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# The 4-H Health and Sanitation Project

4-H CLUB CIRCULAR 36

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## COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE AND THE UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

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# The 4-H Health and Sanitation Project\*

**Object.**—The object of the Health and Sanitation Club Project is to promote health by sustaining interest in the daily practice of health habits by each member, by teaching the relation of sanitary surroundings to health, and through the club activities to develop an interest in, and a sense of responsibility for, community health conditions.

## REQUIREMENTS

There shall be five or more members in the Health and Sanitation Club who are 10 to 21 years of age and who meet regularly with their own officers in charge, under the direction of a local club leader.

**Work Required.**—Each club member is required:

1. To know the health rules.
2. To practice the health habits.
3. To learn the fundamentals of sanitation relating to water supply, disposal of wastes, fly control, ventilation, the home production of clean milk, and vermin control.
4. To make and to install in the home a window ventilator or wind deflector and to take deep breathing exercises out-of-doors.
5. To make and to install a fly trap.
6. To score the home water supply.
7. To score the home toilet.

If the club is organized in a school, the school water supply should be scored and analyzed and the school toilets scored.

In order that each club member may know exactly how regularly health habits are being practiced, a personal record is to be kept one week each month.

A health examination should be made early in the club year so that club members may know their own defects and have an opportunity to have them corrected. Each club member should be weighed and measured. Any deviation from the average normal weight learned by comparison with the height-weight score should be noted and an effort made to reach the average normal. (The Height-Weight-Age tables in the Health and First Aid Circular should be used in this connection.)

**Records Required.**—Members will be required to keep records of their practice of health habits one week each month; of sanitary equipment made or provided; or sanitary improvements made in home, school, or community; and a record of meetings, demonstrations, and exhibits

\*Prepared by Miss Mary E. Stebbins, Extension Specialist in Health, in collaboration with Miss Sara Chiles, State Club Agent.

held, in a record book provided by the Extension Service of the Missouri College of Agriculture.

**Expense.**—The expense to each member will be small, as most of the materials needed usually will be found in the home.

**Time Required.**—Time is necessary:

1. To practice the health habits daily.
2. To take deep breathing exercises out-of-doors.
3. To score the home water supply and toilet.
4. To make and to use a fly trap and a window ventilator.
5. To attend six or more club meetings.
6. To attend an achievement program at the close of the year's work.

**Organization.**—These clubs should be organized in March, April or May for summer club work, and in September, October or November for winter club work.

## I. SUGGESTED PROGRAMS FOR HEALTH AND SANITATION CLUB MEETINGS

Standard clubs are required to hold at least six regular meetings during the club year. These meetings may be held as often as the local club leader and the members desire. However, it is recommended that at least one meeting be held each month.

Below are programs suggested for a number of club meetings. It may be necessary to devote two or more meetings to some of the subjects. It is suggested that these subjects be followed in the order named but local club leaders and clubs are expected to adapt them to local community conditions.

### I. ORGANIZATION OF THE CLUB

- A. **The Business Meeting.**—The local club leader in charge. (See Secretary's Book.)
  1. Repeating of the national 4-H club pledge as follows: "I pledge my *head* to clearer thinking, my *heart* to greater loyalty, my *hands* to larger service, and my *health* to better living, for my club, my community, and my country."
  2. Review of the method of conducting a business meeting. (See Secretary's Book.)
  3. Review of the duties of the club officers and members. (See Secretary's Book.)
  4. Election of officers from the membership of the club: President, Vice-President, Secretary, Song Leader, and Reporter.
  5. Selection of a name for the club that identifies the club and the project.

6. Selection of time and places for regular club meetings.
  7. Appointment of a committee to compose or select an appropriate song for the club.
  8. Adjournment of business meeting for discussions.
- B. Discussions.**—The local club leader in charge.
1. Distribution of club circulars and record books.
  2. Review of standard 4-H club requirements. (See Secretary's Book and Project Announcement.)
  3. Explanation of the project requirements for the Health and Sanitation Club work.
  4. Discussion of main club events for the year and making of club calendar of events.
  5. Setting of one or more club goals.
  6. Setting of individual goals.
  7. Weighing and measuring of club members.
  8. Plan of work for the next meeting. Bring record books to the meeting. Report of the health examination made by physician. Assignment for roll call: "How much I have improved my health since joining the Health and First Aid Club." See Weight-Height-Age Tables in Health and First Aid Club Circular.
- C. The social hour.**

## II. WATER

- A. The Business Meeting.**—The club president in charge.
1. Meeting called to order by the president, who leads the club members in repeating the national 4-H club pledge.
  2. Roll call by the secretary, the members responding by reporting on the previously assigned topic.
  3. Reading of the minutes of the last meeting by the secretary, which should be adopted as a permanent record by the club when approved.
  4. Unfinished business:
    - a. Unfinished business from the last meeting.
    - b. Report of the committee on songs.
  5. New business:
    - a. Appointment of a social committee to plan for social hours at future club meetings.
  6. Songs, led by the song leader.
  7. Adjournment for work.
- B. Discussions and demonstrations.**—The local club leader in charge.
- Importance of pure water. Page 9. Explanation of score card for home water supply. Page 11.
- Plan of work for next meeting. Bring record books. Assign topics for roll call as "The home water supply and what I am doing to improve it". Reports. Demonstrations.
- C. The social hour.**

## III. WASTES

- A. The business meeting.** (Follow suggested outline for Club Meeting II)
- B. Discussions and demonstrations.**
- Disposal of wastes. Page 13. Explanation of score card for toilet. Page 15. Garbage containers. Page 13.
- Plan of work. Assign demonstrations. Reports. Topics for roll call

as "Sanitary Improvements I have made at home in disposal of wastes"

C. **The social hour.**

**IV. FLIES**

A. **The business meeting.**—(Follow suggested outline for club meeting II)

B. **Discussions and demonstrations.**

Why flies are dangerous to health. Page 18. Methods of fly control. Page 19. How to make a fly trap. Page 20.

Plan of work. Demonstrations. Reports. Topics for roll call, as "What I am doing to help rid the home and farm of flies."

C. **The social hour.**

**V. VENTILATION**

A. **The business meeting.**

B. **Discussions and demonstrations.**

What is meant by ventilation. Page 22. How to make a ventilator and a deflector. Page 23.

Plan of work. Demonstrations. Reports. Topics for roll call as "Breathing exercises I have learned".

C. **The social hour.**

**VI. MILK**

A. **The business meeting.**

B. **Discussions and demonstrations.**

Importance of milk for health. Page 25. How to produce clean milk. Page 26. Home pasteurization. Page 27. Home made ice boxes. Page 27.

Plan of work. Reports. Demonstrations. Topics for roll call as "What I am doing to improve the cleanliness of our milk supply".

C. **The social hour.**

**VII. INSECTS AND VERMIN**

A. **The business meeting.**

B. **Discussions and demonstrations.**

Danger to health from insects and vermin. Page 28. Methods of control.

Plan of work. Plans for achievement program. Completion of all records.

C. **The social hour.**

**VIII. CHECK-UP MEETING**

A. **The business meeting.**

B. **Discussions and demonstrations.**

1. Try-outs for the demonstration team by individual club members.

2. Selection of the demonstration team to represent the club. Page 34.

3. Final instructions on completion of the club record books for the year.

4. Final plans for the club Achievement Program.

5. Instructions to the club reporter on news items for the local papers regarding the Achievement Program and the work of the club for the year.

C. **The social hour.**

**IX. THE ACHIEVEMENT PROGRAM**

The achievement program should be held at the close of the work for the club year.

Each club member should hand in to the local club leader the completed record book so that the results of all the work of the club may be summarized for the year in the Club Secretary's Record Book.

All club members should exhibit the fly traps and ventilators which they provided for use in their own homes.

### SUGGESTED PUBLIC ACHIEVEMENT PROGRAM

1. A typical club meeting by the club. Reference: Club Secretary's Record Book.
2. A brief history and a short statement of the club's achievements by a club member or by the local club leader.
3. One or more practical demonstrations by club teams.
4. A talk on 4-H club work.
5. Awarding of 4-H club achievement pins if given, to each member of the club who hands in a complete record book to the local club leader.
6. Announcement of club plans for the coming year.
7. Songs.

#### Suggestions.—

Only club members who complete reports or have their records up-to-date should be eligible to take part in county or state contests.

A news story of the events of the club achievement program and the results of the club work for the year should be carefully prepared and offered to the local newspapers.

### INTRODUCTION TO SUBJECT MATTER

The words sanitation and sanity come from the same Latin word, *sanitas*, which means health. Sanity has come to be thought of as meaning health of the mind, while sanitation has come to mean health of the surroundings in which people live. Healthful or sanitary surroundings will in themselves promote the health of persons living in them. A sane person will provide sanitary surroundings. No one likes to be thought insane, but many people live in unsanitary places all or part of each day and give the matter little or no attention.

Heating, lighting, ventilation, vermin control, protection of foods, control of flies and other insects, purity of water supply, and the disposal of wastes are some of the subjects included in sanitation. Of these, a pure water supply and the proper disposal of wastes are by far the most important for health.

When we think of environment it is necessary to remember that each person lives a continuous life and is influenced by the surroundings met at each moment of life, whether in the home, school, church, place of business or entertainment, or on the highways; whether walking, riding or standing still; playing, working, or studying.

Some persons are particular about the inside of their houses but neglect their yards, sheds, stables, etc.; and some are careful about their entire home places and forget that school and community conditions may be dangerous to their health and even to their lives.

Good housekeeping practices promote sanitation. A high degree of general cleanliness is an important factor, both inside and outside the house, and should include consideration of stables and similar buildings and their surroundings. Chickens and stock should be kept out of the house yard. The same measures should be rigidly applied to schools, churches, stores, theaters, and other public buildings and their surroundings. Roads, streets, and vacant lots should receive attention.

The purpose of the Health and Sanitation Club is to assist each club member to attain and maintain his or her own best possible condition of health, and to acquire a "health conscience" in relation to home, school, and community welfare.

Each club member should make an inventory of his health and then follow the health rules and try to attain or maintain his maximum health.

### Health Inventory

- Is my skin clear, clean and either pink or tanned? .....
- Is my hair smooth and glossy? .....
- Are my eyes bright and sparkling? .....
- Is my tongue clean and pink? .....
- Can I breathe clearly through each nostril? .....
- Do I hear equally well with each ear? .....
- Are my muscles well developed and firm? .....
- Is my chest broad and useful for breathing? .....
- Is my back straight and are my shoulder blades flat? .....
- Is my posture erect and can I easily keep myself erect when walking and sitting? .....
- Is my step elastic and light? .....
- Can I play hard or work hard without too much "tired feeling"? .....
- Have I a "clean, quick mind in a clean, strong body"? .....

### Health Rules

1. Brush teeth each morning and night.
2. Wash the hands before eating.
3. Take a full bath at least twice a week.
4. Have a natural bowel movement daily.
5. Drink at least six glasses of water each day.
6. Eat some fruit and green vegetables each day.
7. Drink milk; one quart a day is desirable.
8. Play or exercise out doors each day.
9. Sleep long hours in open air or with windows open.
  - 10-12 years—12 hours sleep needed.
  - 12-14 years—11 hours sleep needed.
  - 14-18 years—10 hours sleep needed.



### Additional Suggestions

1. If possible, have a thorough physical examination by a physician.
2. Correct physical defects, if they are found.
3. Eat meals at regular hours.
4. Chew thoroughly.
5. Eat no sweets between meals.
6. Wear low-heeled, comfortable shoes.
7. Stand and walk properly—chest up, chin in, abdomen in.

## II. WATER

“Pure water externally, internally, eternally”.

A supply of pure water is of the utmost importance not only because water is the natural drink of man, but because of the dangers to health arising from an impure supply. It is used for so many purposes that the source of supply, well or cistern, should be conveniently located. Inside water systems can be installed in rural homes at very little expense, usually covered by the cost of materials only.

**Water for Health.**—Human beings, in fact, all animals, require large quantities of water. The body may live for weeks without food if a liberal amount of fluids is provided, but will die very soon if no fluids at all are given. Large quantities of pure water taken daily will help to keep the body fit and will prevent many disagreeable conditions.

It is necessary to know that the water used is pure and that the water supply is so protected that no surface drainage or seepage can get into it.

**Pure Water Supply.**—A properly located and properly constructed well or cistern is the best means of assuring a supply of pure water. A tightly fitted pump is necessary. An open top well or cistern cannot contain pure water. The well or cistern should be so located that there will not be any danger of contamination from the barnyard, cesspool, open toilet or other place of filth. All drainage of surface water should be away (down hill) from the cistern or well.

If water from a spring is used the spring must be carefully protected; an open spring is most easily contaminated.

**Dangers of Impure Water.**—The germs of certain diseases, such as typhoid fever, diarrhea, dysentery, cholera, and summer complaint are able to live in water for some time. These are all intestinal diseases and may get into the drinking water supply if rains wash over the ground or sink into the ground and then drain or seep into the well or cistern, carrying in the disease germs which have gotten on or into the soil. If water containing these germs is used, the persons using it may become sick of these diseases.

**Water Analysis.**—Water that is clear, cold and has an agreeable taste is often badly contaminated with disease germs. It is, therefore, wise to have the water analyzed occasionally. Ask the Missouri State Board of Health, Jefferson City, Missouri, where and how a private water supply can be analyzed.

**Methods of Purifying Water.**—If the water supply is impure or contaminated with disease germs, it should be purified as follows:  
“Secure from the local druggist a can of fresh dry chlorinated lime (also called calcium hypochlorite or bleaching powder).

“Make up four tablespoonfuls of the powder into a smooth paste with a small amount of water, crushing all the lumps.

“Dissolve the paste in about a gallon of water, allow the solution to settle and strain through a finely woven cloth.

“Pour the clear solution into well or cistern and mix in the water, if possible. Do not pump out any water for at least two hours.

“Different kinds of water require different amounts of disinfectant. The best method is to add sufficient lime to give the water a pungent odor. This will disappear in a few days.

“The water supply will be safe until recontaminated. In order to permanently safeguard the water supply, the construction of the well or cistern should be improved so as to protect it from waste water, surface and shallow ground water.”

Whenever there is any doubt about the purity of the water supply, such water should be boiled before being used. Water used on picnics, camps and when traveling by automobile is often unsafe unless purified. The majority of the springs in Missouri are contaminated. It is dangerous to health to swim in ponds and stagnant pools, and in rivers, lakes, and creeks into which drainage from populated districts is discharged.

*Individual drinking cups* in homes, schools, and public places will keep pure water pure for the drinker. If one person has used a cup, unless followed by proper cleansing, neither the cup nor the water is clean enough for a second person to use.

The State Board of Health regulation in regard to common drinking cups and utensils is as follows:

“The use of common drinking cups, and of common drinking or eating utensils in any public place or public institution, or in any hotel, soda fountain, concession, lodging house, theater, factory, store, public, private or parochial school or public hall; or in any railway or trolley car or station, or the furnishing of any such common drinking cup or utensil for common use in any such place is prohibited. The words “common use” in this regulation shall be construed to mean for use by more than one person without adequate cleaning by means of scalding water or any equally effective method.”

**Score for Water Supply.**—For scoring the home, school, and other water supplies the following may be used:

**Score Card for Private Water Supply**

	Perfect Score	First Scoring	Second Scoring
		Date	Date
Location			
* { Distance from toilet at least 50 ft.			
{ Distance from cesspool at least 100 ft.			
{ No live stock permitted within 50 ft. ....	20		
Good surface drainage away from water supply ..	20	-----	-----
	40		
Construction			
Watertight concrete platform sloping away from pump.....	15	-----	-----
Waste water trough at least 10 feet long.....	10	-----	-----
Water-tight walls, curbing or casing.....	10	-----	-----
Water-tight joint between pump and pump platform.....	10	-----	-----
Pump.....	15	-----	-----
	60		

Name..... Community.....

Neighborhood..... County.....

P. O. Address.....

\*Any violation of the specifications requires a total deduction. The score will be 20 or 0.

**Construction.**—The well or cistern should be so constructed as to protect the water supply from surface and shallow ground water, from waste water from the pump, and house wastes such as dish water, laundry or wash water.

Wells in sandy or clay soils should have water-tight walls with curbing or casing at least 10 feet deep, in limestone strata; water-tight casing or curbing should be extended through the upper fissured layers down to solid rock formation.

Cisterns should have water-tight, concrete walls. Many plastered brick cisterns leak and admit contaminated shallow ground water. Cisterns should have concrete covers. Wood covers warp, cracks open up and admit waste water.

A water-tight joint between pump base and pump platform is necessary to prevent waste water, bugs, etc. from entering the well.

The well should have a pump with solid base, force style.

**The following may be considered sanitary improvements:**

Protecting the water supply by:

Taking waste water far away from well, cistern or spring.

Making any necessary repairs in the construction of the well.

Providing pump.

Putting a trough under the pump spout.

Keeping the cover on the cistern pump.

Fencing chickens and stock away from the water supply.

Having the water supply analyzed.

Purifying the water supply, if necessary.

Using own individual drinking cup at home, in school, and other places.

### III. WASTES

There are four kinds of household wastes, namely: rubbish, as dust, ashes and rags; garbage or food refuse; waste water from bathing, washing, washing dishes, cooking, etc.; and excreta from the human body. The proper collection and removal of these is an important factor in the maintenance of health.

**Rubbish.**—Accumulations of rubbish are unsightly, may become the abiding place of insects and vermin and may promote bad odors. Papers, rags, and other inflammable material should be burned; tin cans should be buried; garbage which is not used for feeding purposes, may be utilized as fertilizer or should be burned or buried.

An annual or semi-annual house cleaning is an established custom in most homes and in some communities. Often a little care throughout the year would reduce the drudgery of these occasions and would provide better places in which to live. Many communities have established a custom of dumping rubbish in a hollow by the roadside or of throwing it into a stream. Both practices are bad and could be avoided by burning or burying such rubbish.

**Garbage.**—The handling of food refuse or garbage may be so managed that it will never become a nuisance and will not create bad odors or attract flies. A covered metal container should be provided, into which all scraps may be directly placed. A smooth-surfaced container, as a granite bucket, is easily handled; should be emptied frequently and thoroughly washed with soap and water. A lard can with handle and cover is sometimes used, and pails especially designed for this purpose may be purchased. One type which is very convenient and satisfactory is provided with a foot lever which raises the lid. Stores as well as homes should pay strict attention to the disposal of refuse food.

**Garbage Container\*.**—The care of garbage is a problem in many homes. A covered metal container should be provided which can be:

1. Conveniently placed.
2. Easily emptied after each meal.
3. Easily cleaned with soap and water.

The covered pail shown on the following page fills all of these requirements.

The wooden cover is raised by placing one foot on the lever E. This leaves both hands free for scraping garbage.

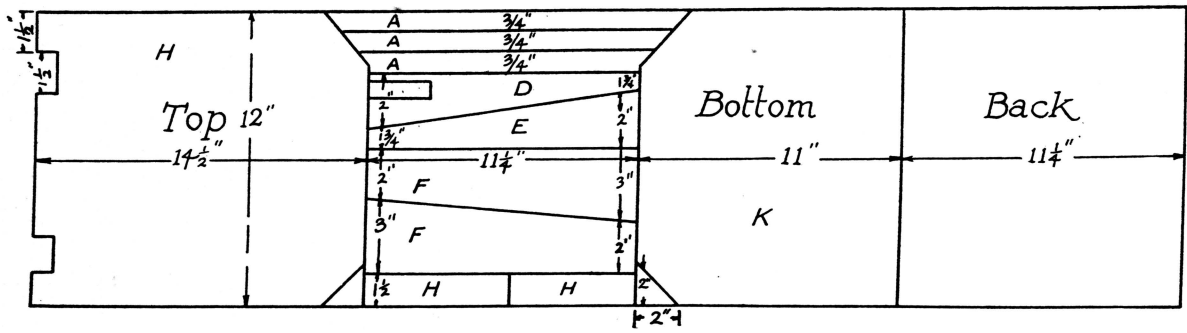
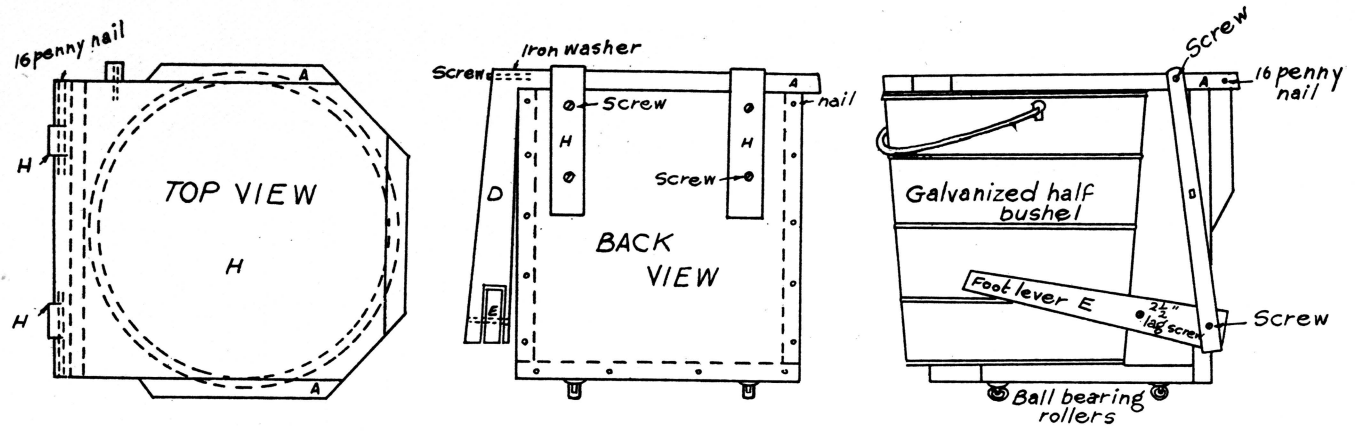
**Disposal of Water.**—Where there is no drainage system, the disposal of liquid waste is often a difficult problem. Water from bathing, washing hands, dishes, and clothes, must all be carried some distance from the house and emptied where it will drain from and not toward the water supply. It is advisable to empty the water in different places, so the soil will not become soggy, so the sun and air may act on it more readily, and so the grass will not be killed.

In many homes much of the wash water and even dish water is thrown out onto the ground around the kitchen door. Such waste water may find its way into the cistern or well and spoil the drinking water; the ground around the kitchen may become soggy and moldy so that no grass can grow, bad odors are produced, and flies are attracted that later find their way into the house. A simple tile drain can be installed, with very little expense of time, trouble, or money, and would save lifting at least one-half ton of water each day in an ordinary household.

A water system in the home is one of the greatest conveniences possible and actually makes a home more healthful, as more water is used for bathing and for cleaning purposes, even more for washing dishes. If a complete water system cannot be installed all at once, a kitchen sink and drain will be a great advantage and will save the home-maker much needless heavy work and fatigue. Even a covered hopper connected with a tile drain will reduce the work and fatigue one-half, and the drain can be so placed that the sink can later be connected. All drains should be carried away from the house at least 50 feet, and so placed as to protect the water supply.

**Disposal of Human Wastes or Excreta.**—The importance of the proper disposal of human wastes cannot be over-emphasized. Serious and devastating epidemics have resulted from lack of attention to such matters. Where there is no municipal sewage disposal system, it becomes the obligation of individual families to protect themselves and others from disease, by the construction and maintenance of a sanitary disposal system, as a septic tank or safe out-door toilet.

\*Designed by Mr. F. W. Boulware.



A Home Made Garbage Container

“The State Board of Health of Missouri is charged with safeguarding the health of the people of the state. It has made a thorough study of the causes and prevention of filth-borne diseases and has determined that a large percentage of the sickness and deaths from these diseases is due to the unsanitary disposal of human excreta.

“As directed by law, it has, consequently, formulated the following regulations which, when followed out, will protect the citizens from the spread of diseases:

Rule 7. “Sanitary Requirements—Every building in which human beings reside, are employed or congregate, located in any incorporated city or town, or in any unincorporated village, and every school building shall be provided with a water closet, or with a privy conforming to these regulations.

Rule 9. “Requirements for Privies—All privies shall be constructed, located, maintained, and cleaned so that:

(a) Flies, rodents or animals shall not have access to the excreta deposited therein. Privy boxes and vaults shall be fly-tight and provided with tight fitting lids for the seats, to accomplish this.

(b) The excreta shall not be discharged upon the surface of the ground.

(c) The excreta shall not pollute sources of drinking water; and no privy, unless it be supplied with a water-tight vault or receptacle, shall be located within 50 feet of any well, spring or cistern.

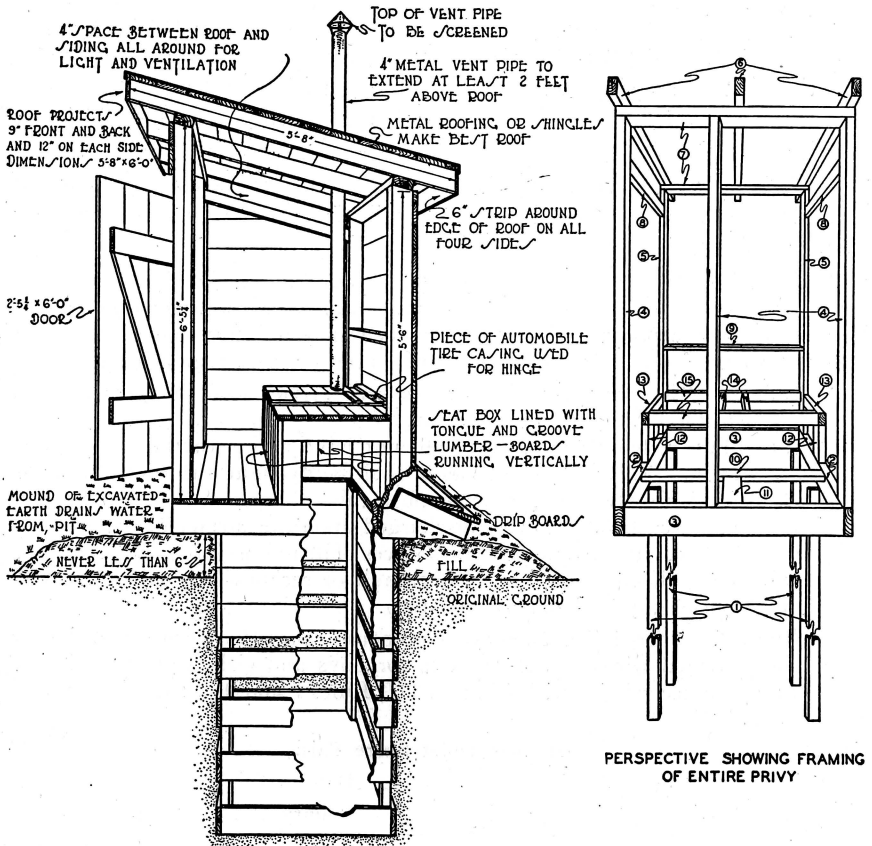
Rule 20. “School Toilets.—Every school not provided with water closets shall be provided with separate privies for boys and girls, constructed and maintained in accordance with Chapter III, Rules 7 and 9 of the State Board of Health.”

**Outdoor Toilet Score Card**

Name..... Date.....

Address..... County.....

	Perfect Score	First Scoring	Second Scoring
<b>Location</b>			
Distance from water supply at least 50 feet.....20			
Surface drainage away from water supply..... 5	25		
<b>Construction</b>			
Pit—3 to 5 ft. deep; curbed, if necessary.....15			
Fly tight seat box.....15			
Seat covers, hinged, self-closing.....10			
Earth banked around house—flashboards in place..... 5			
Weather-proof building.....2½			
Ventilator pipe—screened.....2½	50		
<b>Maintenance</b>			
Clean toilet paper provided.....10			
Cleanliness of house seats.....10			
Pit not filled closer than 1 foot of ground surface. 5	25		



Sanitary Pit Privy. (Courtesy, Missouri State Board of Health from which complete bill of materials may be secured)

**Location.**—Toilet should be located at least 50 feet away from water supply.

Should be exposed to sunshine; not placed under heavy shade trees or inside a dark building.

There should be a walk or hard surfaced path leading from the house.

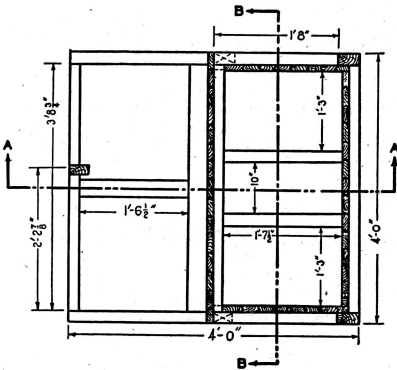
**Construction.**—Pit should be at least 3 to 5 feet deep.

Upper part of pit should be lined with concrete, brick, or wood, preferably concrete.

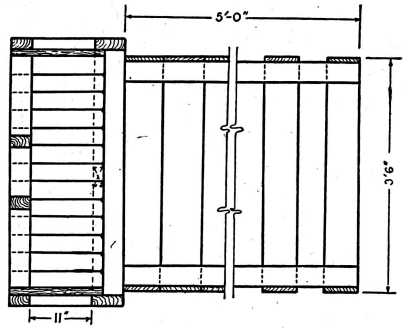
Any space between base of building and ground should be banked with earth and covered with flashboards, to prevent the dirt being removed by chickens, animals or rain.

Seat openings should be covered.

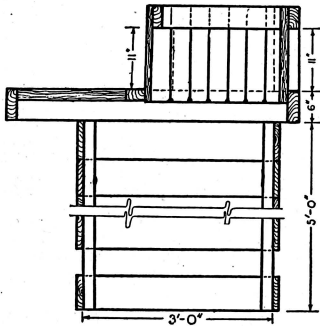




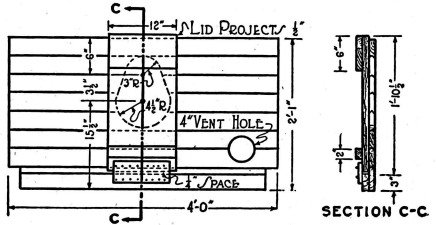
TOP VIEW OF SEAT AND FLOOR FRAMING WITH SEAT BOX LINING IN PLACE



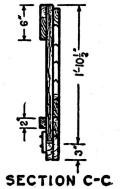
FRONT SECTION VIEW SHOWING FRAMING OF FLOOR AND SEAT WITH SEAT BOX AND PIT LINING SECTION B-B



SIDE SECTION VIEW SHOWING FRAMING OF FLOOR AND SEAT WITH SEAT BOX AND PIT LINING SECTION A-A



PLAN OF SEAT HOLE AND LID



Detailed construction of privy shown on opposite page.

Covers should be larger than the openings and hinged. Leather straps or strips from an old inner tube used as hinges will not rust and stick as metal hinges often do.

Covers should close automatically. A block of wood may be fastened to the back wall in such a position that the cover can not remain upright.

Floors should be free from holes and cracks.

Walls should be smooth (easy to brush and clean).

Roof should be rain-proof.

Vent flue of metal or wood should extend from pit, through the roof.

Upper end of vent flue should be covered with wire screen.

**Maintenance.**—Clean tissue toilet paper should be provided.

Seat, both sides of covers and floor should be scrubbed at least once a week.

Walls should be brushed occasionally to remove dust and cobwebs.

Pit should not be filled higher than within one foot of the ground surface.

**The following may be considered sanitary improvements:**

Providing covered container for garbage.

Garbage pail emptied and washed with soap and water frequently.

Providing pail for waste water.

Emptying waste water far from house and water supply.

Frequently changing the place where the waste water is emptied.

Growing grass on bare spots around the kitchen.

Making toilet fly tight.

Building sanitary toilet.

Washing seats, etc. at least once a week.

#### IV. FLIES

Flies are such common pests that people sometimes forget how dangerous to human life they are. It is generally conceded that if flies should be exterminated, one of the chief causes of disease would be eliminated. Some people even think that it is impossible to get rid of them, but any place can be freed if the proper measures are carried out.

There are many kinds of flies, but it is the house fly which enters the home, store, restaurant, meat-market, etc. It is one of the dirtiest of insects and the most dangerous one known to man. We look upon it with disgust and fear because its habits all its life are so filthy, and because when it gets its wings it is so rapid and so persistent a distributor of dirt and disease.

The house fly never wipes its feet and, therefore, brings filth to your food and to you. This filth is loaded with germs. These germs communicate disease to you. In the body of a single fly 6,000,000 germs have been found. A few flies in spring will multiply to many million in summer. Flies live in dirt, filth and manure—therefore, no filth, no flies.

The body, legs, and feet of the fly are well fitted to carry filth and germs. They are covered with hairs and bristles and the feet have claws, in addition to pads covered with a sticky substance which enables it to maintain its foothold when upside-down. The house fly is often called the "messenger of death". Dr. Woods Hutchison says that it is "the joy automobile of the germ."

Human beings are in constant danger when the discharges from any infectious disease are exposed to flies.

The eggs of the fly are laid on filth, generally on horse manure, but sometimes on cow manure, or other refuse heaps. The eggs usually hatch into maggots (or larvae) in 24 hours; the maggots burrow quickly into the substance—manure or refuse—on which the eggs were laid. The maggot stage lasts four to eight days and towards the end of that period the maggot burrows into the ground for an inch or two and comes to rest. The skin hardens, forming a cocoon (or pupa-case) in which the future fly develops to full size. In about five to seven days the full grown fly will come out from the cocoon hungry, and as soon as its wings are dry will usually go directly from its filthy brooding place to the house kitchen or dining room to feed and will infect everything it touches with the germs which are on its body, wings, legs, and feet, as well as in its saliva and excreta. Epidemics of typhoid fever and other diseases have been definitely traced to flies.

**Protection of Food.**—All food should be kept covered. Raw foods should be thoroughly washed through several waters. All garbage should be promptly and safely disposed of. Keep the house and surroundings clean and sanitary.

All of the measures for fly control should be applied to schools, stores, etc. Very few schools are screened and a fly is just as dangerous in a school room as in the home. Many stores, restaurants, hotels, etc. have foods constantly exposed to flies and dust. When buying food or eating in public places, select the stores and eating houses that keep the foods protected.

**Fly Control.**—The easiest and most effectual means of controlling the fly nuisance and danger is to destroy the breeding places and kill the maggots wholesale, instead of waiting until the flies develop their wings and come into the house carrying diseases and dirt. The maggots usually are in horse manure and must have a certain amount of moisture in order to live. If the manure is spread about once a week so that it will dry out, the maggots will dry up and die. It is possible to kill 88% to 99% of the maggots by the following method.

*Maggot Poison.*—Hellebore (Powdered hellebore is better than ground). One-half pound to 10 gallons of water. Stir mixture. Let stand 24 hours. Sufficient for 8 bu. or 10 cubic feet of manure. Sprinkle or spray manure once a week. This mixture does not destroy fertility of the manure.

Powdered borax is sometimes used but in small quantities is not as effective as hellebore, and in large quantities is injurious to the plants to which the manure is applied.

To destroy the fly after it has developed its wings, traps, poisons, swatters, and sticky paper may be used. Many of the ready prepared poisons contain arsenic and are dangerous. Either of the following mixtures may be safely used.

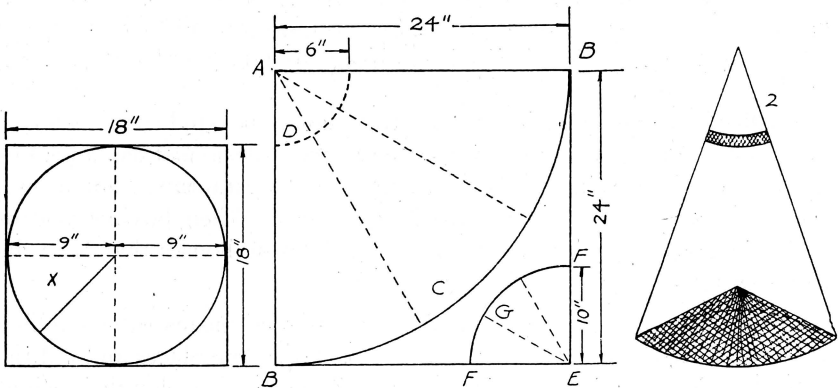
**Fly Poison.**—a. Mix 2 tablespoonfuls of formaldehyde with one pint of equal parts of milk and water.

b. One tablespoonful of formaldehyde in one pint of water sweetened with two tablespoonfuls of sugar. Keep in shallow plates. A piece of bread in the middle of the plate furnishes more space for the flies to alight and feed.

**Fly Traps.**—The home-made fly trap is an inexpensive, simple apparatus which could be made by anyone who is willing to give a little time to the work.

### Home Made Fly Trap

Materials:—2 feet of 42 inch wire screen, or  $3\frac{1}{2}$  feet of 34 inch wire screen. A wooden hoop, or hay wire.



Directions for Making.—

#### 1. To Make Outer Cone.—

(1). Measure from corner (a) 24 inches to (b); then cut curved line (c) from (b) to (b).

Measure from corner (a) 6 inches then cut curved line (d). Join cut edges (ab), overlapping 1 inch. Sew together firmly, using heavy thread or fine wire.

(2). Measure from corner (c) 10 inches to (f); then cut curved line (g) from (f) to (f).

Join the cut edges (ef), overlapping so that the line (gf) of the small cone will fit firmly over the larger cone.

Sew these edges together firmly. Bind the edges with tape, denim or any heavy material.

## 2. To Make Inner Cone.—

- (1). Measure 9 inches from the center (a) of an 18-inch square then cut out a circle of wire. Cut out section X about  $\frac{1}{8}$  of the circumference, leaving enough to make the edges of the cone fit the finished lower edge of the outer cone. Overlap edges, sew firmly.

## 3. To Complete Fly Trap.—

Place the inner cone 2 inside the outer cone 1, tack both edges to a wooden hoop or fasten to a wire.

Make a hole, the size of a lead pencil, up through the tip of the inner cone to form an opening and push the ends of the wire upward.

Note:—While working, wear gloves to protect the hands.

## To use.—

Elevate the cone slightly and place a shallow dish containing butter-milk, molasses, or other food which readily attracts flies, under the cone.

## To Empty Trap.—

Plunge the trap into boiling water; remove the small cone to empty the trap.

**Screens.**—All houses should be perfectly screened. It is an advantage to have the windows screened the full length as that makes it possible to open the windows both at the top and the bottom. All window screens should fit tightly so that there are no cracks around the edges. Door screens should close easily and completely. Often when the door has been closed there is a crack at the top, bottom or edge which will admit flies and other insects. Sometimes the door sags and a little adjustment is needed to correct this defect.

It is a simple and easy matter to repair a break or hole in the screen. Place a patch of screen wire over the hole and sew the patch on with a single strand of wire taken from the edge; or pull out some of the wires around all four sides of the patch so that the loose wire ends will be left sticking out from the solid screen of the patch. Bend these loose ends at a right angle to the patch, place patch over the hole to be repaired so that the bent ends will stick through the screen; bend the ends back on the opposite side of the screen so as to clamp the patch onto the screen.

**The following may be considered sanitary improvements:**

Repairing screens.

Installing new screens.

Installing fly traps.

Spreading manure to kill fly maggots.

Using poisons regularly to kill fly maggots.

Using fly poison.

Protecting food in homes, stores, hotels, and public eating places from flies and dust.

## V.—VENTILATION

“Bring the outdoors indoors”

“Men have been known to go for months without shelter, for weeks without food, and for days without water, but no one can live more than a few minutes without air.”

It is necessary for health that a sufficient supply of fresh, cool, freely moving air be provided at all times, and that is what is meant by ventilation. It includes not only air, but air of the right temperature, of the proper degree of moisture and air that is constantly being changed.

In summer it is an easy matter to have plenty of the right sort of air inside buildings, for windows and doors are kept open most or all of the 24 hours of each day. During the winter months a large percentage of people house themselves closely in bad air and it is during these months that the greatest number of deaths occur—January, February, and March usually being the worst. The winter air is a wonderful tonic, is invigorating and is conducive to health.

“Bad air is undoubtedly as great a cause of ill health as any other condition in our home, social and business life. Hot, dry air is irritating and excites unhealthy conditions of the nose and throat and lower air passages; it lessens the appetite; it produces paleness and weakness; it lowers resistance to disease”.—“An ounce of fresh air is worth a pound of cough syrup.”

The New York State Commission on Ventilation reports that a “well designed but simple arrangement of open window ventilation is the best system from the view point of comfort, health and efficiency”, so that every home, school and public building has within its means the best type of ventilating system. The open window will also permit the sunshine to enter directly without interference of the window glass, which cuts out the part of the sun’s rays most important for health and growth. A good plan is to have some of the windows open at the bottom and some at the top. The cool, fresh air can then enter at the bottom while the heated air will leave at the top.

**Moisture.**—The moisture in the air is called humidity. The amount of moisture in the air has a great influence on the comfort, health and efficiency of the persons living in it. One of the reasons that over-heated air is dangerous is because the heat dries up the moisture; the eyes, ears, nose, throat, and lungs of people in such dried air all suffer. A person is warmer in a room at 60° or 65° where the air has enough moisture, than in a room of 75° or 80° where the air is too dry.

It is not necessary to know the exact amount of moisture in the air; about 52% is considered healthful, but it is impossible to know how much there is without an instrument for recording it. The air in overheated buildings contains only about 25 to 30 per cent moisture.

The important thing is to provide some means of supplying moisture to the air at all times. "Provision should be made for the evaporation of at least a pint of moisture every hour for every member of the family," Dr. Kellogg says.

If a stove is used for heating, a pan of water may be kept on it so that evaporation may supply the required moisture; if a furnace is used, the water pan should always contain water so that the hot air rising into the house will be moisture laden to a healthful degree.

**Circulation of Air.**—Moving air will remove from dwellings any excess heat, smoke, odors, dust or other substance arising from human occupancy, will maintain an even surface (or skin) temperature of the bodies of the persons in them and will have a stimulating effect on such persons, making them more alert and efficient.

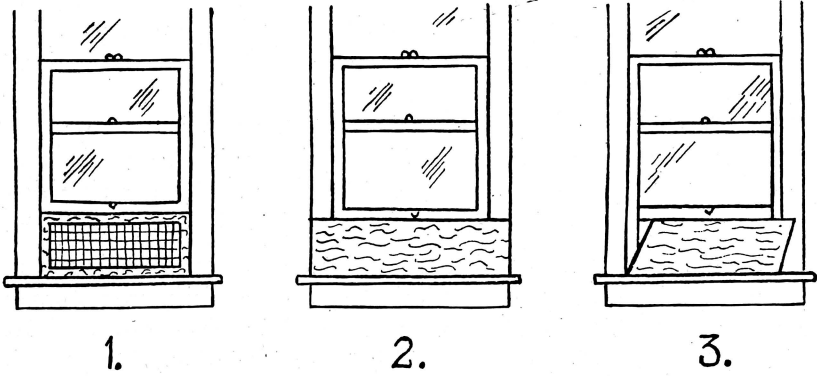
**Deep Breathing.**—Deep breathing exercises should be taken at least every night and morning, before open windows or, better still, out of doors. Correct posture is necessary for it is impossible to breathe properly unless the lungs have room to expand. "When shoulders are rounded and the chest contracted, the lungs are 'squeezed' and deep breathing is impossible. With head lifted, chest raised, spine straightened, ribs elevated, 'Breathe for health', through the nose, of course, about 6 or 8 deep, quiet, unhurried breaths a minute. Inhale while counting one, two three, four; hold five; exhale six, seven, eight nine; relax ten."

Such exercises repeated regularly will gradually result in an unconscious breathing habit which is deep and exhilarating.

**Ventilators.**—Ventilators or wind deflectors may be placed in the windows to prevent the wind blowing directly on the occupants of the room. Such wind deflectors may be purchased for a very small price or can easily be made of materials usually found in any home.

1. A simple wooden frame to which heavy cheese cloth has been tacked, may be made to fit under the open window. (See 1 in figure on next page)
2. A board may be fastened to the window casing and sill so that the window may be opened behind the board; the air entering will be forced toward the ceiling instead of blowing straight into the room. (See 2 in figure on next page)
3. A deflector set at an angle to the window sill is very useful, and may be made entirely out of wood, or may be a wooden frame

with glass insert, or the frame may be covered with fairly heavy cloth as shown in illustration. A frame covered with Cel-o-Glass would permit the important part of the sunshine to enter, as well as air. (See 3 in Figure Below)



**Temperature.**—Cool air is much more healthful and invigorating than hot air. A temperature of  $67^{\circ}$  to  $68^{\circ}$  promotes health and lowers the number of cases of colds, pneumonia, influenza, etc., yet the majority of American houses are kept at a temperature of  $75^{\circ}$  to  $80^{\circ}$  and over during the winter. Dr. John H. Kellogg says there are 1,000 deaths from too much heat in the winter to one death from cold.

A thermometer is one of the most important articles of ventilation equipment. Each home and school is urged to have a large thermometer placed in a prominent place. A "Healthometer" is a thermometer with  $68^{\circ}$  plainly marked as the health temperature.

It has been found that children in cool school rooms work better and learn much faster than in hot school rooms; that in factories the workers do much more work at  $68^{\circ}$  than at  $75^{\circ}$ , and that there are many more accidents at  $75^{\circ}$  than at  $65^{\circ}$ . Beware of the "fatal heat of winter". Keep the thermometer down to  $67^{\circ}$  or  $68^{\circ}$ .

"Of all sad words of tongue or pen,  
The saddest are these: "I've a cold again".

**The following may be considered sanitary improvements:**

Increasing the ventilation by:

Opening more windows.

Keeping the windows open more hours.

Improving the ventilation by:

Keeping the air moist.

Maintaining the right temperature.



Installing window ventilators or wind deflectors.  
Admitting more sunshine through open windows and doors.

## VI. MILK

### “Milk for Health and Happiness”

**Importance of Milk in the Diet.**—Milk is the most nearly complete single food and almost everybody, old as well as young, should “eat more milk”, because it contains such large quantities of the elements that are necessary for the formation and preservation of the teeth and bones and for the general development, growth, and health of all human beings. In some countries camel’s milk is used, in others the populations depend partially or entirely on the milk of goats, while in America cows are the chief source of the milk supply.

**Production of Clean Milk.**—Unfortunately, the germs of some serious diseases are able to live in milk and the persons using that milk may become sick of these diseases and may die. Many epidemics of typhoid fever have resulted from the typhoid germs getting into the milk supply. Diphtheria, scarlet fever, and septic sore throat are other diseases that may be carried in milk. The germs of all these diseases get into the milk after it leaves the cows and the persons who handle the milk are entirely responsible, for the cows do not have any of the above mentioned diseases.

“Clean milk is milk of good flavor from healthy cows, that is free from dirt and contains only a small number of bacteria, none of which are harmful.”

**Cows Must Be Healthy.**—Tuberculosis is a disease which cows do have and which will spread from the cows to the people who use the milk. Many people have been hopeless cripples, others hopelessly sick and untold numbers have died, because milk was used that came from cows with tuberculosis.

It is, therefore, necessary to know that the cows are healthy and that the whole process of getting the milk from the healthy cows to the persons using it, is one unbroken chain of cleanliness.

**Tuberculin Test for Cows.**—The cows can be tested by what is called the Tuberculin Test which proves whether or not the cows have tuberculosis. Every cow and every herd should be tuberculin tested once a year. The milk from cows that have tuberculosis should never be used and such cows should be removed from the herd, for tuberculosis is catching and will spread from cow to cow until most or all of them are affected. The stables and premises should be thoroughly disinfected.

A good veterinarian can make the tuberculin test. Ask your agricultural agent or write the Missouri College of Agriculture for full information about how to get such tests made for your cows.

**Clean Cows.**—If the milk is to be clean, the cows must be kept clean, for manure, loose hairs, and other foreign matter may drop into the pail during the milking and will carry bacteria with them.

The stables should be clean, well lighted, and well ventilated. A clean yard is a great help in keeping the cows from becoming soiled with mud and manure. The best method of preventing such dirt from getting into the milk is to have the cows clean at milking time. The udders, flanks, and underparts of the bodies of the cows should be carefully wiped with a clean damp cloth before the milking is done.

**Milk Handlers Must be Healthy.**—Great care must be taken to have only healthy persons handle milk or anything with which it will come in contact. The bacteria which cause milk borne diseases may drop into the milk, may be carried by flies, may get into the milk from contaminated milk vessels or may be introduced from the hands of the milker. Bacteria causing such diseases as typhoid fever, tuberculosis, and diphtheria can be carried by people who are apparently well, or who are well enough to be at work. Such persons should never take any part in the handling of milk.

After the cows are prepared for milking, each milker should wash his hands thoroughly with soap and water and put on a clean pair of overalls and a jumper or wear a suit, preferably white, which is used for no other purpose.

Milking should be done only with clean, dry hands. If the hands become soiled, they must be again washed. If a milking machine is used, it should be properly cleaned and sterilized.

**Milk Utensils Must be Clean.**—All utensils which come in contact with milk should be made of durable, smooth, non-absorbent material. Wooden vessels are undesirable. Badly battered or rusty utensils are objectionable as they are hard to clean.

Utensils must not only be thoroughly cleaned, but should be sterilized, either boiled or steamed. First, rinse the utensils in cold or lukewarm water, then wash thoroughly until clean with hot water and an alkali washing powder, using a stiff brush; avoid rags, greasy soaps and soap powders. When not in use, the milk vessels should be kept where air and sunshine can reach them but should be protected from dust and flies.

**Care of Milk.**—Milk should be taken from the stable immediately after milking and strained. Wire gauze strainers should be thoroughly clean and in good repair. Strainer cloths should be new or thoroughly boiled each time they are used.

Milk should be cooled immediately after milking, to a temperature below 50° F. and kept at or below that temperature. Cold water will

cool the milk faster than the air. Rapid cooling is the most satisfactory way of keeping milk sweet.

**Cooling Milk.**—Milk must be kept cold. The jars or cans may be covered and kept standing in cold running water. If running water is not available, it will be necessary to put fresh, cold water in the trough frequently. A refrigerator or refrigerated room in which to keep the milk is a safeguard and a great convenience.

“A home-made ice box may be easily and cheaply constructed as follows: Secure a wooden box deep enough to hold a large earthenware jar, allowing a few inches above and below the jar. Put a layer of sawdust or excelsior three inches deep in the bottom of the box. Get a piece of oilcloth or linoleum and sew the ends together to make a cylinder which will fit loosely around the jar. Galvanized pipe or other metal may be used around the jar, if preferred; place the jar inside the cylinder and stand in the center of the box. Pack sawdust or excelsior all about them. Tack several layers of newspapers to the cover of the box on the inside. The vessel containing the milk may be placed in the center of the jar and ice packed around it. Keep the milk container covered and keep the box cover in place. The jar may be removed to empty water from the melted ice.”

**Pasteurization.**—It is so easy for milk to become contaminated and there are so many diseases that may be carried in milk, that the wise and safe thing to do is to pasteurize it before use.

Pasteurization is recognized by health authorities as the most practical, economical, positive and best method of preventing the spread of disease through milk.

Pasteurization is very simple. The milk is heated to 142°F. and kept at that temperature for 30 minutes, then cooled quickly and kept cool, at 50°F. or colder.

In the home, pasteurization may be done by any of the following methods:

a. “Place the bottles of milk on a support in a kettle of cold water; the water should come up on the bottles as high as the level of the milk in the bottles. Cover, heat the water without allowing it to boil, and leave until small bubbles appear on the top of the milk. Remove the bottles and cool quickly, leaving the milk in the bottles until used.”

b. “Put a gallon of water on the stove in a kettle. When the water is boiling hard, remove the kettle from the stove to a table and allow it to stand uncovered for 10 minutes; then put the filled and loosely corked bottles into the water, cover the kettle, and allow it to stand covered for half an hour. At the end of this time remove the bottles, cool rapidly under running water, and keep cold.”

Where there is a large quantity of milk to be home pasteurized, the following procedure may be used:

“Place a tank which is to contain the water on a stove and then set the milk can, containing the milk to be pasteurized, in the tank on a couple of bricks or a metal support so that the milk can will not rest directly on the bottom of the water tank and the water may circulate around the bottom of the milk can. Fill the tank with water to the level of the milk. Heat the water and milk until the thermometer shows that the temperature of the milk is not less than 145° F. and not more than 150°. Then change the thermometer from the milk to the water and add cold water until the temperature of the water is also 145° to 150° F. Allow the milk to remain in the water at this temperature for thirty minutes. The process should be carried out in such a manner that the temperature of the milk at the end of the thirty minutes holding period will not be less than 142°F. After the milk has been held at the proper temperature for thirty minutes, it should be cooled by running cold water into the tank. Agitation of the milk during the heating and cooling periods will insure more uniform heating and more rapid cooling. The milk should be cooled to 50° or less and kept this cold until used.”

—Lewis Shere, and Harry F. Ferguson, Milk Sanitarians.

**The following may be considered sanitary improvements:**

Having cows tuberculin tested.

Keeping stables, barns, and barnyards clean.

Keeping long hairs clipped on flanks, udders, under parts of bodies of cows.

Washing flanks and udders of cows previous to each milking.

Washing and drying hands before milking.

Putting on clean clothes before milking.

Removing milk immediately, straining, cooling, and keeping it cool.

Properly cleaning and caring for milk pails, strainers, cloths, etc.

Pasteurizing milk.

## VII.—INSECTS AND VERMIN

Everyone considers mosquitoes, roaches, fleas, rats and mice dirty and an annoyance; many people know that they are very destructive to various kinds of property and that it costs enormous sums of money to feed them, but not so many people realize that they actually carry various kinds of diseases of which human beings sicken and great numbers die.

The removal of such pests would definitely promote the health of vast numbers of people and would prevent innumerable deaths. All of them can be controlled at much less expense of time, labor and money than it takes to continually combat them.

The easiest, least expensive and most thorough way to begin the removal of any animal or insect pest is to destroy its breeding place. In that way hordes can be destroyed all at once, while fully developed adults will have to be dealt with one at a time, or in relatively limited numbers.

A high degree of general cleanliness inside and outside of buildings will do much to rid the premises of such pests, as most of them live, breed, and thrive in filth, dirt, and rubbish heaps.

### Mosquitoes

Mosquitoes are a nuisance any time and any place and prevent peaceful sleep for many people. Often the pleasure of a cool summer evening in the yard is destroyed by the bites of mosquitoes and a great many people are sick with malaria all or part of every year. Some are so sick that they must stay in bed, some try to carry on their regular duties, and many die each year all because of mosquitoes. Only one kind of mosquitoes can carry malaria. One other kind carries yellow fever, but since we may not always recognize that kind and because all mosquitoes are a nuisance, the wise plan is to try to get rid of them all.

**Destroy the Breeding Places.**—Mosquitoes need water or damp places in which to breed and sometimes a very little water is sufficient. Therefore we want to get rid of such places or take care of them in such a way that they are unfit for the development of young mosquitoes.

The adult mosquito lays the eggs on the water, and when they hatch they must go through various stages of growth before they are mosquitoes with wings. During the first stage they are “wigglers”, live under the water and must come to the surface of the water for air. Without the air they will die. So one of the important ways to control mosquitoes is to put oil on the water in ponds, drainage ditches, etc. Very little oil is needed and it does not hurt the stock to drink it. Crude oil is usually used diluted with an equal amount of kerosene for the summer, but with three parts of kerosene to one part of crude oil for winter use. Sometimes the oil is put in a tightly covered can or pail which has a very small hole in the bottom through which a wick has been drawn. The oil escapes slowly from the end of the wick and spreads over the surface of the water in a thin film. Sometimes pieces of waste are soaked in the oil and tied to sinkers. The oil is drawn out of the waste and spreads over the water in the vicinity of the sinker.

Drainage of the pools, puddles, etc., is of prime importance. Weeds and other vegetable growths should be removed from pools.

When the breeding of mosquitoes is taking place in an artificial lily pond, a bird bath, or other ornamental receptacle for water, a good

means of prevention is to stock the pool with such fish as gold-fish, trout, and minnows that will feed on the wigglers.

Troughs used for watering the stock should be emptied frequently and scrubbed out during the mosquito breeding season.

**Control of Small Breeding Places.**—Mosquitoes like to breed near human habitations and will often be found in very small puddles near houses, sometimes in a hoof print, in a rut, in the road, in a sagging gutter pipe on a roof, in a tub or barrel holding a little water or even a tin can which has been thrown out. Tin cans can be burned in a hot fire or buried, but, if it is necessary to allow them to accumulate for a time, it is well to punch holes in the bottoms at the time of opening to prevent their holding water. Puddles should be drained and barrels, tubs, etc. kept entirely empty, or the water in them oiled. Damp cellars and very thick shrubbery near the house will increase the danger and annoyance from mosquitoes. There should never be enough shrubbery or trees to keep the premises damp. "Let a little sunshine in" to dry out the dampness of cellars and under the shrubs and vines.

**Screens.**—Buildings should be completely and thoroughly screened to prevent the entrance of mosquitoes and other insects.

### Roaches

"Like all evil-doers, cockroaches like the dark." They are called "night feeders" because they hide in cracks and holes during the day and come out at night to rob us of health by spreading their filth and their diseases everywhere they go. They travel fast and furiously over and into any kind of available food. They will feed greedily of the worst filth and pass quickly to foods that humans will eat; any food that is exposed will be visited by them.

Certain diseases are carried in the intestinal canals of roaches, and some forty species of animal parasites, of which three round worms and possibly a tape worm are capable of infecting human beings. Roaches are called the "grandfathers" of insects because while most insects live very short lives, they live to be three or more years old unless destroyed they breed in enormous numbers and mature young. It requires long, continued, and persistent efforts to rid premises that have once become infested with roaches. There is a characteristic and disagreeable odor readily noticeable in roach-infested places. Beware of the first roach; despise him and destroy him at once.

**Prevention.**—Cleanliness is one of the most important preventive measures. Open food, even crumbs, will attract roaches. It is necessary to keep kitchens, tables, floors, and pantry shelves free from crumbs and scraps of food. Left-overs should be carefully covered.

**Eradication.**—To rid the premises of roaches, thoroughly scrub all shelves, tables, sinks, floors, and woodwork with soap, water and a brush (washing soda may be used in the water); fill all cracks and crevices in shelves and woodwork; avoid leaving dishes unwashed; carefully remove all crumbs and scraps of food; use one of the following remedies:

1. Mix 1 part of plaster of Paris and 3 parts of flour.
2. Make a paste of 1 part of sweetened flour and 2 parts of phosphorus, and water.
3. Use powdered borax or powdered sodium fluoride. Scatter freely in cracks and crevices, in drawers and on pantry shelves and other hiding places. Avoid contaminating the food or drinking water with the powders. It will be necessary to continue the treatment persistently for some time.
4. If the infestation is severe, it may be necessary to resort to fumigation. Stuff all cracks around doors and windows with paper or cloth and burn Pyrethrum powder.

### Fleas

Fleas, like other pests, like dirty places; they are often carried around in the hair or fur of animals and the eggs are dropped just anywhere, often on the cat's fur or on the dog's hair. Of course, these eggs may fall off anywhere the cat or dog goes and when the eggs hatch the larvae or wigglers may crawl under the edge of a dusty carpet or into a crack in the floor; and when they have passed through that stage and the next one, they come out full grown fleas.

**Prevention.**—To prevent having fleas in the house, it will be necessary to keep the house scrupulously clean; the premises outside free of fleas; to keep floor cracks free from dust, and to keep dogs and other animals outside the house. Use an oil mop for cleaning the floors. Barns and pig-pens can be kept free with very little effort. Salt used once or twice a year is usually sufficient. Sprinkle the salt freely on the floors of the stables and other buildings; in pig pens sprinkle a little water on the salt, just enough to make it slightly moist so it will spread into the cracks and crevices. If the salt is used on a rainy day, enough moisture will probably be absorbed from the atmosphere. It is well to sweep the floors before the salt is applied.

If the dogs and cats have fleas on their bodies, they should be bathed every two days in the following solution until they are entirely free:

Ninety-eight parts of soapy water and 2 parts of creolin. Spray the cat's and dog's beds with oil, either kerosene, benzine or crude oil.

### Rats

A rat is one of the most expensive visitors one can entertain, and yet there are more rats than people in the United States. It is estimated

that there is one rat for every person living in a city and ten for every person living in the country; that one rat will eat about 50 pounds of grain in a year, and will destroy very much more; will eat many chickens and eggs, and that each year rats destroy \$200,000,000 worth of property in the United States.

What is still worse, they carry diseases which make people die and there have been many hundreds of thousands of deaths which are directly traceable to rats. They carry many parasites in their intestines, one of which is a tapeworm which people sometimes get. There is one disease which hogs get from rats and which people sometimes get from eating pork. The rat flea is the carrier of the Bubonic Plague. In addition, rats are very filthy, they run around in all kinds of dirt and will then take their dirty feet and bodies and tails into and through the food of human beings, depositing their dirt and their diseases wherever they go.

Most of the rats we have in the United States are the kind that prefer to live and raise their families in excavations or little caves, which are often found under barns and sheds. They frequently burrow two feet or more to get under a building. They eat anything they can find and while they sometimes move about in the day time, they really see better in the dark, so do most of their hunting and feeding at night. They multiply rapidly and grow up very fast. Under favorable circumstances it is possible for one pair of rats to have 400 to 600 children and grandchildren in 15 to 18 months.

**Prevention.**—The best way to prevent having rats is to “build them out” which means that all out-buildings will be raised off the ground in such a way that a rat cannot climb up the posts or gnaw through boarding. If a building is flat on the ground, the rats are furnished an ideal place to dig their cave homes, and to live and grow. If the buildings are raised, the rats will not find protection for their homes. No boxes or other material should be put under the buildings. A wire net may be stretched around to prevent this. The grounds around the building should not provide dwelling place for the rats, but should be kept clean and free of rubbish. No garbage should be left around.

**Eradication.**—

a. Gas—To rid the premises of rats, the best known method is to “gas” them. There is a powder called Calcium Cyanide which forms a gas when the ground moisture mixes with it. This gas is heavier than air and settles down in low places. To kill the rats, the powder is pumped into the openings of the rat runs, the ground air mixes with the powder, the heavy gas goes on into the caves, and the rats are killed. Any person using the powder should stand up and should have the wind blowing away from him, never toward him. This powder can be purchased from a drug store under its own name or a trade name “Cyanogas”



A simple pump or duster for forcing the dust into the nest may be purchased.

b. **Poisons**—Poisons are sometimes mixed with food and placed where the rats can find them easily, but such poisons are not always eaten. Rats are not at all particular about what they eat, they will eat what they come to first, however filthy, instead of following the very attractive smell of good food. The following poisons may be used:

1. 1 part phosphorus to 10 parts cheese, meal or glucose.
2. 1 part plaster of Paris to 2 parts flour.
3. 1 part Barium Carbonate to 4 parts bait.

Bait used may be meats, vegetables, or cereals. Cereals should be made into a mush. Meats and vegetables should be ground. The barium must be mixed with the bait and all baits must be kept fresh.

Place this bait where the rats will find it but where the other animals and poultry cannot get it because they may become poisoned by it.

c. **Traps**.—Traps may be used, though it is difficult to trap rats for the same reason that it is difficult to poison them, and also because they are very suspicious and investigate everything with their beady little eyes before they try a new thing. If the trap is well concealed and the rat is hungry, he will go into it and sometimes large numbers have been caught. If the trapping is to be successful, all other food must be removed, the traps should be placed where the rats have been accustomed to feed, and should be more or less concealed.

### Mice

No home should house mice. They are destructive and dirty and careless in their habits. They run around in all kinds of filth, over and into any exposed food; they gnaw their way through even thick wooden partitions. They raise families that grow up very fast and it is necessary to get rid of every one or the evil will increase.

Mice are quite readily trapped as they are attracted by the smell of certain foods which they like better than others. Cooked bacon is a good bait.

**Poisons**.—It is not hard to destroy mice with poisons mixed with their favorite foods, but they often go back into their holes in the walls or under the floors to die, producing a bad odor which lasts several days.

### Ants

Ants frequently become a great nuisance. It is almost impossible to get rid of them by poisoning the ones in the house. It is possible to get rid of the whole nest by using the following mixture:

Equal parts of Tartar Emetic (a cheap white powder) and sugar.

Mix with a little water to make a paste. The ants will not die where the mixture is placed, but each ant carries a little home to the queen and when she dies the whole nest of ants will move.

**The following may be considered sanitary improvements:**

Instituting measures for control of mosquitoes, rats, mice, roaches, fleas, or ants, by:

Clean-up.

Destroying breeding places by:

Draining puddles.

Emptying or oiling all water containers, or periodically cleaning such containers as water troughs.

Making holes in bottom of all tin cans not immediately burned or buried.

Bathing flea infested cats and dogs.

Oiling beds of cats and dogs.

Destroying any of the above named pests.

### DEMONSTRATIONS

So far as possible, all club members should be instructed in the regular club meetings by the demonstration method. As a usual thing, one or more members of each club can begin doing before the club useful phases of the work program soon after the processes have been demonstrated by the club leader.

Demonstrations should be given throughout the club year when they are of most value to the members. After two or three months of practical experience in club work, all mature members should be able to give public team demonstrations.

#### **Suggested subjects for Team Demonstrations.—**

Repairing screens

Making fly trap

Making window ventilators

Making wind deflectors

Proper construction of well and curbing, using models.

Making simple ice box

Home pasteurization of milk.

Other demonstrations that conform to the subject matter in this book, may be given.

**Suggested Outline of a Demonstration on Making a Fly Trap**

**Explanation.**—This demonstration is arranged for a team of two members from the same club, designated as “A” and “B”.

**Equipment.**— Table, scissors, tape line or yard stick, wire screening, needles, cloth strips, wood strips, material for bait, and completed fly trap. It is suggested that each demonstrator wear a 4-H club cap made up in the national club colors of green and white. In as far as practicable, members should arrange their own equipment and stage and should clean up after the demonstration.

**Time.**— Fifteen to thirty minutes.

**Procedure**

<p style="text-align: center;"><b>A Speaks—</b></p> <p>A leads team in giving the 4-H club pledge; tells the club and county the team represents; introduces team-mate and self. Formally states what is to be demonstrated. Makes outer cone of fly trap and explains each step.</p>	<p style="text-align: center;"><b>B Assists—</b></p> <p>B joins in giving pledge, and then stands at attention until introduced.</p> <p>Gets material in order ready for use, and assists with work.</p>
<p style="text-align: center;"><b>A Assists—</b></p> <p>Aids with materials and work.</p>	<p style="text-align: center;"><b>B Speaks—</b></p> <p>Makes inner cone and completes fly trap. Explains each step during the process of making.</p>
<p style="text-align: center;"><b>A Speaks—</b></p> <p>Summarizes the points demonstrated in the making of the fly trap. Asks for questions and he or team-mate answers them. Concludes the demonstration.</p>	<p style="text-align: center;"><b>B Assists—</b></p> <p>Gathers up all material in orderly way.</p> <p>May assist in answering questions</p>

**GENERAL REFERENCES**

- Missouri College of Agriculture, Extension Service, Columbia, Missouri, Disposal of Household Wastes, Circ. 203.  
 Blueprints of Septic Tanks.  
 General information may be secured on water systems for farm houses and on traps for larvae of flies.  
 Missouri State Board of Health, Jefferson City, Missouri.  
 “Health Manual for Missouri.”  
 Bulletin No. 20—“Sanitary Privies.”

**MY HEALTH HOUSE**

I am building my Health House day by day  
As I eat and sleep and work and play.  
My food is the lumber that I use,  
And the best materials I must choose,  
Such as milk and vegetables, fruit and eggs,  
While fresh air furnishes nails and pegs;  
And Sleep, the carpenter, takes them all  
To silently fashion each room and hall.

If I build aright, when I am grown  
I shall have a house I am proud to own.  
No need for breakdown and repairs,  
For good material wears and wears.  
For I'm building my Health House day by day  
As I eat and sleep and work and play.  
Some build for Happiness, some for Wealth  
But I shall find both in my House of Health.

—Howell