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Loss From Foul Brood and Poor Management

BY WESLEY FOSTER

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LOSS FROM FOUL BROOD AND POOR MANAGEMENT.

WESLEY FOSTER, STATE INSPECTOR.

This paper is intended to aid the bee-keeper in the detection and cure of foul brood, and in the essential principles of bee management. The loss to the bee-keepers of Colorado due to the actual death of colonies from foul brood is conservatively estimated at \$50,000 annually. The loss in crop totals as much, and the discouragement to the bee-keeper often causes him to give up the business.

The disease is prevalent in almost every county in Colorado where bees are kept, so the importance of a thorough understanding of its nature and the treatment for cure is necessary to save the industry from destruction in widely extended districts.

Probably the next greatest loss to the bee industry is from poor management, caused by ignorance of the bees' requirements and fear of stings. Disease would not be so widespread if bee management had not been so greatly neglected. The few suggestions here offered will help in avoiding the grossest errors, but will not supplant the need of every bee-keeper for a good bee book, supplemented by actual experience in apiary work.

THE SYMPTOMS OF FOUL BROOD.

The bees of an affected colony do not work with the vigor common to a normal hive, and do not readily clean out the infected larvæ. The larvæ, on first becoming diseased, turn from a white to a light chocolate color, and, as decay progresses, to a dark coffee color, the bodies settling into a formless mass on the lower side of the cells. (See Figs. 3 and 4.) Most of the larvæ die at about the time of the capping of the cells, although some die before sealing; and these are left exposed to view. The cappings of the sealed cells become sunken and darker in color than those of the healthy brood. (See Figs. 1 and 2.) The bees tear small holes in the caps of many of these affected cells. If there is any considerable quantity of diseased brood in the various stages of decay, a very offensive odor is given off, especially on warm days, the odor bearing some resemblance to that of an old glue pot. This odor may be detected several feet from a hive which is far advanced with the disease, and may be easily noticed upon removing the cover, if the disease has made much headway. However, when breeding has largely ceased in the fall or late summer, the dried-down scales of the dead larvæ will be all that will appear (see Fig. 3), and most of these may be covered with the honey in the cells. A characteristic peculiar to this disease is the ropiness of the decaying brood, which may be demonstrated by inserting a straw into the mass and slowly withdrawing it; if the mass adheres, stringing out for half an inch or more, it is, no doubt, American foul brood. (See Fig. 5.)

THE TREATMENT OF FOUL BROOD.

A cure is usually effected by removing all infected material from the bees, causing them to construct new combs and store uncontaminated honey in place of the old. This is done by the shaking treatment. The best time to treat diseased colonies is when there is a honey flow, so that other bees will not be inclined to rob. If this is not possible, a tent of mosquito netting may be placed over the hive during treatment. The work may be done in the evening, about sundown, when there will be slight danger of robbing.

All preparations should be made before shaking, so that no honey will be exposed to robbers. Provide a clean, new hive with frames containing starters not over one inch wide. An extra hive without frames will be needed in which to place the old combs after shaking off the bees. The cover must be kept on this hive, except when putting in the combs. Now, with veil in place, smoker and hive tool in hand, you are ready to

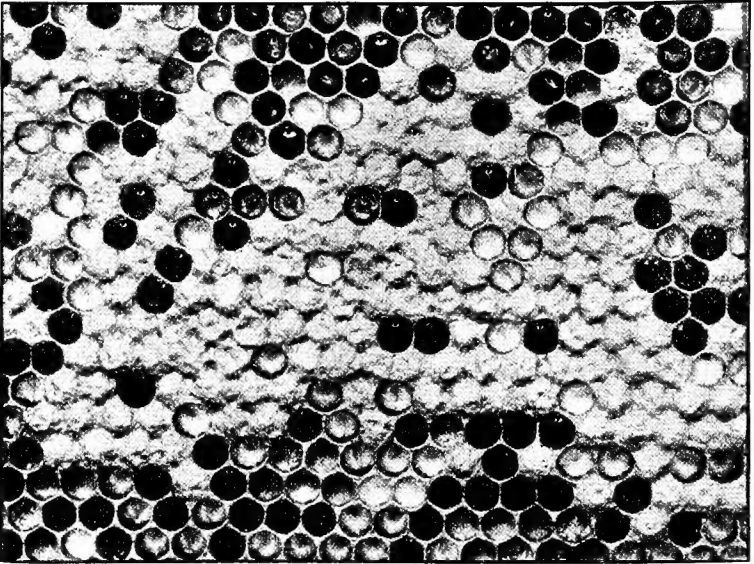


Fig. 1.—Normal healthy brood, showing the plump, bulging surface of sealed brood, and the unsealed larvae of the unsealed cells.

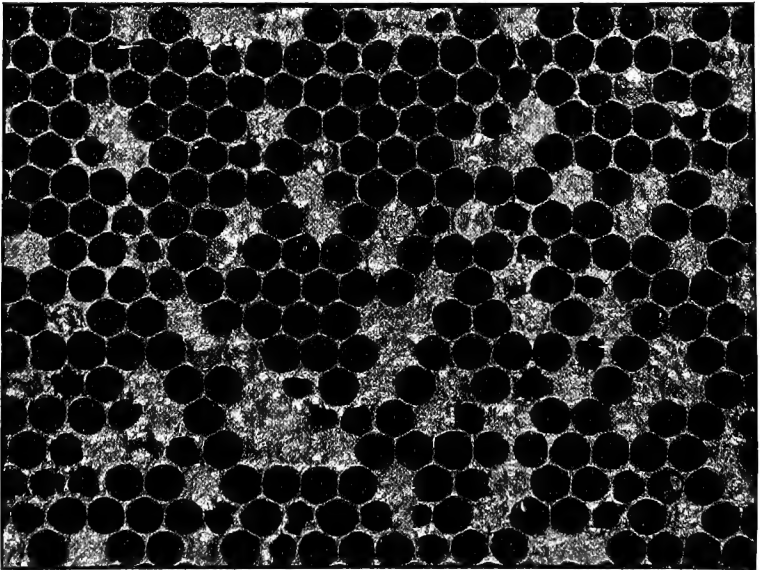


Fig. 2.—A comb affected with American foul brood, showing the flat and concave surface of the sealed cells, the broken cappings and the discolored comb in comparison with Fig. 1. This comb had a very offensive odor, although the dead larvae had dried down to a scale.

begin. Move the hive to be treated back several feet and to one side, placing the new hive with startered frames in its place. Lay a sheet of newspaper in front of the entrance, to shake the bees upon.

Open the hive, and shake the bees off the frames upon the newspaper in front of the new hive. Place each frame as shaken in the empty hive provided, and keep this hive covered. The remaining bees in the old hive are now to be shaken out; when the treatment will be complete. Carry the old combs and hive away, and store them where no bees can get at the honey. When the bees have all gone into the new hive, a piece of perforated-zinc queen-excluder may be tacked over the entrance to keep the colony from absconding, as the queen cannot pass through the perforations in the zinc, and the bees will not leave the hive without her. The newspaper must now be burned, as it is probably daubed with some of the diseased honey. Great care should be used so that no honey is left around on hives, tools or clothing, where other bees may get the diseased honey. Wash everything clean with water, and cover with dirt any drops of honey on the ground. If no honey is being gathered from the flowers, the bees will have to be fed. In the fall the bees may have to be given full combs of honey from healthy colonies in order to winter them.

If but one or two colonies are found diseased, the old combs should be burned, as it does not pay to save them. If there is considerable, however, the brood may be saved by stacking it in upper stories over other diseased colonies till the healthy brood has hatched; then store the combs away, secure from all bees, till the combs can be rendered and the wax and honey saved. The honey may be used for feeding back to the bees after boiling it in a closed vessel for thirty minutes. Sufficient water should be added so that the honey will not burn. Honey from diseased colonies must not be sold without a permit from the state entomologist.

CLEANING THE HIVE.

The hive bodies, covers and bottoms may be rendered safe for use again by burning out with a gasoline blue-flame torch, or by scraping all bits of wax and propolis from the interior, and thoroughly washing all honey off the inside and outside of the hives. It is not necessary to burn out with straw or coal oil, if the cleaning of the hive is done very thoroughly. The frames may be rendered safe by boiling, but they warp badly and it does not pay to save them.

VIGOR OF A SHAKEN COLONY.

If the diseased colonies are of good strength and are shaken early in the honey flow, the loss will not be great, as the bees work vigorously, like a new swarm.

SHAKING IN THE FALL.

Diseased colonies may be shaken in the fall, and after three days given combs of honey upon which to winter. If the diseased colonies are weak, several may be united.

RAPIDITY OF INFECTION.

Bees are such far-ranging insects, always in search for any sweet thing, that a bit of unguarded honey is quickly carried to the hive of the bee discovering the booty. A honey bottle thrown out with a trifle of honey still remaining is sufficient to spread contagion, if the honey came from a diseased colony.

Colonies weakened by disease are the first to be robbed by the bees in the neighborhood, and a colony dying of foul brood during the winter will be robbed of its honey when the first warm days of spring arrive. The infection may be spread over a large district in a few weeks from a few weakened, diseased colonies. The germs are carried in the honey. The disease is only given to a healthy colony through honey from a diseased one.

It is urged upon every owner of bees to learn how to do his own inspecting. Do not wait for the inspector. It is impossible for him to

get to every apiary at a time when the most favorable treatment can be given. The ability acquired in learning to successfully treat foul brood will make other problems of bee management easy of solution.

It is a mistaken idea that it does not pay to treat one's own bees unless all the neighbors do the same with theirs. The bee-keeper who keeps his own apiary clean by treating foul brood whenever found will harvest the most paying crops year after year. Foul brood is not a terror to the man who has experience in treating it.

The following is a list of the county bee inspectors in Colorado:

- Adams County—Walter Martin, Brighton.
- Arapahoe County—F. W. Ostrander, Littleton.
- Bent County—D. S. Jenkins, Las Animas.
- Boulder County—W. C. Dyer, Boulder.
- Crowley County—Harry Ingalls, Ordway.
- Delta County—R. W. Ensley, Read.
- Denver County—L. F. Jouno, Denver.
- Fremont County—F. W. Brainard, Canon City.
- Garfield County—O. V. Coulter, Rifle.
- Larimer County—R. L. Pennell, Fort Collins.
- Mesa County—William Harkleroad, Grand Junction.
- Montezuma County—R. W. Calkins, Cortez.
- Montrose County—Robert E. Foster, Olathe.
- Otero County—V. O. W. Hopper, Rocky Ford.
- Prowers County—D. C. Polhemus, Lamar.
- Weld County—Charles Adams, Greeley.

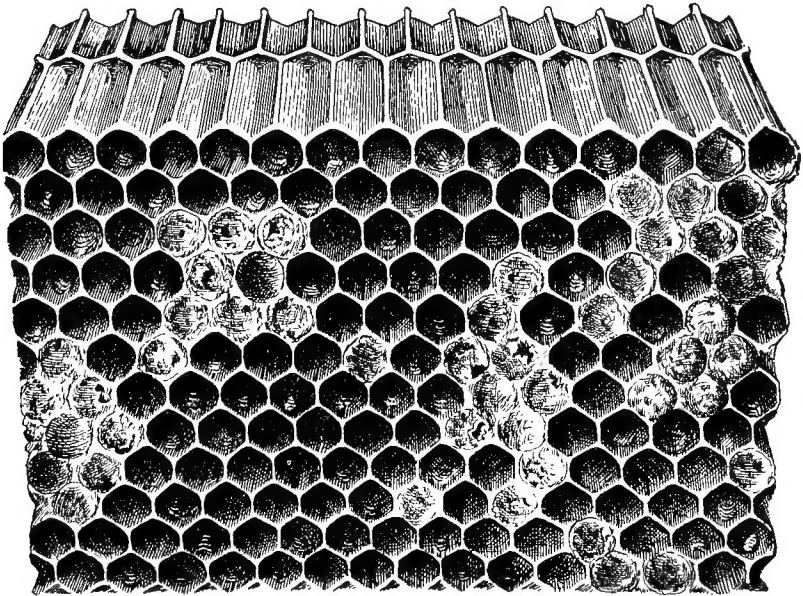


Fig. 3.—American foul-brood comb, showing irregular patches of sunken coverings and scales. The position of the comb indicates the best way to view the scales.—Courtesy Department of Agriculture, Washington, D. C.

PREVENTIVE MEASURES.

It is easier to use precautions than to combat the disease after it has entered a district. If the following measures were followed, the disease would be less likely to spread:

1. Do not feed bees honey the source of which you do not know.
2. Transfer all queens received through the mail to clean cages, and destroy the old ones, candy and all, including the bees accompanying the queens.
3. Do not move colonies from one place to another without thorough inspection. It is against the law, if disease exists in the vicinity, unless a permit is issued from the state entomologist.
4. Contract the entrance to all weak hives, and inspect all colonies not doing well, as soon as found.
5. The purchase of second-hand combs and supplies is dangerous, unless they are known to come from healthy districts.
6. Do not put honey from diseased colonies on the market.

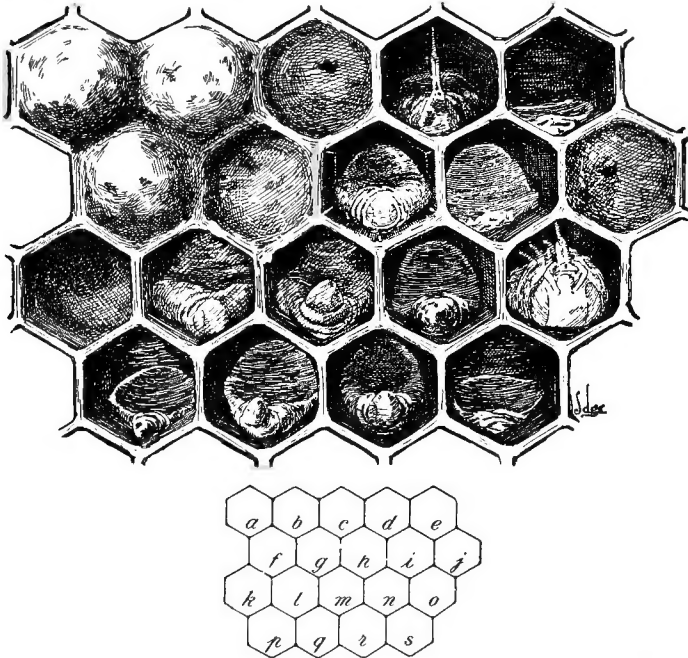


Fig. 4.—American foul brood; a, b, f, normal sealed cells, c, j, sunken cappings, showing perforations; g, sunken capping not perforated; h, l, m, n, q, r, larvae affected by disease; e, i, p, s, scales formed from dried-down larvae; d, o, pupae affected by disease. Three times natural size.—For the use of this cut courtesy is due the Department of Agriculture, Washington, D. C.

American foul brood is known to exist in the following counties in this state:

Adams,
Arapahoe,
Bent,
Boulder,
Delta,
Denver,
Fremont,

Garfield,
Douglas,
Jefferson,
La Plata,
Larimer,
Mesa,
Montezuma,

Montrose,
Otero,
Prowers,
Pueblo,
Weld.

Foul brood probably exists in several other counties, but definite knowledge is lacking.

SUGGESTIONS ON BEE MANAGEMENT.

Every farmer, fruit-grower and gardener could profitably keep a few colonies of bees, if cared for in an intelligent way. The great trouble is in getting started right.

BUYING BEES.

Buy only standard movable-comb hives, preferably the ten-frame size. Select colonies of good strength, straight combs, and abundant stores. Be sure that foul brood is not in the apiary by having it inspected before purchasing. It is advisable to have but one size of hive; then everything will be uniform and interchangeable.

THE BEE SUIT.

Most of the discouragement causing beginners to give up is from getting severely stung. This is not necessary, as everyone should have a good bee hat, a pair of gauntlet gloves, a smoker, and a hive tool. The gloves can be improved by cutting off the thumb and first finger half-length.

MOVING BEES.

Bees can be moved safely, except in very cold weather. The cover should be removed, and a good burlap sack tacked over the hive. The entrance may be closed with a piece of screen wire. The bottom board

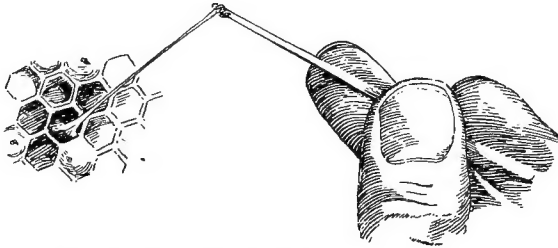


Fig. 5.—The ropiness of American foul brood.

should be fastened to the hive body firmly at each corner with a hive staple. Nails may be used, but are not so convenient. Load hives in the wagon with the frames pointing from side to side. This will largely prevent the swinging of the frames. Do not load or unload bees while the horses are hitched to the wagon, and always keep the hives covered with a wagon sheet when hauling, in case any bees should get out.

LOCATION OF THE HIVES.

Place the hives in a well-protected spot, and where they will be in the shade during the heat of the day. The hives should be close to the house for safety from thieves, and where stock cannot knock off covers or tip over hives.

Do not set hives closer than six feet, unless absolutely necessary.

PUTTING FOUNDATION IN SECTIONS AND FRAMES.

It is useless to use the movable-comb hive unless the combs are movable. It is useless to keep bees unless they are in movable-comb hives. You cannot have straight combs without using comb foundation, and having that foundation securely fastened in each frame. The Hoffman frame, which is universally used in Colorado, is provided with a wooden wedge to be crowded into a groove beside the groove in which the comb foundation is inserted. Be sure that this wedge holds the foundation in securely. Never attempt to use anything but *Brood Foundation* in brood frames and *Surplus Foundation* in the pound honey boxes. Surplus foundation cannot be made to hold in brood frames by using the wedge sup-

plied. Wired frames, while not necessary, are more satisfactory both for comb and extracted honey production. The different machines on the market for fastening the foundation in pound honey boxes are all satisfactory if used properly. The melted-wax plan is the best for sections. Be sure that there is a slight ridge of wax from one end of the starter to the other where the wood and starter join.

WHEN TO OPEN A HIVE OF BEES.

A knowledge of bee temperament is necessary to the bee-keeper if he would avoid severe stinging. Hives should not be opened except when the weather is warm and the bees are flying. The most favorable time is between ten in the morning and three in the afternoon.

Bees are inclined to be cross

After a shower;

When no honey is being gathered;

Early in the morning;

Late in the afternoon;

When the weather is cool;

If robbing has been allowed in the apiary;

When waxy or propolized rags are used in the smoker;

When the bee-keeper's breath is blown directly on the bees;

When the hive is bumped or jarred;

When some are crushed in the hive, causing the crushed bees to emit poison;

When quick, irritating motions are made.

HAVE A BEE DAY.

Bees do not require a great deal of care, but what they do require they must have. Have one day each week during the season as the bee day. If you have but a few colonies, it may not take over a half-hour; but give them the attention they require each week. On one of the first warm days in the spring go through each hive and make a record of the strength of the colony, amount of honey and brood, and condition of queen. If short of stores, feed either syrup or give frames of honey from some other hive with honey to spare. Unite weak or queenless colonies with strong ones by placing the weak or queenless colony on top with a newspaper between. The bees gnaw holes in the paper and come together gradually without fighting. When the bees have gone below from the upper story, it should be removed.

HOW TO OPEN A HIVE.

Light the smoker, using burlap rags, and when the fuel is burning briskly close the cover of the smoker; put on your bee hat and gloves, and, with smoker and hive tool in hand, you are ready to begin. Give a few puffs at the entrance, lift the cover, and give a few puffs over the frames; remove the division board, or one of the frames easiest to pull out. Before pulling out a frame, pry the others on each side over, so that few, if any, bees will be crushed in removing the frame. Always pull the frames out slowly, as quick movements irritate the bees, and crush some on the ends and sides of the combs. Keep the smoker close at hand for use in case any bees become angry.

CLIPPING QUEENS.

If queens are to be clipped, the work can most easily be done in April or May, when the colonies are not populous. It is difficult to find queens when the hives are running over with bees. The hives should be opened carefully, and as little smoke used as possible. The queen will generally be found on the three or four center frames. Lift her from the comb by clasping the wings between the thumb and first finger of the right hand, while holding the frame in the left hand. Now set down the frame and clasp the queen's legs with the left hand, and clip off two-thirds of both

wings on one side with a pair of embroidery scissors. Handle the queen just as carefully as possible, and be sure she does not get a leg in the way when clipping the wings.

SWARMING.

The swarming season often begins in May if fruit bloom yields abundant nectar. June, however, is the swarming month, so that extra hives with started frames should be in readiness. Clipping the queen's wings will save climbing trees after swarms, and the occasional loss of one when no one is around to hive it. If a swarm issues, and the queen is clipped, she may be found within a few feet of the hive entrance, and can be placed in a wire cage. The hive is then moved to a new stand, and a new hive put on the old stand. The caged queen is then placed in the hive until the swarm returns, when she may be released.

PUTTING ON SUPERS.

The supers holding the pound-section honey boxes should be put on about the time white cappings appear along the top bars of the frames. A few sections of empty comb, called "baits," entice the bees to begin work in the supers much sooner than would ordinarily be the case. At this time of year give plenty of ventilation, if the bees are inclined to cluster on the outside of the hive, by raising the front off the bottom board and placing a block an inch thick under the hive.

When the super is half or two-thirds finished, place an empty super on top. By the time the second super is well started the first one is probably finished and should be removed.

TAKING OFF HONEY.

Bees can be driven from supers of finished honey very readily during the honey flow. Begin smoking as soon as the cover is lifted, and keep smoking till most of the bees have gone below. Remove the super at once before the bees have an opportunity to run back into the super. The nozzle of the smoker should not be held too close to the honey, as there is danger of tainting the honey from the smoke.

Another method of taking off honey is to place a bee escape board under the supers of comb honey, which the bees will leave through the escape. The escape must be watched, as it is in danger of becoming clogged with dirt or dead bees.

