The VEGETABLE GARDEN

—*Month by Month*—

EVERY FARM should have its vegetable garden this year, for fresh vegetables and a good surplus for canning and storing. Food produced at home saves just that much of commercial stocks for our armed forces and allies. And it saves money for the farm family, too!

Circular 376

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Thomas P. Cooper, *Dean* and *Director*

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The Vegetable Garden, Month by Month

By John S. Gardner

The vegetable garden should produce a supply of fresh vegetables for the family thruout the growing season, and a surplus for canning or storing for use thru the remainder of the year. This may be considered adequately done if the retail value of the vegetables produced amounts to one dollar a week, the year thru, for each member of the household.

SOIL MANAGEMENT

It is difficult to give specific directions for fertilizing gardens in all parts of Kentucky, but the following are a few general suggestions. Plow under a 2-inch coat of manure; follow with a disk; then on each 10,000 square feet (100 feet by 100 feet, or 1/4 acre) broadcast 100 pounds of 20-percent superphosphate and drag it in lightly. Soil so fertilized will grow excellent tomatoes, peas, beans, squash, and sweet corn. The rows of cabbage, greens and onions should be side-dressed with nitrate of soda at the rate of 1 pound to 100 feet, or with poultry manure, 1 bushel to 300 feet. Two dressings should be made, the first a month after sowing or setting and the second, 2 to 4 weeks later.

If manure is not to be got, "humus," or rotted vegetable matter, must be provided from some other source. It is the humus in a soil that keeps it loose and easily workable, and enables it to hold moisture. If space is available for a double garden, each half may be sown in alternate years to lespedeza, soybeans, or cowpeas, to provide green matter to turn under. Where space is lacking for a double garden, green matter for turning under may be provided by a winter cover crop of rye, hairy vetch, fall greens, or oats (see page 14).

Nearly all vegetables grow best on soil that is slightly acid. The soil should contain lime but not enough to make it alkaline. If manure is used freely no lime, as a rule, need be added.

USE GOOD SEED

Use *good seed* to avoid poor stands and mixture of varieties. The best rule is to patronize only seedsmen whose product has given general satisfaction.

To help gardeners get good seed the Kentucky seed law requires

PLANTING CHART FOR VEGETABLES

Kind of vegetable	Seed for 100 ft. of row	Seed for 1 acre	Plants per ounce of seed	Space between rows, inches	Space between plants, inches	Days from planting to maturity	Crop expected from 100 ft. of row
Asparagus seed	1 oz.	3 lbs.	500	14-24	4-6	(4 yrs.)	200 lbs.
Asparagus plants	.....	.....	.....	48	36	(3 yrs.)	200 lbs.
Bean, bush	2 lbs.	60 lbs.	.....	30-36	2-3	50-75	5 bu.
Beans, pole	1 lb.	30 lbs.	.....	40-48	6-8	60-75	5 bu.
Brussels Sprouts	.....	5 oz.	4000	24-36	16-22	100	.....
Beet	2 oz.	8 lbs.	.....	14-24	1-3	60-70	2½ bu.
Cabbage	.....	4 oz.	5000	24-36	16-22	100-140	90-150 lbs.
Chinese cabbage	1 oz.	.....	2000	.....	.. ....	60-70	85 heads
Carrot	1 oz.	3 lbs.	.....	16-24	1-3	70-90	2 bu.
Cauliflower	.....	5 oz.	4000	24-30	20-24	75-90	75 heads
Celery	.....	5 oz.	8000	24-40	4-6	120-130	150 stalks
Chard	1 oz.	.....	.....	30-36	10-12	50-60	10 bu.
Sweet corn	1 lb.	12 lbs.	.....	34-42	5-6	75-95	12 doz.
Cucumber	1 oz.	3 lbs.	.....	48-60	36-48	60-70	2 bu.
Eggplant	.....	8 oz.	2000	24-30	18-24	80-90	200 fruits
Kale	1 oz.	5 lbs.	.....	24-32	18-24	55-65	3 bu.
Lettuce	½ oz.	4 lbs.	.....	12-18	4-8	65-85	4 bu.
Lettuce (Cos.)	½ oz.	4 lbs.	.....	12-18	4-8	60-70	100 heads
Cantaloupe	1 oz.	3 lbs.	.....	70-80	48-60	80-95	60 fruits
Watermelon	2 oz.	4 lbs.	.....	90-100	72	80-90	40 fruits
Mustard	1 oz.	4 lbs.	.....	14-24	4-6	40-50	3 bu.
Okra	2 oz.	10 lbs.	.....	24-40	12-18	50-60	.....
Onion	1 oz.	5 lbs.	.....	18-24	3-4	100-140	2 bu.
Onion (sets)	2 lbs.	8 bu.	.....	18-24	3-4	80-100	2 bu.
Parsnips	1 oz.	4 lbs.	.....	18-24	3-4	200	2 bu.
Parsley	1 oz.	4 lbs.	.....	12-20	4-6	50	200 plants
Peas	1½ lbs.	150 lbs.	.....	24-36	1-2	60-80	1 bu.
Pepper	.....	2 lbs.	1000	20-30	18-20	115-130	2 bu.
Pumpkin	5 oz.	4 lbs.	.....	95-110	60-80	120	50 fruits
Radish	1 oz.	4 lbs.	.....	12-18	1-2	25-30	100 bunches
Spinach	1 oz.	8 lbs.	.....	18-24	3-5	40-50	2 bu.
Spinach (New Zealand)	1 oz.	8 lbs.	.....	36-48	18-24	50-60	2 bu.
Squash (bush)	2 oz.	5 lbs.	.....	42-48	42-48	55-65	200 fruits
Squash (vining)	2 oz.	3 lbs.	.....	70-90	60-90	90-110	80 fruits
Tomato	.....	4 oz.	2000	40-60	36-40	110-130	10 bu.
Turnip	1 oz.	2 lbs.	.....	12-20	2-4	45-60	2 bu.
Sweetpotatoes	75 slips	4-6 bu.	.....	36-48	18	120-130	5 pks.
Potatoes	6 lbs.	15 bu.	.....	36	15	140	1½ bu.

Turnip	1 oz.	.....	12-20	2-4	45-60	2 bu.
Sweetpotatoes	75 slips	.....	36-48	18	120-130	5 pks.
Potatoes	6 lbs.	.....	36	15	140	1½ bu.
		2 lbs.				
		4-6 bu.				
		15 bu.				

that each package of 1 pound or more of garden seeds for sale in the state shall be plainly marked with the approximate percentage of germination and the year when the test was made. The buyer should look for this information and be guided accordingly.

JANUARY

Plowing.— Gardens left bare last fall should be plowed before the end of this month, with a heavy coat of manure turned under. Freezings and thawings after winter breaking will loosen the soil, and the manure will have time to rot. The broken soil surface also will absorb more of the late winter rains and snows. Most gardeners plow too shallow for the seedbeds to store enough moisture for the crops to bridge over from one shower to the next, later on. When it is recalled that most of Kentucky's moisture falls in the winter, the importance of winter breaking becomes evident.

A good depth is 10 inches. If the custom has been to plow less than that, the 10-inch depth should be approached an inch a year, lest enough subsoil be turned up to weaken the richer topsoil. Always, plenty of stable manure should be turned under.

Start (in hotbed) * —

Cabbage..... *Early Jersey Wakefield, Golden Acre,* or *Copenhagen Market;* or, on gardens where wilt is troublesome, *Yellows-resistant Early Jersey, Marion Market,* or *All Seasons.*
Broccoli.....*Calabrian Green Sprouting.*
Cauliflower....*Snowball* (or any other small, early sort)

FEBRUARY

Planning.—No enterprise is likely to succeed unless it is planned thru, and a garden is no exception. Haphazard planting usually results in many disappointments. The following steps are involved in making a good garden plan:

(1) Make a budget of the kinds and amounts of food needed for the year. As an aid in this budgeting, see "Canning and Storage Budget and Record Card for a Family of Five" and "Vegetable Timetable," issued by the College of Agriculture and Home Economics Extension Service. Plan for an adequate canning and storing surplus.

(2) Determine the garden space needed to produce the amounts and kinds of vegetables budgeted (see page 4).

(3) Measure the garden spot and make an exact map of it. Show

* Full information concerning hotbeds is found in Kentucky Extension Circular 276, which may be obtained free from County Agents or Home Agents, or by writing the College of Agriculture and Home Economics, at Lexington.

the location of walks, rows of perennials, nearby trees whose root competition or shade might affect the vegetables. Then sketch in the required vegetable rows on the map. To make best use of the garden space, plan to plant late crops in the same rows where early crops have been grown, or plant small early-maturing crops in the row with or near those which are larger and slower in maturing. For example, lettuce, spinach, or green onions can be set between cabbage plants; tomatoes can be set in rows of peas still being picked; or radish seed can be planted in the row with parsnips, salsify, or carrots. The length of time the more usual vegetables occupy the garden is shown in the following tabulation:

	Days		*Days*
Beans	50- 70	Early potatoes	120-150
Beets	30- 60	Corn	50- 60
Carrots	50- 70	Radishes	25- 40
Peas	40- 60	Lettuce	30- 40
Tomatoes	about 80	Early greens	40- 50
Peppers	(all season)	Parsnips	(all season)
Early cabbage	90-120	Late greens	(from August 1 on)

Since the average gardening season in Kentucky lasts from April 1 to October 1, that is 180 days, many succession schemes can be worked out.

(4) Make a seed list, consulting page 4 and a good seed catalog.

For the convenience of those who do not wish to make their own budget of food for the year, a typical planting of the more essential vegetables for a family of five is given below. This planting should supply 18 to 20 servings per week of fresh vegetables (in addi-

BASIC GARDEN PLANTING FOR A FAMILY OF FIVE

(In addition to 1,500 to 2,000 feet of potato rows)

Vegetable	Amount of seed	Number of plantings	Total feet of garden row
Peas	5 lb.	2	200
Onions	1 gal. (sets)	1	150
Greens (spring)	2 oz.	2	150
Greens (chard)	1 pkt.	1	40
Greens (fall)	2-5 oz.	1 to 4	150-500
Cabbage (early)	100 plants	1	150
Cabbage	¼ oz.	1	200
Beets	3 oz.	2	150
Carrots	2 oz.	1 or 2	250
Beans	7 lb.	6 or 7	350
Tomatoes (early)	50 plants	1	200
Tomatoes	¼ oz.	1 or 2	400
Sweet corn	1 lb.	3 to 5	600 to 700
Turnips	2 oz.	2	300 to 400
Radishes	1 oz.	3	100 to 150
Lettuce	½ oz.	3 to 5	100 to 300
Sweetpotatoes	350 slips	1	600
Potatoes	100 lb.	1	1500 to 2000

tion to potatoes) in season, and 10 to 12 per week during the rest of the year. Such a garden for 5 persons can be grown on about 1/3 acre if care is taken to practice succession planting. Most gardeners will add eggplants, peppers, cucumbers, cushaws, cantaloupes, watermelons, broccoli. cauliflower, celery, and perhaps others to this list.

Plowing.— If not plowed early, gardens standing bare should be plowed this month, as early as weather will permit. Gardens under cover crop should be broken, after having been cut fine with a disk harrow. It may be possible to leave unbroken that part of the garden to be planted to "warm" vegetables (tomatoes, peppers, etc.) until later, to give time for the cover crop to make more growth.

Start (in hotbed) —

Lettuce..... *New York* or *Wonderful,* or *Bibb.*
Peppers..... *California Wonder* or *Ruby Giant* and *Chili* or *Birdseye* (hot).
Tomatoes..... *Break O' Day* or *Pritchard.*
Eggplants..... *New York Improved.*

Reset in hotbed, 2 inches each way—

Cabbage, broccoli, and cauliflower, started in January.

MARCH

Seedbed preparation.—With the garden broken, all that needs to be done is to cut it thoroly with a disk, then drag it smooth. The object when making a seedbed is to have the soil particles, to a depth at least 2 inches below the seed, as fine as the smallest seed to be sown. The depth of seed sowing is determined by the size of the seed: the larger the seed, the deeper it should be sown. It has been determined by experiment that the proper depth is eight times the least thickness of the seed.

Fertilizing.— In addition to the manure plowed under, commercial fertilizer should be used. If the amount of manure per acre is 10 tons or more, this may be merely 20 percent superphosphate, but a complete fertilizer (4-8-8, 5-10-5) will make the crops better. One hundred pounds of superphosphate or 200 pounds of complete fertilizer is the amount for a garden 100 feet square. All fertilizer should be broadcast after the land is plowed, and then dragged in.

Set—

Asparagus.. *Martha Washington*
Cabbage... For varieties, see January.
Cauliflower For varieties, see January.
Broccoli....For varieties, see January.
Rhubarb... *MacDonald, Linnaeus, Victoria.*
Onions.....Yellow or white sets, or those of *Ebenezer* variety, or use "slips" of *Silverskin, Prizetaker* or *Bermuda.*
Lettuce.... For varieties, see February.

Plant—

Radishes... *White Tip Scarlet, Rapid Red.*
Turnips... *Purple Top Strap-leaved.*
Mustard... *Southern Curled.*
Spinach... *Bloomsdale Savoy.*
Lettuce... *Grand Rapids.*
Peas..... *Alaska* or *Radio.*
Rape..... *Dwarf Essex,* sometimes called "smooth kale."
Potatoes... *Irish Cobbler* or *Bliss Triumph* (certified seed).

Side-dress.— Toward the end of the month, side-dress cabbage, broccoli, cauliflower, lettuce, and onions, with nitrate of soda, 1 pound to 100 feet of row, or with dried chicken manure 1 bushel to 300 feet.

APRIL

Plant—

Sweet corn... *Early Adams* (15th).
Carrots..... *Chantenay,* enough for entire year's supply.
Beets..... *Crosby's Egyptian, Eclipse.*
Spinach..... *Savoy.* After the 15th, *Long Standing, New Zealand.*
Swiss chard... *Lucullus.*
Beans..... *Valentine, Stringless Greenpod,* 15th and 30th.
Cucumbers... *Long Green,* for both picklers and slicers; or use *Boston Pickling* and *Arlington,* or any other white spine.
Cantaloupes... *Early Hackensack,* after 15th.
Potatoes..... *Irish Cobbler* or *Bliss Triumph* (certified seed) before April 15.

Set—

Cauliflower... *Snowball.*
Broccoli..... *Green Sprouting.*

Bed—

Late tomatoes. *Marglobe* or *Baltimore* (under cover).
Sweetpotatoes. *Nancy Hall, Porto Rico,* or *Southern Queen.*

Side dress—Cabbage, cauliflower, broccoli and onions with chicken-manure, 1 bushel to 300 feet of row, or with nitrate of soda, 1 pound to 150 feet, twice.

Insect Control

In this month and to continue thruout the season, begins the campaign against garden pests. Controlling them is not difficult if the following rules are kept in mind:

1. Use the right materials.
2. Apply them in the right way.
3. Begin at the right time and follow schedules strictly.

Cutworms often destroy early potatoes and bean seedlings and transplanted plants soon after they are set. Use poison bait made as follows: Mix, dry, ½ pound of paris green and 12 pounds of bran; moisten with one quart of molasses and enough water to make a crumbly mash. Toward evening sow the bait along the rows and in areas surrounding cut-off plants. Cutworms always feed at dusk or after dark. This bait is POISONOUS to POULTRY and other animals.

Transplanted plants can be protected by wrapping them at setting with 4 or 5 thicknesses of newspaper extending an inch or so above and below ground.

Leaf-eating insects.— General control for all leaf-eating insects is by poison placed where they feed, but *if plant parts are affected that are to be used for human food, poison dare not be used!* Instead, use rotenone, for it is considered harmless to humans when taken internally in small quantity. The controls for the more usual insects follow, but these apply also to those not named, if the damage they do is similar.

Cabbage Worm.—Beginning when the first "cabbage butterflies" are seen and repeating every few days until heading starts, dust with the following mixture: paris green, 1 lb.; lead arsenate, 1 lb. hydrated lime, 12 lb.

NOTE: After cabbage begins to head, and on cauliflower, broccoli, brussels sprouts, and greens, *always* dust with ready-prepared rotenone dust, 1 to 1½ percent.

Potato Beetle.—Beginning when the first "hardshells" are seen, dust with the mixture recommended for cabbage, or with calcium arsenate, 1 lb.; hydrated lime, 6 lb. Or, beginning at the same time, spray with: lead arsenate, 2 level tablespoons; water, 1 gallon.

Cucumber Beetle.— These insects winter over in garden trash or in any brush. As the seedlings come up, the beetles enter cracks in the soil to lay eggs from which hatch worms that injure and sometimes destroy the seedlings or, later, the plants as they begin blooming. Obviously control must begin before the beetles enter the soil. Thus, beginning *when the soil begins to heave, dust the middles of the hills* with calcium arsenate, 1 lb.; gypsum, or " gypsum hard-coat plaster," 16 lb. and *repeat* every 3 days until at least 10 dustings have been given. It is profitable to give as many as 20 dustings, always at the center of the hill, giving 60 days' protection.

Mexican Bean Beetle.—The adults spend the winter in any place that gives shelter. When the weather becomes warm, they go to the bean seedlings and lay eggs from which hatch the spiny "cockle burrs" that are so devastating. As these always feed on the *under sides* of the leaves, the control material must be put there to be effective and the sprayer or duster must therefore have an upturned nozzle. This is the program:

Keep on the lookout for the *first* egg clusters (on the undersides of the leaves) and, when they are found, *immediately apply there* any of the several ready-mixed dusts, or mix your own as follows:

Calcium arsenate, 1 lb.; sulfur, 1 lb.; hydrated lime, 4 lb.

Or spray with:

Magnesium arsenate (42% actual metallic arsenic), 2 tablespoons; water, 1 gallon.

Then, in 10 days after the first application, repeat, and perhaps again, in 10 days. If dusting or spraying must be done after bean pods appear, use rotenone dust or spray (made of extract) to avoid danger of poisoning. This program must be repeated for each planting of beans.

Sap-sucking insects (plant lice and "stink-bugs" or "squash bugs").— Almost any of the vegetables may be attacked by these bugs. Because they consume no foliage but draw sap from the deeper tissues, surface applications of poison cannot be effective against them. Rather, they must be controlled by materials that act by contact with their bodies. A well-known material is *tobacco extract,* manufactured or homemade, but its effective time is so short that it must be applied so as actually to hit the insects. It is well suited to the control of the plant lice but can also be used effectively against the stink bugs while they are still in the immature, soft-bodied stage. Use fresh spray (or dust) directly on the insects, and spray again in 30 minutes if not all are killed.

In the past several years *rotenone* has been increasingly used in the control of sucking insects. It kills by paralyzing, and is effective for several days after it is applied. It kills plant lice readily and, if strong enough, the hard-shelled stink bugs also, but not the harlequin bug on cabbage and on the greens of the cabbage family. For the control of this insect handpicking is still best. Rotenone, too, should be applied (spray or dust) when the insects are seen, but if coverage is complete, continued killing is assured for several days, because rotenone holds its potency longer.

MAY

Plant—

Sweet corn	*Golden Cross Bantam, Howling Mob* (1st and 15th).
Cucumbers	*Long Green* or *Straight Eight,* or any white spine; for pickling, *Boston* or *Chicago Pickle.*
Cantaloupes	*Rocky Ford, Hale's Best, Hearts of Gold* or *Tip Top.*
Squashes (cymblings)	*White Scalloped, Summer Straightneck.*
Squashes (storing)	*Green Striped Cushaw, Des Moines, Hubbard.*
Watermelons	*Stone Mountain, Kleckley* or the resistant strains of these if watermelon wilt is suspected.
Summer spinach	*New Zealand.*
Okra	*White* or *Green Velvet.*
Beans	*Stringless Greenpod, Pencil Pod Wax* (15th and 30th).
Lima beans	*King of the Garden, Sieva* (pole); *Yopp's Pole* and *Bush* and *Henderson Bush.*
Summer lettuce	*Cos Trianon.*

Set—

Tomatoes..... Any early variety, or see February, particularly concerning wilt-resistant varieties.
Sweetpotatoes..... *Nancy Hall, Porto Rico,* or *Southern Queen.*

Start—(in outside bed)—

Canning tomatoes... *Greater Baltimore, Stone,* or *Matchless.*
Late cabbage..... *Drumhead, Copenhagen Market, Yellows-resisant Succession,* or *All Seasons.*
Late broccoli..... *Calabrian.*
Brussels sprouts.... *Danish Prize.*

Cultivation.—The only worth-while reason for cultivating a garden is to kill weeds. In fact, if weeds could be destroyed without stirring the soil at all, that would be all right, for several experiment stations have proved that snipping them off at the ground line gives just as good results, and even better results, than deep stirring. One excuse for "working" a garden is to loosen run-together soil. But that is no remedy; rather such soils lack humus. Deep stirring is likely to injure the roots and cause temporary wilting, or sometimes complete killing of the vegetables. In any event there is setback that must be overcome, and time is lost, if not part of the crop.

Therefore, to control weeds, shave or scratch the soil surface just deep enough to remove the smaller ones, and pull or cut off the larger ones. A 16-tooth garden harrow or a 5-tooth cultivator may be used, but without any weights. As for hand tools, nothing is better than a sharp hoe, used with a "scalping" or scraping motion. Likewise, the side-hoe attachment on a garden plow is excellent.

"Smothering" the weeds in the row, by throwing a ridge over them, is not always effective and may be harmful, for, in making ridges, soil must be borrowed from the middles and the moisture level may fall below root reach.

Thus, in summary, let all cultivation be merely deep enough to upset the weeds, while still small. Also, let the surface stay level, no hilling and no ridging done, except possibly for potatoes, but then only to close the cracks the growing tubers make.

Insect control.—A troublesome insect on potatoes coming up and on the vegetable plants in general is the **black fleabeetle.** It riddles the leaves with many fine holes, sometimes killing the plants, but always setting them back. The best way to stop this insect is to *spray with bordeaux mixture,* which is also the control for the blight diseases to which all the vegetables are more or less subject.

Bordeaux mixture is made of bluestone (blue vitriol), lime, and

water. It must be used fresh mixed as it spoils on standing. For 2½ gallons

First, prepare "bluestone stock" by dissolving 1 pound of bluestone (blue vitriol) in 5 quarts of water. Bluestone dissolves in about 1 hour if hung in a cloth sack just into the water; or powdered bluestone may be used which can be dissolved by stirring. A non-metal container must be used, as bluestone "eats" metals.

Next, into a larger container (such as the tank, preferably brass) of a 3-gallon compressed air sprayer, pour 9 quarts of water. Add 1 quart of bluestone stock, and 4 ounces of screened hydrated lime. Then stir or shake thoroly.

If Colorado beetles need to be controlled together with fleabeetles and blight, on potatoes, add 2 rounded tablespoons of lead arsenate to each gallon of bordeaux. For the vine crops, combination for blight and cucumber beetles or blight and Mexican bean beetle is made by adding 2 rounded tablespoons of magnesium arsenate. For the bean beetle, take particular pains to cover the under side of the leaves.

This way of making bordeaux mixture calls only for equipment easy to get: a sprayer (needed anyhow); a cream crock for dissolving the bluestone (and which is not harmed by so using); a corked jug in which to keep the unused portion of the "stock" until more bordeaux needs to be made; a fruit jar or milk bottle to measure it and the water, and a measure for the lime made by cutting down a baking powder can. Bordeaux mixture prepared for use in dust form, called "copper lime dust," can be obtained from seedsmen and druggists. It is not feasible to mix copper-lime dust at home.

JUNE

Plant—

Sweet corn..... *Golden Cross Bantam Stowell's Evergreen* (1st and 15th).
Beans (1st to 15th) *Stringless Greenpod* or *Refugee,* double-size plantings for canning surplus.
Beets..... *Detroit Dark Red,* for winter storing.
Summer lettuce.. *Cos Trianon.*
Cucumbers..... *Long Green,* late picklers and slicers.
Cantaloupes..... (See May)

Set—

Tomatoes..... (See May).

Insects.— In this month, the fight against insects becomes intensified because new generations have come. Refer to April.

Blight.— The hot, showery weather common in June favors the spread of blight on tomatoes, eggplant, potatoes, beans, and the melon crops. See bordeaux mixture, under May.

Cultivation.— The uncertain moisture supply during this month

makes it advisable to cultivate carefully. "Working" the soil should be stopped and "cultivation" substituted. See May.

Cleaning up.—During this month, some of the early crops become mature and spent vines and plants should be removed to prevent the spread of diseases that may be present, and to get rid of insect havens. These cleared spots may be put to use by planting them to beans, sweet corn, or late tomatoes.

JULY

Plant—

Sweet corn.....*Golden Cross Bantam, Stowell's Evergreen* (1st and 15th).
Beans (15th and 30th)...*Stringless Greenpod* or *Refugee;* double size plantings for canning surpluses
Summer lettuce.....*Cos Trianon.*
Beets for storing.....*Detroit Dark Red*

Set—

Late cabbage and late tomatoes.. (See May).

Pests.—Trouble with insects and diseases will not abate during this month; in fact, July's hot weather and scarcity of rain contributing, the ravages of insects are intensified. See April, and May for bordeaux mixture. Bordeaux mixture, by the way, has a tonic effect on plants and appears to offset lack of moisture.

Cultivation.—With moisture uncertain, the need for cultivating to conserve it becomes all the more important. See May, and refrain from deep "working," hilling, and ridging.

Sanitation.—Removing spent vegetable tops and vines should continue, and the spots and rows so vacated should be planted to late vegetables as long as there is enough time for them to mature before frost, October 15 being the average date of killing. Toward the end of the month, greens also may be sown. *Siberian* kale, *Southern Curled* mustard, or *Bloomsdale Savoy* spinach. At the worst, these plantings serve as winter cover crops.

AUGUST

Set—

Rhubarb, if neglected this spring (See March).

Plant—

Beans.....*Stringless Greenpod* (not much after August 1).
Kale.....*Siberian.*
Turnip greens...*Seven Top*
Table turnips....*Purple Top White Globe.*
Chinese cabbage..(Celery Cabbage) *Pe Tsai.*
Lettuce.....*Grand Rapids* or *New York (Wonderful)*
Radishes.....An early variety, or *White* or *Rose Chinese*
Beets (perhaps)..*Crosby's Egyptian*

Chinese cabbage should be sown "in place" soon after August 1: 1 ounce of seed should sow 100 feet. Thin to 12 inches. Watch for plant lice at any stage.

Lettuce, both heading and leaf sorts may be had far into the winter by sowing seed in a shaded place, August 1. In 4 to 6 weeks, transfer into a cold frame and shade at least during the heat of the day. When frosty nights come, place the sash, but give ample ventilation during the day. Later in the season keep the sash placed most of the time. New York lettuce may thus be kept in fine, usable condition until really severe weather comes, sometimes until Christmas.

Winter cover crops should be sown this month. The advantage of putting the garden under a growing cover cannot be overstressed. If the garden was arranged to have the early crops together in one place, the weeds where they stood should be chopped in or plowed under to make a seedbed for rye, ryegrass, crimson clover (in latitudes south of Lexington), barley, or wheat, or several of these in combination. In rich gardens no additional fertilizing is needed, but a light dressing of manure helps always. This cover, to be turned under next spring, takes the place of the fibrous part of manure, keeps the soil from washing during the winter and saves plant food. In this last respect it is better than stable manure.

A substitute "winter cover crop" is greens: kale, turnip greens, table turnips, mustard or rape. Quite hardy, these may keep growing all winter to serve as real cover crops, but if they are killed, their roots and the dried tops furnish some humus, or manure substitute.

They should be sown in several lots, 15 days apart, so that some may dodge the plant lice and the fleabeetles. The seed may be sown mixed, broadcast, but because insects almost always give trouble, it is better to sow in drills, thinly (3 seeds per inch). For plant lice the control is tobacco or rotenone; for fleabeetles, bordeaux mixture or rotenone (dust or spray). (See April and May.)

Another cover crop, sown now, is spring oats. With enough rain there should be 15 inches of growth when winter comes, and tho the tops are killed there is an appreciable amount of matter for turning under which meantime holds the soil against washing and preserves some plant food that would otherwise get away. Rates for sowing a 100-foot square (1/4 acre) are: kale, turnips, etc. 1 pound; crimson clover, 5 pounds; all grains except oats, 1½ pecks; oats, 2 to 3 pecks.

Winter vegetable storage.—This is the time to arrange for storing the surplus vegetables for winter. If there is already a house cellar or an outside cellar, perhaps minor repairs or readjustments

should be made now. If no structure is available, now is the time to consider building one. Kentucky Extension Circular 266, "Home Storage Structures and Equipment," describes several forms. This circular can be obtained free thru the county agent or the home agent, or direct from the College of Agriculture and Home Economics at Lexington.

SEPTEMBER

Sow—

Turnip greens.... *Seven Top*
Table turnips.... *Purple Top White Globe*
Winter radishes.. *White* or *Rose Chinese.*
A winter cover crop.

Set—

Lettuce. (See August).

Cover crops.— (See August.) Up to the 15th of this month, wheat, barley, or rye may be sown, mixed with hairy vetch. Altho it is uncertain how much green matter will be produced to turn under, at least some soil fertility is conserved and the soil is held against winter washing.

Winter storing.— In late September or early October the vegetables planted for storing should be harvested and stored. If a satisfactory storage place has been prepared, much of the success of storing now will depend on the condition of the vegetables. They should be mature, for underripe vegetables may wilt, no matter how good the storage conditions are. They should be free from wounds, disease infection, bruises and cuts. In short, prime quality, careful handling, good ventilation and the right temperature all are essential to successful storage.

OCTOBER

Killing frost comes to the latitude of Lexington about October 15. Then gardens must come to an end except for late cabbage, late greens, and turnips. Rye can still be sown for winter cover, however, at about double the normal rate of sowing. It may not make much growth for turning under, unless it can be left until the end of April. For that reason, it should be used on land for tomatoes, eggplant, peppers, second plantings of beans and sweet corn.

If no cover crop is sown and the garden is level enough so there will be no serious winter washing, breaking should be done after frost has seared the vegetable tops. Turned under in partly green condition, they readily change to humus. The same is true of the fall stands of crabgrass, wiregrass, and foxtail with which even the best gardeners find at least parts of the garden now covered.

If this killed vegetation is permitted to lie thru the winter, its fiber becomes dry and tough, to give trouble when the seed bed is being prepared, and it carries with it the hazard of making the soil "drouthy." For that reason, often it is cleared off or burned off and valuable matter is destroyed. A pity, too, for Kentucky gardens almost universally lack humus, "soil conditioner."

On a garden broken in the fall, manure may be spread any time during the winter. The rains and snows and freezings and thawing start its breaking down and it becomes immediately usable.

Hillside gardens and gardens of even moderate slope should be left undisturbed, for the chances are that there will be less washing off a surface beaten down by the past season's rains than off a plowed one. But it would have been better to have sown a winter cover crop to prevent washing. Leaving such a garden "as is" is choosing the lesser evil. Kentuckians who have their own interests at heart, and those of their gardens, will have them covered for the winter, in all cases. October is the very last call for winter cover crops.

THE CROPS: SOME NOTES ON HANDLING

The vegetables are discussed in the groups into which they fall because of similarity in cultural requirements. Culture of potatoes is discussed in Kentucky Extension Circular 307, "Potato Growing," and that of sweetpotatoes, in Kentucky Extension Circular 308, "Sweetpotato Growing."

Asparagus and Rhubarb

Asparagus may occupy the same ground for as long as 30 years, and rhubarb, 3 to 6 years. The planting should therefore be made where there is good drainage the year thru, for neither can long abide "wet feet." Again, the site must be such that there is no interference with preparing the garden for the annual vegtables. The best location is along one edge of the garden. The soil should be fertile and deep. The ground should be plowed or spaded deep and a heavy coat of manure worked into it or, if manure cannot be had, a heavy sod or a growth of rye, soybeans, or cowpeas should be turned under.

Asparagus.— Use only the rust-resistant varieties, Mary or Martha Washington.

Make a trench 15 inches wide and 12 inches deep, laying the topsoil to one side and the subsoil to the other. Tramp 2 inches of manure in the bottom of the trench and cover with a few inches of topsoil. Then set the crowns with their roots fully spread out, and cover with the remaining topsoil. Space the crowns about 2 feet in the

row, and the rows at least 3 feet from any other vegetable and from each other; 4 feet is better. When the shoots have grown above the garden level, fill the trench with the subsoil.

No harvesting should be done until the third year of the planting, and then not longer than 6 weeks. In years thereafter stop harvesting about the end of June, to let the roots recover and store up reserves.

Asparagus beds need manuring regularly. During the first two years spread the manure early in the spring before the shoots begin emerging. Beginning the third year, spread a heavy mulch of manure *at the end of the cutting season,* after having hoed out any weeds that may have started. The reason for manuring a bearing bed after cutting is over is that until that time the roots do not take plant food from the soil but produce the shoots from reserves that have been stored in them in the previous season.

Each spring, as early as the weather permits, hoe or harrow the bearing bed deeply, but not to touch the roots. This puts the humus from the previous summer's manure mulch into deeper soil, and helps the shoots to come thru straight, by virtue of the loosened soil.

Asparagus suffers from only one pest, the asparagus beetle, a chewing insect. Cutting stalks every other day during the harvest period helps to reduce damage. Stalks which have been left to grow should be thoroly covered occasionally with lead arsenate, 3 pounds to 50 gallons of water to which 3 pounds of soap have been added.

Rhubarb.— Use piece-roots for setting, a growing tip on each, set with the tip just at the ground surface. Space the roots in the rows 30 to 36 inches, and the rows 3 feet apart. Rhubarb may be set early in the spring, or at the end of the cutting season, usually in August. Customarily, no harvesting is done in the year the bed is set.

For earliest growth, commercial gardeners mulch heavily with manure (8 inches, sometimes) as soon in the spring as hard freezes are over. Then, when the leaf tips emerge, the manure is raked away and cultivated in. If particularly early growth is not sought, a moderate coat of manure is spread between the crowns, and worked in. Thereafter the planting is cultivated to keep down weeds.

In harvesting remove at one pulling only half the leaves that are ready, in order to avoid too much drain on the plants.

No insects seriously injure rhubarb, but the leaf disease, anthracnose, may be quite troublesome, even in the first year. Heavy fertilizing lessens the trouble, as does spraying with bordeaux mixture, 4-4-50. Three sprayings should be made, the first just as the buds begin bursting; another in 2 weeks, and the last, 2 weeks later. Good advice

is to use cuttings from crowns obtained locally, that have shown resistance to the trouble.

Victoria has long been a standard variety, and several sorts with more color are obtainable.

Peas

Seed for the earlier plantings should be sown about 1 inch deep, but later plantings in furrows as deep as 4 inches, with the seed covered only an inch, and the furrows filled later during cultivation. Peas sown in this manner continue bearing farther into warm weather. A good practice is to sow peas in pairs of rows 6 inches apart and 2½ to 3 feet between pairs. Thus the dwarf bush sorts support each other, and for the taller sorts one line of poultry wire or brush set between the rows suffices to support both.

Insect pests.—Peas are attacked by only one insect of any importance, the plant louse. For control measures see page 10.

"Cool" Vegetables, Transplanted

(Cabbage, cauliflower, broccoli, brussels sprouts, celery)

Cabbage plants for the early crop should be 6 to 8 weeks old at setting time. Sometimes purchased "frost-proof" plants are infested with cabbage lice. Accordingly it is advisable to dip such in strong "tobacco tea" or a solution of nicotine sulfate prepared according to the instructions on the container.

For the late crop, the plants may be started in a seedbed 4 to 6 weeks prior to setting time, or 2 or 3 seeds may be planted at each place where a head is to stand, and the seedlings thinned to one.

Cauliflower does best in Kentucky as a spring crop. It is handled like cabbage. As soon as the "flower" head appears, four or five of the lower leaves should be lapped over it and pinned together with a toothpick to keep the cauliflower white and tender.

Broccoli may be grown in both spring and fall. Its handling, early and late, is the same as for cabbage. The edible portions are the bud-clusters that branch out from the leaf axils.

Brussels Sprouts are practicable to grow only in late fall, for firm sprouts cannot form in high temperatures, as in late spring. Handling is the same as for late cabbage. The edible parts are the "sprouts," miniature cabbage heads that arise in the leaf axils. As they form, the leaf alongside should be cut off, to an inch or so of the stem, to make the sprouts fill out faster and larger.

Celery is handled the same as cabbage except that, when the plants are about half grown, the leaves should be gathered together so they stand upright, and held so by drawing a low ridge of earth against them. Usually this is done about 8 weeks after setting. Three or four weeks later, the summer and early fall varieties should be blanched by excluding light from the bases of the stalks, with boards or paper. Winter varieties, such as Giant Pascal, usually are blanched with a bank of earth.

Insects.—See pages 8-10.

Diseases.—Two diseases affect cabbage and related plants. They are black rot and "yellows." Those who grow their own plants may guard against black rot by using clean plant-bed soil and by treating the seed. The procedure for treating the seed is as follows:

1. Dissolve one 7½ grain tablet of mercury bichloride in one pint of water. (Only wooden or crockery ware containers should be used.) Bichloride is a deadly poison, but does not burn the hands.
2. Put the seed into a cloth bag, and wet thoroly.
3. Dip in the solution for 30 minutes.
4. Wash in five changes of water and spread to dry quickly, not in the sun, and at room temperature.

Another way which is perhaps more effective but less convenient is to immerse the seed for 30 minutes in water at 122° F. The temperature must be carefully held by aid of a good thermometer.

The "yellows" is a disease likely to occur in a plant bed or a field which has been used too often for cabbage. No treatment is effective, but varieties resistant to the disease should be used. These are Wisconsin All Seasons, Marion Market, and Wisconsin Hollander, in the order of their season.

A serious disease of celery is leaf-spot, which causes spotting at first, but, later the yellowing and rotting of the entire plant. Its control is to spray with bordeaux mixture (see page 11).

Greens and Salads

(Turnips, spinach, kale, endive, lettuce, chinese cabbage, rape, swiss chard)

Spinach, mustard, kale, and turnip.—When seed are sown at the rates given in the planting chart (page 4), the stand will be satisfactory, but it is sometimes advisable to thin the seedlings to 1 inch.

Swiss chard should be thinned to a stand of 10 inches or one foot. Greens may be gathered thru the summer by taking only the outer leaves, leaving the central bud intact.

New Zealand spinach may be sown in the same manner as late cabbage (page 18). The spacing of the plants should be no closer than 2 feet, in rows 3 feet apart. Harvest by pinching off the clusters of leaves at the ends of the branches. The plants continue branching all summer, making the supply of greens a continuous one.

Chinese cabbage and endive may be sown in continuous drills and thinned to the proper stand, or the plants may be grown in a bed and set in the same manner as late cabbage (page 18). The final stand of either should be 10 inches to 1 foot apart. Chinese cabbage forms its head of itself, but endive needs special treatment. Two weeks before endive is to be harvested, the plants must be tied up loosely with soft twine, so as to shade the heart and to induce center growth. This should not be done too far ahead of harvest or rotting may result.

Lettuce may be sown in continuous drills and thinned to a stand of six inches for the leaf sorts or 10 to 12 inches for the heading varieties.

Insects.— (See page 10.) To make direct insect control easier, row-sowing of all greens is suggested, rather than broadcasting.

Root Vegetables

(Parsnip, salsify, radish, turnip, beet, carrot)

The root crops do not require rich ground in the sense that cabbage does, but they must be well supplied with humus to hold an abundance of moisture and to make shapely roots. The general manuring recommended previously (page 3) suffices.

Insect pests and diseases.— Root vegetables are remarkably free from insect attack, except radishes and turnips, which sometimes suffer because of plant lice and black fleabeetle (see page 10).

Salsify may be attacked by blight. It is controlled by spraying with bordeaux mixture (see page 11). A spray should be applied as soon as the plants are up and two more sprays should follow at two-week intervals. Turnips and radishes may suffer from black rot which stunts the tops and disfigures the roots. To avoid this disease these crops should not follow cabbage or early greens of the cabbage family in the same year.

"Warm" Crops Sown

(Beans, okra, sweet corn)

Plantings of beans in June and July should be doubled to assure a surplus for canning. In planting lima beans, particularly the large-

seeded varieties, there is distinct advantage in placing the seed with the eye down. In good seasons the early corn rows may be put into corn again, but early varieties should be used, to mature before frost.

Altho okra plants may be started in hotbeds in the same manner as tomato plants, and at the same season, the usual custom is to sow the seed in the open garden. It is best to wait until the ground is warm, for okra seed rots easily. In order to assure a stand, two seeds should be dropped at each place. The rows should be 30 inches apart in hand-worked gardens or 36 inches if horse-drawn cultivating is to be done. The spacing in the rows should be 18 to 24 inches.

Since all the vegetables in this group are "fruit" or "seed" vegetables, their main fertility requirement is phosphorus. Altho the general fertilizing recommended (page 3) gives good results, it is advantageous to double the amount of superphosphate in the manure-superphosphate combination. The best complete fertilizer for these crops is 4-12-4.

Bean insect pests and diseases.—The most serious insect pest of beans is the Mexican bean beetle. For control measures, see page 9. or Ky. Extension Circular 257.

The most serious bean disease is anthracnose, sometimes called blight. It causes spotting of the leaves and sometimes of the pods. In severe cases the plants die, sometimes before any beans have matured. The use of clean seed and clean soil is the best means of preventing the blight. It may be partly checked if bordeaux mixture (page 4) is applied as soon as first signs of spotting are seen, and then again in 10 days or 2 weeks.

Corn insect pests and diseases.— Some insects that attack corn are the corn ear worm and the corn root louse. No wholly satisfactory control for the corn ear worm has been found. Clipping off the silks and shuck to the tip of the cob about 5 or 6 days after the first silks show signs of browning has given the best control of any method tried at the Kentucky Agricultural Experiment Station. The parts clipped off should be destroyed immediately to kill the eggs or young worms attached to them. The use of poisons dusted on the silks has not given consistent control. Short-shucked varieties (Country Gentleman, for example) are most severely attacked; Howling Mob is somewhat less damaged because its shucks are longer.

The corn root-louse occasionally causes slowness of growth and general unthriftiness in corn by drawing the sap from the roots. There is no direct control of this insect but an indirect way is to destroy the ants which place the lice on the corn roots. The ant hills may be de-

stroyed by fumigation with carbon disulfide. The procedure is to punch an inch hole into the ant hill, and pour in a tablespoonful of disulfide. Then the hole is plugged with earth and the ant colony is gassed.

A bacterial wilt, called Stewart's Disease, may attack all sweet corn but is particularly troublesome on Golden Bantam types. It causes severe stunting of the stalk growth. The disease may be avoided by using the "cross" varieties bred to resist it.

"Warm" Crops, Transplanted
(Tomatoes, peppers, eggplants)

Seed for the vegetables in this group should be sown in hotbeds in February or March (see Kentucky Extension Circular 276). The seedlings may be reset in the bed 4 inches each way or merely thinned so they are not cramped. When all danger of frost is past, they are transplanted to the garden. The soil should be quite moist; if there is any question, it is advised to put a small amount of water deep about the plant roots; never on the surface around the plant.

All these are "fruit" crops, and the general fertilizing recommended (page 3) is well suited.

In small gardens, space may be saved by setting tomato plants as close as 2 feet in the row and pruning them to one or two main stems, supported on stakes driven at each plant. Apart from economy, this practice hastens fruiting and improves fruit size. Pruning consists merely in removing the suckers that arise at the base of each leaf. The stakes should be placed when the plants are set and the stems should be tied to them. The ties should be placed just below the fruit clusters, so loosely that the stems are not injured, but the cord (or strip of cloth) should pass twice about the stake to prevent slipping.

Tomatoes sometimes are injured by the fruitworm which bores holes in the fruit, rendering it worthless. There is no satisfactory means of control. Tobacco hornworms, sometimes troublesome on tomatoes, may be picked off by hand or poisoned with arsenical dust or spray (page 10).

Tomatoes and eggplants are subject to blight, which destroys the foliage and reduces the yield. An indirect damage to tomatoes is sunscalding of the fruit. The control for blight is bordeaux mixture (see page 11). Four to six sprayings are suggested, the first while the plants are still in the bed, and the others at 10-day to 2-week intervals, depending on rapidity of growth.

Another disease that attacks tomatoes is "wilt." This is often con-

fused with blight. The difference is that blight causes the leaves to drop off one by one, beginning at the base of the plant, whereas wilt causes the whole plant to dry up, with the leaves still attached. Wilt occurs principally in gardens where tomatoes have been grown for a long time or where rotation has not been practiced. It is a soil disease and spraying or other plant treatment is not effective against it. The control is to use wilt-resistant varieties such as Break O'Day, Pritchard, Marglobe, and Rutgers, in the order of earliness.

"Melon" Crops

(Cucumber, squash, cantaloupe, watermelon)

The "melon" crops are "fruit" vegetables and require an abundance of phosphorus. Because of their heavy vine growth, however, nitrogen is needed as well. The general fertilizing recommendation (page 3) is satisfactory. Sowing seed sparsely in drills and then thinning the plants provides better opportunity for controlling pests than hill planting.

Pests.—The insect enemies of this group are the striped cucumber beetle, the pickle worm, and the squash bug, all serious pests. For control of cucumber beetle and squash bugs, see pages 9 and 10. The pickle worm hatches from eggs laid on the rind of the fruit, and burrows its way in. Poisoning is therefore not practical. However, because the adult prefers to deposit its eggs on squash blooms, growers can protect cucumbers and canteloupes by placing hills of Early White Bush squash in the plantings about every fourth plant each way. As soon as the squash are two inches in diameter, they should be picked and burned to destroy the worms that may have entered. It is advisable to make repeated plantings so as to provide a continuous supply of blooms to serve as "traps" thruout the summer.

Occasionally, plant lice become troublesome among the members of the "melon" group. The control is tobacco (see page 10).

The disease troubles of this group are wilt (of which there are two kinds) and several kinds of leaf-spotting diseases, collectively called "blight." For the wilt there is no control, but there are preventive measures worth taking. They are:

1. Insect control, for some forms of wilt are introduced and spread by insects, solely.
2. Crop rotation, for some forms of wilt accumulate in soil where melon crops are grown year afer year.

Several varieties of watermelons resistant to wilt have been developed, but they are subject to further improvement both in quality and in suitability for shipping. Of the Kleckley type, the best are Iowa King

and Kleckley No 4. Wilt-resistant Stone Mountain may be had, but its quality is inferior.

"Blight" is the name given to several forms of leaf spotting diseases that affect the melon crops. The field control is spraying with bordeaux mixture (see page 11). It is well to anticipate the coming of blight by beginnng to spray when the plants begin to run, and giving them 2 to 5 sprays at 2-week intervals, thereafter. A preventive for some forms of blight is seed treatment, which is given as follows:

1. Dissolve one 7½ grain tablet of mercury bichloride in one pint of water, using anything but a metal vessel.
2. In this solution, dip the seed for five minutes.
3. Wash it in two changes of water.
4. Spread out the seed so that it will dry quickly.

Onions

There are five ways to grow onions. They may be raised direct from seed; from slips raised in frames, from "sets" or bulblets grown from seed the year before; from "top sets" of the "multiplier" sorts; and from "bottom sets" or divided bulbs of the so-called "potato" onion.

Land for onions should be most fertile; some gardens are not rich enough. Moisture is most important, too; therefore onion land should be well supplied with humus. The best soil for onions is sandy loam, but the heavier soils may be made suitable by proper management. The way to begin is to turn under heavy sod or a green-manure crop, preferably top-dressed with stable manure. If the land is bare, the amount of manure should be greater; some commercial growers spread as much as 30 tons to the acre. Breaking should be as deep as possible, and seedbed preparations should be most thoro.

After growth has begun, additional feeding should be done. Nitrate of soda may be drilled, or sown by hand, down the rows, but not in contact. The rate is 200 to 300 pounds per acre. A second application a month after the first will not be amiss.

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