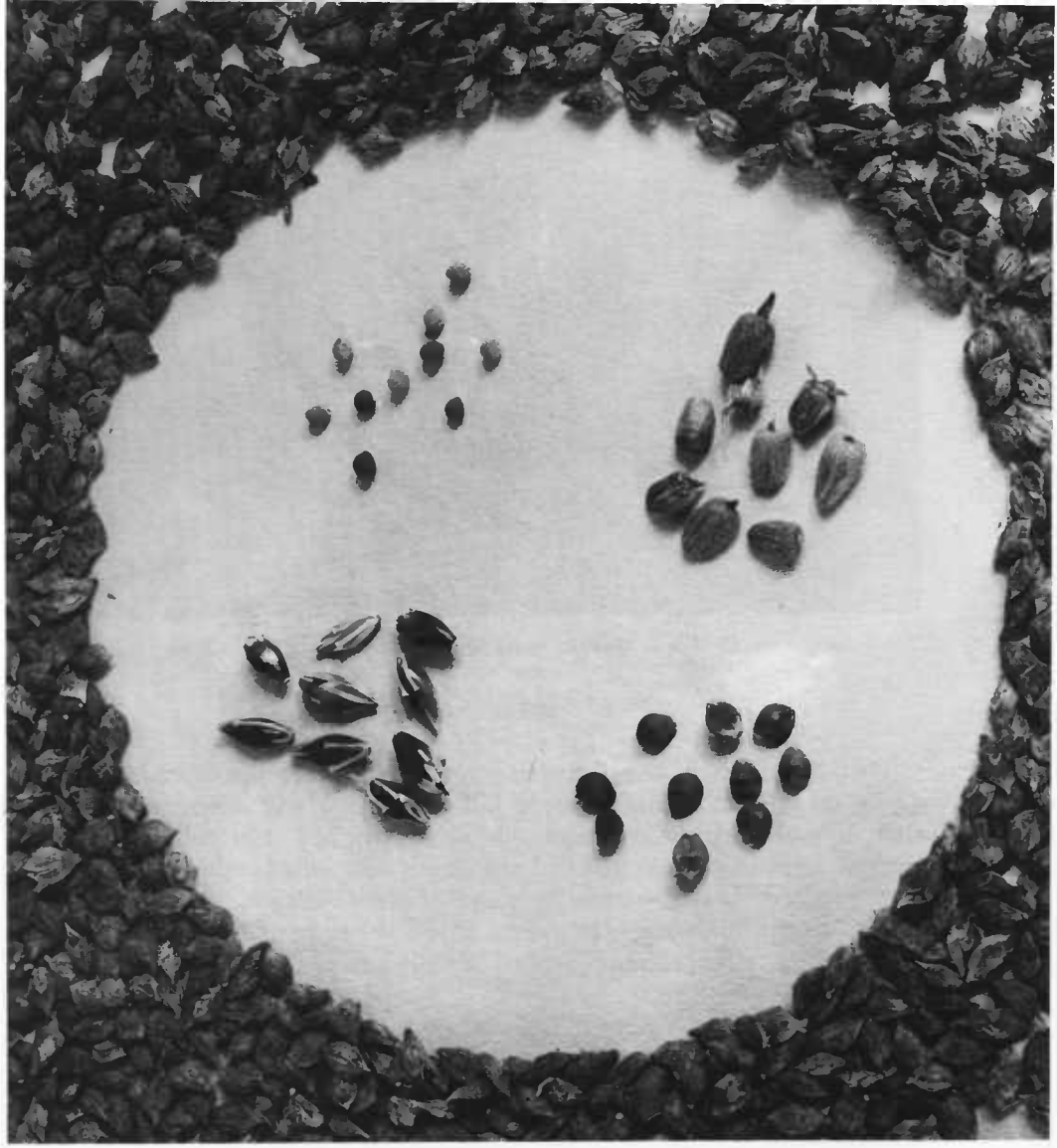
Weeds

MANY TROUBLESOME weeds came from other countries, usually mixed with crop seeds. A report in 1860 said 70 thousand weed seeds were counted in 2 pints of clover seeds shipped from England. Purslane, common milkweed, St.-Johns-wort, nutgrass, johnsongrass, bullthistle, sowthistle, mayweed, hedge bindweed, jimsonweed, and dock were among the introduced weeds. Some plants, like oxeye-daisy, wild onion, chicory, purslane, cornflower, morning-glory, and wild carrot, were brought in to flavor foods or beautify settlers' yards. Some got out of hand. Earthen ballast from sailing ships was dumped near eastern ports. It contained weed seeds, which grew into plants that were spread by wind, water, and man. The 1895 Yearbook of Agriculture listed 200 weeds that were serious obstacles to agriculture in the United States; 108 of them came from abroad.

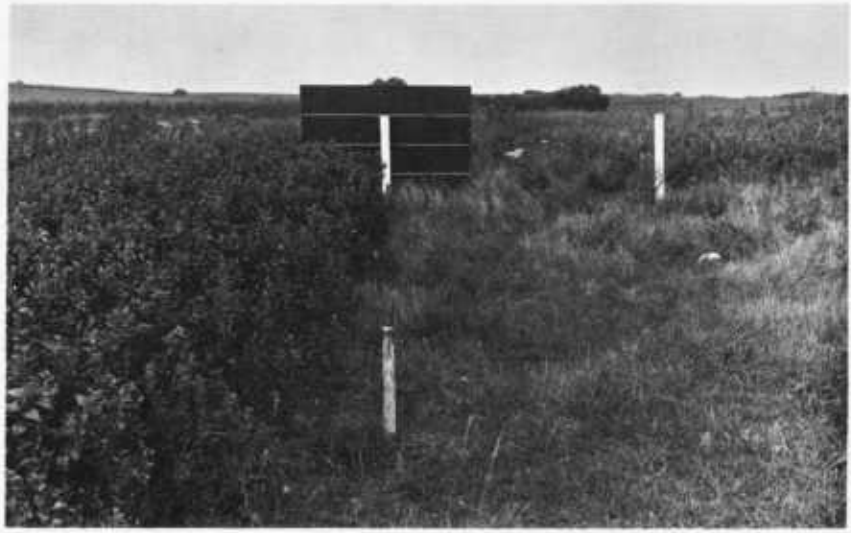
Weeds cause losses of millions of dollars to American agriculture, because they reduce yields of crops and prevent the efficient use of land. Some people are allergic to the pollen of some weeds. Poison-ivy causes discomfort to many persons. Weeds harbor insects and disease-producing organisms that attack crop plants. They steal water and nutrients from valuable plants. They increase costs of labor and equipment and reduce land values. Thorny weeds discourage hand harvesting. Weeds clog harvesting equipment and prevent recovery of full harvest. Weeds clog up irrigation and drainage canals. Weeds interfere with swimming, boating, and fishing. They are costly to control in rights-of-way and lawns.

Farmers used the hoe, hand pulling, tillage, mowing, burning, smother crops, and crop rotation to control weeds. They came to know the importance of preventing annual weeds from producing seeds and of mowing the tops and cultivating crops to starve roots of perennial weeds. Nevertheless, weeds continued to spread. Long ago men knew it was futile for one farmer to control weeds on his land while a nearby farmer allowed them to grow. The Federal Government recognized more than 100 years ago the need for preventing the spread of weeds from one farm to another. Many States penalized farmers who permitted certain kinds of weeds to grow. Legislation was passed to prevent the sale of crop seeds containing seeds of noxious weeds. It was the forerunner of the Federal Seed Act and State laws designed to tighten the control over the sale



Seeds of dodder, johnsongrass, bull paspalum, and rough buttonweed were sorted out from the lespedeza seeds that surround them.

of crop seeds contaminated with weed seeds. A century ago salt was poured on cut stubs of thistles to prevent their regrowth. Salt and ashes were placed along roadsides and fence rows where it was desirable to kill all vegetation. Europeans who used copper salts on grain to control fungus diseases noticed that the chemicals killed certain broad-leaved weeds but did not injure the grain. This amounted to what is now known as selective weed control, which was possible only on a limited scale until the 1940's.



The tract on the right was sprayed twice with 2,4-D. The buckbrush on the left was not.

Then scientists in the Department of Agriculture discovered that 2,4-D, an organic chemical, could kill weeds in a way different from that of such inorganic compounds as copper and iron sulfate and sodium arsenite, which scorched the weeds and killed only the parts they touched. Leaves, stems, or roots of weeds absorb 2,4-D. Once inside susceptible plants, it moves to all other parts and kills the entire plant, even though at first it touches only a limited area.

Nonproductive brush and scrub trees infest millions of once-productive acres.

Dense oak brush was treated with 2,4,5-T, and the land returned to a good volunteer stand of grasses.

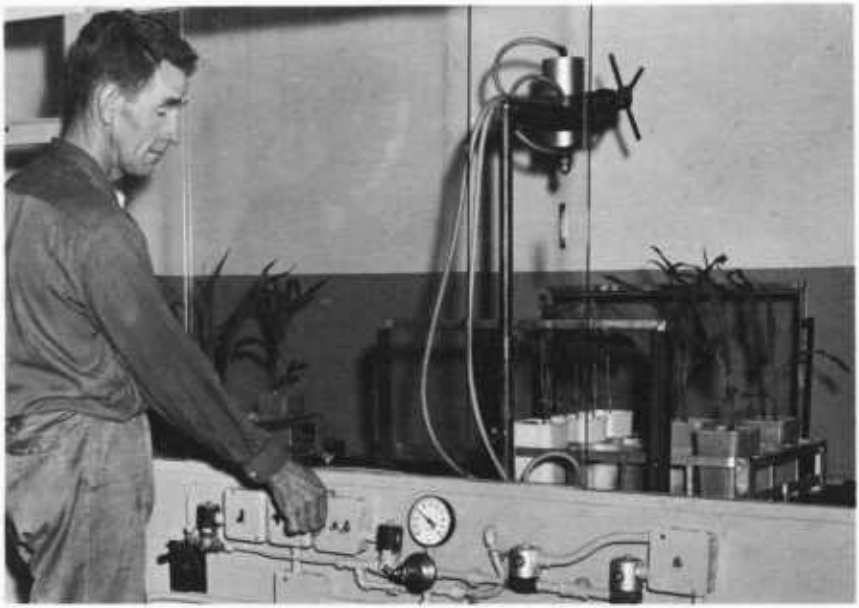
A weedkiller was applied at planting time to all but one strip of a field of sugarbeets.

Applying chemicals to control weeds.

Following the introduction of 2,4-D in 1944, there was a phenomenal growth in production of selective herbicides by the United States chemical industry. Several dozen effective and safe selective organic herbicides are available now to farmers and homeowners. Among them are 2,4,5-T, MCPA, silvex (phenoxy compounds); DNBP (a substituted phenol); TBA (a substituted benzoic acid); IPC, CIPC, EPTC (carbamates); monuron, diuron, fenuron (substituted phenylureas); TCA; dalapon; and simazine and atrazine (triazines).

They are effective against weeds in row crops, pastures and rangeland, drainage ditches and irrigation systems, lawns, and gardens, under powerlines, and along railroads and highways. They are used against ragweed, poison-ivy, and unsightly weeds in many cities. Weedkillers can be applied before the crop plant comes above the soil or even before the seeds are planted. Small amounts of liquid containing a herbicide can be sprayed over a wide area. Herbicides in granules are useful. Sometimes herbicides are placed near the root zone to kill young weeds as they begin to grow. The chemicals have useful characteristics. Some evaporate. Some dissolve in water, and others do not. Some can be dissolved in oil. Some remain a long time when mixed with soil. Research workers take advantage of such characteristics. They use herbicides that break down in the soil and become harmless before the crop seeds are planted. They use persistent chemicals when they want to keep land free of weeds for a long time—for example, along railroads. They use oil-soluble herbicides to kill brush and trees. The oil penetrates crevices in the bark and helps the weedkiller to penetrate the plant. Thus they fit the herbicide to the need at hand. Effective machines have been developed and airplanes have been adapted for applying the chemicals. Chemical weedkillers are used on more than 53 million acres of cropland. Some plants change certain inactive chemicals into herbicidally active ones. Corn changes the herbicide simazine into inactive components. Because most weeds are unable to do so, they die when a cornfield is sprayed with this chemical, but the corn lives. Thus the physiological characteristics of the weeds themselves provide a basis for selective weed control. Weedkillers, correctly used, leave no residues in plants, soils, and water that may harm man and animals.

An example of biological weed control is a beetle that has been used to control selectively St.-Johns-wort on western ranges. This insect, *Chrysolina quadrigemina,* feeds on the weed but does not eat grass or other valuable plants. Rangeland that was almost worthless for grazing because of this weed has been made useful again. Some insects have been introduced from abroad to control such weeds as gorse, tansy-ragwort, Scotch-broom, and puncture vine in the Western States. *(W. B. Ennis, Jr.)*



Hundreds of chemicals are evaluated each year to determine their weedkilling properties and effects on crop plants.

Simazine applied at planting time kept a cornfield free of weeds. It produced 106 bushels an acre.

An uncultivated, untreated cornfield yielded 45 bushels an acre and nearly 2 tons dry weight of weeds.