

ANTIDOTES FOR POISONS

First—Send for a physician.

Second—Induce vomiting by tickling the throat with feather or finger; drinking hot water or strong mustard and water. Swallow sweet oil or whites of eggs.

Acids are Antidotes for Alkalies and vice versa.

Acids—Muriatic, Oxalic, acetic, Sulphuric (Oil of Vitrol). Nitric, (Aqua Fortis). **ANTIDOTE**—Soapsuds, Magnesia, Lime Water.

Prussic Acid—**ANTIDOTE**—Ammonia in water. Dash water in face.

Carbolic Acid—**ANTIDOTE** Flour and water. Mucilaginous drinks.

Alkalies—Potash, Lye, Hartshorn [Ammonia]. **ANTI-DOTE**—Vinegar or Lemon juice in water.

Arsenic—Rat Poison [Paris Green]. ANTIDOTE⁷⁷
Milk, Raw Eggs, Sweet Oil, Limewater, Flour and
water.

Bug Poison—Lead, Saltpetre, Corrosive Sublimate, Sugar of lead, Blue Vitrol, **ANTIDOTE**—White of eggs or milk in large doses.

Chloroform—Chloral, Ether. **ANTIDOTE**—Dash cold on head and chest. Artificial respiration.

Carbonate of Soda—Copperas, Cobalt. ANTIDOTE
Soapsuds and Mucilaginous drinks.

Iodine—Antimony, Tartar Emetic, **ANTIDOTE**—
Starch and water, astringent, infusions, strong Tea.

Mercury and its Salts.—ANTIDOTE Whites of eggs, milk and Mucilages.

Opium—Morphine, Laudanum, Paregoric. Soothing Powders and Syrups. **ANTIDOTE**—Strong Coffee, hot bath. Keep awake and moving.

HELP IN CASE OF ACCIDENTS.

Burns and Scalds—Cover with Cooking Soda and lay wet cloths over it. Whites of eggs and Olive Oil. Olive Oil or Linseed Oil, plain mixed Chalk or Whiting.

Lightning—Dash cold water on person struck.

Sunstroke—Loosen clothing. Get patient into shade and apply ice-cold water to the head.

Mad Dog or Snake Bite—Tie cord tight above wound. Suck the wound and cauterize with white-hot iron at once, or cut out adjoining parts with sharp knife.

Venemous Insect's Stings, etc.—Apply Ammonia, Oil, salt water or Iodine.

Fainting—Place flat on back, allow fresh air and sprinkle with water.

Tests of Death—Hold mirror to mouth. If living, moisture will gather. Push pin in flesh. If dead, the hole will remain: if alive, it will close up.

Cinders in the Eye—Roll soft paper up like a lamp-lighter, and wet the tip to remove; or use a medicine dropper to draw it out. Rub the other eye.

1921

JANUARY							MAY							SEPTEMBER									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
..	2	3	4	5	6	1	1	2	3	4	5	6	7	..	4	5	6	7	8	9	1	2	3
9	10	11	12	13	14	15	16	16	17	18	19	20	21	11	12	13	14	15	16	17	18	19	20
16	17	18	19	20	21	22	22	23	24	25	26	27	28	18	19	20	21	22	23	24	25	26	27
23	24	25	26	27	28	29	29	30	31	..	..	..	..	25	26	27	28	29	30	..	..	..	..
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FEBRUARY							JUNE							OCTOBER									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
..	6	7	8	9	10	11	..	5	6	7	8	9	10	..	2	3	4	5	6	7	1	8	9
13	14	15	16	17	18	19	12	13	14	15	16	17	18	9	10	11	12	13	14	15	16	17	18
20	21	22	23	24	25	26	19	20	21	22	23	24	25	16	17	18	19	20	21	22	23	24	25
27	28	..	..	..	..	..	26	27	28	29	30	..	..	23	24	25	26	27	28	29	30	31	..

MARCH							JULY							NOVEMBER									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
..	6	7	8	9	10	11	..	3	4	5	6	7	8	..	6	7	8	9	10	11	12	13	14
13	14	15	16	17	18	19	10	11	12	13	14	15	16	13	14	15	16	17	18	19	20	21	22
20	21	22	23	24	25	26	17	18	19	20	21	22	23	20	21	22	23	24	25	26	27	28	29
27	28	29	30	31	..	..	24	25	26	27	28	29	30	27	28	29	30	..	..	..	..	..	..
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APRIL							AUGUST							DECEMBER									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
..	3	4	5	6	7	8	..	7	8	9	10	11	12	..	4	5	6	7	8	9	10	11	12
10	11	12	13	14	15	16	14	15	16	17	18	19	20	12	13	14	15	16	17	18	19	20	21
17	18	19	20	21	22	23	21	22	23	24	25	26	27	18	19	20	21	22	23	24	25	26	27
24	25	26	27	28	29	30	28	29	30	31	..	..	..	25	26	27	28	29	30	31	..	..	..

1922

JANUARY							MARCH							MAY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	..	..	1	2	3	4	..	1	2	3	4	5	6
8	9	10	11	12	13	14	5	6	7	8	9	10	11	7	8	9	10	11	12	13
15	16	17	18	19	20	21	12	13	14	15	16	17	18	14	15	16	17	18	19	20
22	23	24	25	26	27	28	19	20	21	22	23	24	25	21	22	23	24	25	26	27
29	30	31	..	..	..	..	26	27	28	29	30	31	..	28	29	30	31	..	..	..

FEBRUARY							APRIL							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	1	2	3	4	..	..	..	4	5	6	1	..	..	..	1	2	3	4
5	6	7	8	9	10	11	2	3	4	5	6	7	8	4	5	6	7	8	9	10
12	13	14	15	16	17	18	9	10	11	12	13	14	15	11	12	13	14	15	16	17
19	20	21	22	23	24	25	16	17	18	19	20	21	22	18	19	20	21	22	23	24
26	27	28	..	..	..	..	23	24	25	26	27	28	29	25	26	27	28	29	30	..
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Domestic Rates of Postage.

FIRST CLASS MATTER (Letters and other matter wholly or partly in writing).....	2c an oz.
SECOND CLASS (Newspaper and Periodicals).....	1c for 4 oz.
THIRD CLASS (Books, Circulars and Miscellaneous Printed Matter).....	1c for 2 oz.
FOURTH CLASS (Merchandise).....	1c an oz.
SPECIAL DELIVERY STAMP (additional to regular postage).....	10c
MONEY ORDERS (\$1.00 to \$100).....	3c to 30c

See Below for Explanations and Exceptions.

First Class Matter—Letters and all other written matter [whether sealed or not], excepting manuscript copy accompanying proof-sheets, also all matter sealed [see below], 2 cts. an ounce, excepting drop letters at NON-CARRIER offices, 1 ct. an ounce. Postal Cards 1 ct. each.

Second Class—Newspaper and Periodicals published quarterly and oftener, and not for free distribution when bearing a statement of entry as second class matter. The general public pay by affixing stamps at the rate of 1 ct. for each four ounces or part thereof when not sealed.

Third Class—Circulars, newspapers and periodicals not embraced in the term "book," miscellaneous printed matter on paper, proof-sheets, corrected proof-sheets, and manuscript copy accompanying the same, and matter in point print or raised character used by the blind—all when unsealed 1c for each 2 ounces or fraction.

Fourth class—See next page. For further information, ask postmaster.

Sealing—Any matter, is regarded as sealed when it is not so wrapped as to allow a thorough examination without in any way injuring the wrapper.

Registration—All classes of mail matter may be registered at any post office by affixing 8 ct. in addition to the regular postage.

Foreign Mail Matter—Rates of Postage.

The rates of postage applicable to articles for foreign countries are as follows:

Letters for Canada, Cuba, Mexico, Republic of Panama, city of Shanghai [China], England, Ireland, Newfoundland, Scotland, and Wales, per ounce..... 2 cts.

Letters for Germany by direct steamers per oz..... 2 cts.

Letters for all other foreign countries and for Germany when not dispatched by direct steamers:

For the first ounce or fraction of an ounce..... 5 cts.

For each additional ounce or fraction of an ounce..... 3 cts.

Single post cards (including souvenir cards). each..... 2 cts.

Reply postal cards, each..... 4 cts.

Printed matter of all kinds, for each two ounces or fraction of two ounces..... 1 ct.

Commercial papers, for the first 10 ounces or less..... 5 cts.

For each additional 2 oz. or fraction of 2 oz..... 1 ct.

Samples of merchandise, for the first 4 oz. or less..... 2 cts.

For each additional 2 oz. or fraction of 2 oz..... 1 ct.

Registration fee in addition to postage..... 10 cts.

Parcel Post or Fourth Class Mail Information.

Weight in pounds	First zone		Second zone 50 to 150 miles.	Third zone 150 to 300 miles.	Fourth zone 300 to 600 miles.	Fifth zone 600 to 1,000 miles.	Sixth zone 1,000 to 1,400 miles.	Seventh zone 1,400 to 1,800 miles.	Eighth zone all over 1,800 miles.
	Local rate.	Zone rate 50 miles.							
1	\$0.05	\$0.05	\$0.05	\$0.06	\$0.07	\$0.08	\$0.09	\$0.11	\$0.12
2	06	06	06	08	11	14	17	21	24
3	06	07	07	10	15	20	25	31	36
4	06	08	08	12	19	26	33	41	48
5	07	09	09	14	23	32	41	51	60
6	03	10	10	16	27	38	49	61	72
7	08	11	11	18	31	44	57	71	84
8	09	12	12	20	35	50	65	81	96
9	09	13	13	22	39	56	73	91	108
10	10	14	14	24	43	62	81	101	120
11	10	15	15	26	47	68	89	111	132
12	11	16	16	28	51	74	97	121	144
13	11	17	17	30	55	80	105	131	156
14	12	18	18	32	59	86	113	141	168
15	12	19	19	34	63	92	121	151	180
16	13	20	20	36	67	98	129	161	192
17	13	21	21	38	71	104	137	171	204
18	14	22	22	40	75	110	145	181	216
19	14	23	23	42	79	116	153	191	228
20	15	24	24	44	83	122	161	201	240
21	15	25	25						
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46	28	50	50						
47	28	51	51						
48	29	52	52						
49	29	53	53						
50	30	54	54						

Rates of Postage on Fourth Class or Parcel Post Matter—To be Fully Prepaid—Unsealed—are as follows:

(a) Parcels weighing 4 ounces or less, except books, seeds, plants, etc., 1 cent for each ounce or fraction thereof, any distance. (b) Parcels weighing 8 ounces or less containing books, seeds, cuttings, bulbs, roots, scions, and plants, 1 cent for each 2 ounces or fraction thereof, regardless of distance. (c) Parcels weighing more than 8 ounces containing books, seed, plants, etc., parcels of printed matter weighing more than 4 pounds, and all other parcels of fourth-class matter weighing more than 4 ounces are chargeable, according to distance or zone, at the pound rates shown in the table, a fraction of a pound being considered a full pound.

Zones—Parcel Post Guide and Flaps.

To ascertain in which zone a post office is located from the office of mailing, a parcel post guide, costing 55 cents, and map, costing 20 cents, are jointly used. The guide applies to all offices, but a separate map is required for each unit. A zone key is

furnished with the guide. The guide and maps may be purchased by sending a money order to Third Assistant Postmaster General, Washington, D. C. Stamps are not accepted.

WEIGHTS AND MEASURES.

TROY WEIGHT

24 grains 1 pwt	12 ounces 1 pound
20 pwts 1 ounce	

Used in weighing Gold, Silver and Jewels.

APOTHECARIES' WEIGHT

20 grains 1 scruple	8 drams 1 ounce
3 scruples 1 dram	12 ounces 1 pound

The ounce and pound in this are the same as in Troy Weight.

AVOIRDUPOIS WEIGHT.

27 11-32 grains... 1 dram	4 quarters..... 1 cwt
16 drams..... 1 ounce	2,000 lbs..... 1 short ton
16 ounces 1 pound	2,240 lbs..... 1 long ton

DRY MEASURE

2 pints..... 1 quart	4 pecks 1 bushel
8 quarts 1 peck	36 bushels 1 chaldron

LIQUID MEASURE

4 gills 1 pint	31¼ gallons 1 barrel
2 pints 1 quart	2 bbls..... 1 hogshead
4 quarts 1 gallon	

LONG MEASURE

12 inches..... 1 foot	40 rods..... 1 furlong
3 feet..... 1 yard	8 furlongs..... 1 stat. mile
5½ yards 1 rod	3 miles 1 league

MARINERS' MEASURE

6 feet..... 1 fathom	5,280 feet..... 1 stat. mile
120 fathom 1 cable le'th.	6,086 feet... 1 nautical mile
7¼ cable lengths 1 mile	

SQUARE MEASURE.

144 inches 1 square foot	40 square rods 1 rood
9 square feet 1 sq. yard	4 roods 1 acre
301-2 sq. yds 1 sq. rood	640 acres... 1 square mile

SURVEYOR'S MEASURE

7.92 inches=1 link	4 rods=1 chain
25 links=1 rod.	
10 sq. chains or 160 square rods=1 acre	
640 acres=1 square mile.	
36 square miles [6 miles square]=1 township.	

CUBIC MEASURE

1728 cubic in.=1 cu. foot	128 cubic ft.=1 cord [wood]
27 cubic ft.=1 cubic yd.	40 cubic ft.=1 ton (shpg.)
2,150.42 cubic inches=1 standard bushel.	
268.8 cubic inches=1 standard gallon.	
1 cubic foot=about four-fifths of a bushel.	

Useful Rules And Calculations.

To find the circumference of a circle multiply diameter by 3.1416.

To find the diameter of a circle divide circumference by 3.1416

To find area of a circle multiply square of diameter by .7854.

To find the area of a triangle multiply base by 1-2 perpendicular height.

To find the surface of a ball multiply square of diameter by 3.1416

To find the solidity of a sphere multiply cube of diameter by .5236

To find the side of an equal square multiply diameter by .8862.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. standard) weighs 8 lbs. ¼ oz., and contains 231 cubic inches.

A cubic foot of water contains 7 1-2 gallons, 1,728 cubic inches, and weighs 62 1-2 pounds.

To find the capacity of a bin in bushels multiply its length breadth and height in inches and divide the product by 2150. Result will be approximately correct.

To find capacity of a cylindrical tank or cistern in gallons. Square the diameter of its circle in inches and multiply by .7854, multiply this by the depth of cistern or length of tank in inches and divide by 231. Result will represent gallons.

To find area of an irregular field, divide it into imaginary triangles compute the area of each by multiplying its base in feet by half its perpendicular height in feet, add the results together and divide by 43560. Result will be acres.

To lay off a right angle, to a straight line at a given point. From the given point, lay off 6 feet on the line in either direction, and from the given point strike an arc with a radius of 8 ft. From the point first determined strike another arc intersecting the first one with a radius of 10 feet. Draw line from this intersection to the given point and this line will form right angle with first.

Weight which a beam or joist will support varies as the thickness and as the square of the depth, that is, length between supports being constant double thickness will support double load; double depth will support four times the load.

THE GASOLINE ENGINE

If your engine stops on you, or fails to start, observe **First**—Whether there is a supply of gasoline in the tank.

Second—If there is, turn the wheel around a time or two to be sure you have "compression." If the cylinder is tightly packed so that the piston compresses the air on its outward stroke as it should, you will, of course, feel the increased resistance to your effort at that point in the turn. If no compression, then the cylinder leaks and there is need of repacking the openings into the cylinder, or of cleaning the inlet or **exhaust** valve.

Third—If there is compression look to your ignition. Are your batteries in working order? Are you getting a good spark?

Fourth—Are your cylinder and other working or bearing parts properly lubricated?

In nearly every case failure of the engine must be attributed to one of the above causes.

CONCRETE

Next to the cement itself the quality of sand is important. This should be clean, sharp and not too fine. The rock or cinders, where latter are used, should be clean and free from dust.

For ordinary base not exposed to weather, a mixture of one cement, two sand and five rock is a good proportion. For base of side-walk, one, two and four is generally used, with $3\frac{1}{4}$ inches depth laid upon 8 inches of cinders.

The surface coat, generally $\frac{1}{2}$ inch thick, should be half cement and half sand. This coat in all concrete work must be applied *as soon after the body is laid* as conditions will permit.

Mix cement and sand thoroughly while dry. Add water to make moderately thin batter and put in rock after thoroughly wetting them.

In placing the concrete in forms it should be tamped just enough to bring the mortar or thin part to the surface. Leave narrow spaces between sections. An expansion space $\frac{1}{8}$ in. is sufficient for an 8 ft. block.

Rods $\frac{3}{8}$ to $\frac{1}{2}$ in. in section secured at their ends and placed 6 to 15 inches apart, imbedded near bottom of 5 or 6 inches of concrete, according to weight to be supported, will carry an ordinary floor of 10 or 12 feet clear width. Twisted rods of square section are best for this purpose.

Concrete fence and gate posts reinforced with rods or wire are largely used.

Fertilizers.

Nitrogen, Phosphoric Acid and Potash are the chemical ingredients of the soil consumed by the plants. The maintenance of a soil's fertility means simply the restoration to it of these elements as fast as they are taken out by the plants. These are all contained to a greater or less degree in stable manure and they can be obtained singly or in mixed form in commercial fertilizers. Manifestly the fertilizer needed in any case depends upon the soil itself and the crop to be raised.

Nitrogen is obtained in a convenient and concentrated form as **Nitrate of Soda**. The crystals may be powdered and sprinkled upon a lawn for instance or be worked into the soil near growing vegetables—preferably just before rain; or be dissolved at the rate of one pound to a barrel of water and applied. Nitrate of soda may be used at the rate 100 to 500 pounds per acre; it is a powerful stimulant, its effect immediate but temporary. Nitrate of Soda contains usually about 16 per cent of Nitrogen. Other commercial sources of Nitrogen are Sulphate of Ammonia supplying about 20 per cent of Nitrogen; Dried Blood about 10 per cent; Cotton Seed Meal about 7 per cent. Stable manure contains about 5 per cent, of Nitrogen.

Phosphoric Acid may be obtained from ground bone which contains about 20 per cent besides about 4 per cent Nitrogen or from Phosphate Rock which yields about 12 per cent.

Potash may be secured in the form of Sulphate or Muriate both yielding about 50 per cent or from Kainit yielding about 12 per cent. Hardwood unleached ashes containing about 5 per cent are a highly valuable source of Potash supply as the lime contained is a corrective of sourness besides they serve to improve the texture of the soil physically.

Under special conditions any of these chemical elements may be advantageously applied alone—ground bone at the rate of 1000 to 2000 lbs. to the acre; Sulphate of Potash 200 to 400 lbs.; but combinations of two or all are generally indicated. A "complete" fertilizer is one containing all and the figures used in connection with such formulas 2:6:8; or 3:7:6 for instance means that those relative percentages of Nitrogen, Phosphoric Acid and Potash respectively, are contained in the mixture.

Barnyard manure may be said to contain .5 per cent Nitrogen; .2 per cent Phosphoric Acid; .5 Potash and so is a "complete" fertilizer relatively rich in Nitrogen; and its

Fertilizers (Continued).

usefulness is greatly enhanced in comparison with commercial fertilizers by its added value as humus in the soil. Legumes [such as clover, alfalfa, peas etc.] have the property of securing their supply of Nitrogen from the air instead of from the soil. Not only do they not take this element from the soil but if they are plowed under the effect is to add to the soil's supply all the Nitrogen which the plants have stolen from the atmosphere. This process is known as *green manuring* and where the provision is made also for deficiencies in Phosphoric Acid and Potash there is no surer or better way to restore worn-out soil.

Where the soil is "sour" the need of *Lime* is indicated. The question of sourness can be determined by mixing a small quantity of the soil with water to the consistency of batter and testing with a piece of *litmus paper* which may be obtained from a drug store. If the blue paper is turned after an hour to a strong red color, lime is needed. This may be applied finely ground at the rate of a ton per acre, either before plowing in Spring or Fall or after plowing by harrowing in.

It must be remembered that most soils are not so deficient in plant-food as they are in the capacity to release that food to the plant. This is the great object of tillage.

Silos Size Capacity etc.

Cows	Feet in Diameter	Feet in Height	Capacity Tons	Daily Feed approximate
12	10	30	47	$\frac{1}{4}$ ton
17	12	32	74	$\frac{1}{2}$ "
23	14	34	109	$\frac{3}{4}$ "
30	16	36	155	1 ton
33	18	38	212	1 $\frac{1}{2}$ "

Below is about the daily allowance.

Calves to winter age 7 to 9 months	16 to 24 pounds
Cows for breeding	30 to 50 pounds
Beef cattle yearlings and coming 2 year old	20 to 30 pounds
Later when fattening	12 to 25 pounds
Milk or dairy cattle	35 to 50 pounds
Sheep wintering	3 to 5 pounds
Lambs to fatten	2 to 3 pounds
Sheep to fatten	3 to 4 pounds

As an example,

40 milk cows would eat about 40 pounds per head per day needing a silo 16 to 18 feet in diameter.

Water System Information

With the general use of gasoline engine power, the inestimable boon of pipe distribution of water has been brought within reach of every enterprising farmer. The following information will be found of practical value in laying out such a system.

First, determine if your supply of water is sufficient to justify an installation. Assuming that bath room, closet, and kitchen supply is to be included, make calculation on this basis; for daily consumption for each person in the family 100 gallons; for each horse, 10 gallons; for each head of cattle, 12 gallons; for each hog or sheep $2\frac{1}{2}$ gallons; to soak thoroughly 100 square feet of lawn, 15 gallons.

With the total thus arrived at in mind, measure the available supply. If this is from a well, pump out a measured depth say 2 or 3 or more feet, and keep record accurately of the time required for the water to rise to original height. Remember that it is not the supply on hand but the *dependable inflow* in which you are interested. Then with the diameter of the well known, the inflow volume per day can be readily computed. If the water stands deep in the well, it will run in at an increasing rate as the depth is reduced. If the supply is from a spring, measure the run-off for one minute or other fixed time and calculate total for day.

If the necessary supply is found to be present and can be reached within a depth of 18 or 20 feet of the location of pump, use suction pump; otherwise, a lift pump will be necessary.

Remember that the important factors now will be *amount of water to be supplied per minute; length of run from pump to tank for distribution; total height or head to which water must be lifted.*

As to the first, usually a good arrangement is to have sufficient pumping capacity to supply the needs of the whole twenty-four hours in two spells of say one hour each, so that the operation can go on while the chores are being done.

As regards the length of run, this with the rate of supply required, determines the diameter of pipe to be used. The matter of skin-friction in the pipe is highly important. For instance, to deliver 25 gallons through a one-inch pipe 10 feet long on a level with the cylinder would involve only about 2 lbs. per square inch pressure on the piston or plunger, but to deliver the same amount at the same level through the same pipe 1000 feet long the cylinder pressure would be 200 lbs. per square inch! Even if this pressure were practical the waste of power required would be relatively enormous. By using a 2-inch pipe for the 1000 feet

Water System Informaton. (Cont'd.)

Water System (Continued).

Gal. Del. d. per min.	Total Run—Feet	Total Head—Feet	Requi. Diam. Pipe inches	Diam. Cyl. †	length stroke No. strokes	Diam. Cyl. †	length stroke No. strokes	Pressure Approx.	Required H. P.
10	200	50	1	3½	6 42	3	5 36	28	.3
		100	"	"	8 42	"	5 36	49	.5
		150	"	"	8 32	"	5 36	70	.7
		200	"	"	8 32	"	5 36	92	1.0
	500	50	1¼	"	8 32	"	5 36	24	.3
		100	"	"	8 32	"	5 36	46	.5
		150	"	"	8 32	"	5 36	68	.7
		200	"	"	8 32	"	5 36	88	1.0
	1000	50	1½	"	8 32	"	5 36	26	.3
		100	"	"	8 32	"	5 36	48	.2
		150	"	"	8 32	"	5 36	70	.7
		200	"	"	8 32	"	5 36	90	1.0
20	200	50	1½	4½	6 50	3½	5 50	26	.4
		100	"	"	8 50	"	5 50	48	.75
		150	"	"	8 40	"	5 50	69	1.3
		200	2	"	8 40	"	5 50	89	1.75
	500	50	"	"	8 40	"	5 50	24	.40
		100	"	"	8 40	"	5 50	44	.75
		150	"	"	8 40	"	5 50	67	1.3
		200	"	"	8 40	"	5 50	88	1.75
	1000	50	"	"	10 32	"	5 50	26	.5
		100	"	"	8 32	"	5 50	48	.9
		150	"	"	8 32	"	5 50	69	1.3
		200	"	"	8 32	"	5 50	89	1.75
30	200	50	2	5	10 36	4	6 48	23	.6
		100	"	"	8 36	"	6 48	44	1.2
		150	"	"	12 30	5	5 36	66	1.7
		200	"	"	8 30	"	6 88	88	2.3
	500	50	"	"	8 30	"	6 26	26	.7
		100	"	"	8 30	"	6 48	48	1.25
		150	"	"	8 30	"	6 69	69	1.8
		200	"	"	8 30	"	6 91	91	2.4
	1000	50	"	"	8 30	"	6 31	31	.8
		100	"	"	8 30	"	6 52	52	1.35
		150	"	"	8 30	"	6 74	74	1.9
		200	"	"	8 30	"	6 94	94	2.5
40	200	50	2	6	10 36	5	6 40	25	1.
		100	"	"	8 36	"	6 46	46	1.75
		150	"	"	12 28	"	6 71	71	2.5
		200	"	"	8 28	"	6 89	89	3.45
	500	50	2½	"	10 36	"	6 24	24	1.
		100	"	"	8 36	"	6 47	47	1.75
		150	"	"	12 30	"	6 68	68	2.50
		200	"	"	8 30	"	6 89	89	3.20
	1000	50	"	"	8 30	"	6 27	27	1.00
		100	"	"	8 30	"	6 48	48	1.75
		150	"	"	8 30	"	6 72	72	2.50
		200	"	"	8 30	"	6 91	91	3.30

†—Single acting cylinder. ‡—Double acting cylinder.

under same conditions the pressure would reach only about 7 lbs!

Finally, in calculating pressure on pump-piston remember that every hundred feet, in height of raise, means 43 lbs. per square inch. *This is the same whether the rise is very gradual or directly vertical, and this measurement must run from cylinder level to top of water in storage tank.*

Tank provided must be sufficient to accommodate full supply from one pumping to another. Usually the open tank is employed, elevated to deliver to all points of discharge by gravity. For small supply the closed or pneumatic tank can be used located in cellar or under-ground, the water being discharged therefrom by air pressure.

With these facts clearly grasped, the following table will furnish all data needed for several representative volumes, runs and heads; so that an approximation of all requirements can be quickly arrived at in all ordinary cases. Where your measurements do not approximate closely any of those given, use figures for the *nearest run* given and for the *next highest* head; thus for 20 gallon, 300 foot run, 80 foot head, take figures for 20—200—100.

In using table herewith, note that column headed "Required Horse Power" means theoretical or calculated power. In arranging for gasoline power it is *necessary to provide double the calculated amount* so as to cover engine deficiency, loss in transmission etc. Engines rated at from 1 to 6 H.P. will be required for the various cases specified in the table.

To apply information herein let us take an example:
EXAMPLE—I have 7 persons in my family, want full domestic supply; also to provide for 8 horses 7 cows and 100 head of hogs. My source of supply is a spring 600 feet from proposed location of tank and the height from spring level to top of level in tank is 75 feet. How much water will I require, what size pipe, pump and engine?

ANSWER—From above data

7 persons will require , . . . 700 gallons
8 horses will require 80 gallons
7 cows will require 84 gallons
100 head of hogs will require 250 gallons

Total 1114 gallons per day

Assuming that 20 gallon per minute will be a convenient delivery, your problem is to deliver 20 gallon through 600 feet of pipe to a height of 75 feet. Referring to table opposite no calculation is found for these measurements so take that for nearest run 500 feet and next greater head, 100 feet.

Water System (Continued).

This you will see calls for a 2-inch pipe, and $3\frac{1}{2} \times 5$ double acting suction pump, running 50 strokes per minute with a calculated power of .75 [that is, $\frac{3}{4}$] horse. With proper power allowance a $1\frac{1}{2}$ or 2 H.P. Engine will be required.

Referring to another page in this booklet, headed *Useful Rules and Calculations*, you will find data and methods for calculating size of tank required. If for a 24 hour supply, a tank 5 feet in diameter and 8 feet in height will suffice or for 12 hours supply one 4 feet diameter and 6 feet in height.

Finally at the rate, 20 gallons per minute, the 24 hour supply may be pumped in a little less than an hour. For the larger deliveries where the double action suction pump is employed it is usual to use the duplex or double cylinder type reducing the bore and stroke proportionally.

Sprays and Insecticides.

There are three kinds of enemies to be combatted with chemicals applied to the plant—chewing insects, sucking insects and fungous diseases.

To reach the first successfully, the problem is to place a suitable poison where the depredators will *eat it* in their attack on the plant.

To reach the second, substances must be sprayed or otherwise applied directly upon the insect which will destroy it *by contact*.

To combat the third, applications must be made of agents that will *destroy the fungous growth* or render highly unfavorable the conditions for its development.

Almost all plants are subject in greater or less degree to attacks and the subject cannot be fully treated here but we give below the standard recipes for general use.

For Chewing Insects, such as beetles, caterpillars cod-lin-moth, curculio, etc. spray with *Arsenate of Lead* using 4 to 6 lbs. to 100 gal. water for fruits. For potato beetle make the solution one-third stronger. Arsenate of Lead will not injuriously affect leaves when used in proper strength

London Purple and *Paris Green* are other effective arsenates but are less easily and safely handled. For potato beetle these are usually prepared at the rate of

- 1 oz. Paris Green
- 2 oz. Fresh slacked lime
- 10 gallons of water

For Sucking Insects such as aphides [lice] spray with

Sprays and Insecticides (Continued).

Kerosene Emulsion, Tobacco Extract, or Whale Oil Soap.

Kerosene Emulsion is made as follows

- $\frac{1}{4}$ lb. Hard washing soap
- 1 gal. Boiling water
- 2 gal. Kerosene

Dissolve the soap add the kerosene, agitating thoroughly to make intimate mixture. When ready to use, dilute for dormant trees with 5 to 7 parts of water; for aphids on foliage with 10 to 15 parts of water.

Tobacco Extract can be made by boiling the stems and sufficient water to make 2 gallons of liquid to 1 lb. of tobacco. But the extract sold ready prepared is better.

Whale Oil Soap 1 lb. dissolved in 5 to 7 gal. water. For San Jose scale *Lime Sulphur* wash is popular. Prepared as follows;

- 20 lbs. Quicklime rapidly slacked
- 15 lbs. Flower of Sulphur dissolved add to lime.
- Mix thoroughly add water to make
- 50 gal. Boil for one hour.

Also *Miscible Oil* preparations which are heavy petroleum extracts sold ready to apply after proper dilution.

Both lime-sulphur solution and the Miscible Oils can be used on trees *only when dormant*. Both are valuable as fungicides as well as insecticides.

For Fungous Diseases such as blight, blotch, canker, mildew, scab, leaf-curl, etc. the standard remedy in addition to the use of lime-sulphur or oil applications while the tree or plant is dormant, is

Bordeaux Mixture prepared thus;

Copper Sulfate (Blue Vitrol) 5 lbs. Dissolve in glass, wooden, brass or stoneware vessel in 2 or 3 gallons of hot water, Lime 5 lbs. slacked in small amount of water. Pour the dissolved sulfate into a barrel and add water to make 45 gallons. Strain the dissolved lime into this through cheese cloth. Stir the whole thoroughly adding sufficient water to bring the whole to 50 gal. This is the standard 5-5-50 solution. Do not add lime to the sulfate until latter is largely diluted. *When using keep thoroughly agitated.*

Note—that it is feasible and usual to mix the arsenical (preferably arsenate of lead) with the Bordeaux Mixture and thus reach two enemies with one spraying.

Remember in combatting the enemies of plant life that much depends upon wise preventive measures such as elimination and destruction of affected parts, rotation of crops, clean and thorough tillage, etc.

Weight of Seeds and amount sown per acre.

This table represents the general practice. Weights given are the legal delivery, not actual, weights. These vary in different states but figures show the extremes.

The amount of seed to be sown per acre varies with the soil, climate and individual opinion.

	Weight	Quantity to Acre
Wheat	60 lbs.	1½ to 2 bush.
Corn shelled	56 "	} 5 to 8 quarts
Corn cob	70 "	
Rye	56 "	1 to 2 bush.
Barley	48 "	1½ to 2½ bush.
Buckwheat	48 to 52 "	¾ to 1½ bush.
Oats	30 to 33 "	2 to 4 bush.
Clover-seed	60 "	10 to 18 lbs.
Flax-seed	56 "	1½ to 2 bush.
Timothy-seed	45 "	10 to 18 quarts
Hemp-seed	44 "	1 to 1½ bush.
Blue Grass-seed	14 "	1 to 3 bush.
Hungarian-seed	48 "	½ to 1 bush.
Broom-corn seed	52 "	1 to 1½ bush.
Sorghum seed	42 to 56 "	1½ to 2 bush.
Alfalfa seed	60 "	12 to 25 lbs.
German Millet	50 "	1 peck
Cotton Seed	30 to 33 "	1 to 3 bush.
Cow Peas	56 to 60 "	1 to 1½ bush.
" " Drill with corn		½ to bush.
Milo	50 to 60 lbs.	5 lbs.
Soybeans	58 to 60 "	3 to 6 pecks
Brome Grass	10 to 14 "	12 to 15 lbs.
Swt. Clover(chilled)	60 "	2 to 4 pecks
Beans	60 "	1½ to 2 bush.
Onions	52 to 57 "	4 to 5 lbs.
Potatoes	60 "	10 to 14 bush.
Peas	60 "	1½ to 2 bush.
Cabbage		¾ to 1 lb.

Common Farm Pests; how to Combat.

THE MOLE contrary to common belief is entirely caravivorous; that is, it lives wholly upon the flesh of worms and insects and does not eat vegetable matter. Its runways are however frequently inhabited by guests—mice and shrews that do great damage to vegetation and of course the excavations and upheavals of the runways greatly injure lawns and gardens.

Recent elaborate experiments indicate that poisoning is not effective in removing this pest though probably effective against his guests. Of all weapons tried against him the ordinary spring harpoon trap is the best. Care must be used in setting it upon fresh or main runways. Continued rolling down the ridges or casts has been found to discourage the presence of moles.

POCKET GOPHERS are easily destroyed by poisoning. A few small crystals of *Strychnine* inserted into a small piece of potato, or into raisins, will be effective. At the mound find the gopher's runway and insert the poisoned food well back closing the opening.

Gophers may also be successfully trapped in common steel traps by laying bare their runway, inserting trap and covering same lightly with fine dirt then closing the opening.

PRAIRIE DOGS may be exterminated by the use of *Strychnia Sulphate*, one and one-half ounces to two and one-half gallons of water; dissolve thoroughly by heat then sprinkle over a bushel of cut green alfalfa or green stems of wheat or barley or green corn stocks. Scatter the poisoned food outside the burrows preferably in the evening.

RATS by far the greatest pest known to the farmer must be combatted by making barns, cribs etc. proof against them by the greater use of concrete and suitable wire screens and by removing wherever possible all piles of lumber, trash old stacks, shocks etc.—thus reducing or removing their breeding places. Then similarly, limit their food supply by cleaning up all garbage and waste and making rat-proof all stores of grain and food of every kind. A poorly fed rat is much less prolific than a well fed one. The most effective methods of attacking the rat are a good dog of proper breed; the *guillotine* wire trap (not the common steel trap) and when the odor of the dead animal is no serious objection, poison. Probably the best poison is *Barium Carbonate*; it is cheap, not likely to injure other domestic animals in the small quantities necessary and slow in action impelling the rat to go out in hunt of water when he frequently dies outside.