

The bee benefits the farmer in two ways. Most important, though this has been realized only fairly recently, is in pollinating his crops. Second—and this has been recognized throughout history—is in providing honey.

18. Bees—The Beneficial Insect

F. B. PADDOCK, *Apiarist*

THE HONEYBEE WAS PROBABLY INTRODUCED INTO THE United States at two places—by the English in New England, and by the Spaniards on the coast of Florida. The spread of bees through the mild climate of the South was much more rapid than from New England. The bees moved across the nation a little in advance of the white settlers, so that the Indians called them the “white man’s fly” and knew that when they came, the white man was not far behind. By 1797 honeybees had reached the Missouri River, for it is recorded that honey was cut out of hollow trees then by both Indians and whites.

Iowa honey was highly prized by settlers farther east. The great profusion of wild flowers furnished “pasture” for swarms of honeybees that lived in tall trees along the streams. Expeditions were made into the state to hunt bee trees. If a bee tree was found to be marked, it was as a matter of honor left unmolested as belonging to a prior expedition.

Accompanied by an Indian guide, John Huff came up the Skunk River in 1835 and camped a short distance above the present location of Rome, in Henry County. The region was still occupied by the Sac and Fox Indians. Eighty gallons of honey were collected and put into barrels made at the camp. In the fall the expedition returned by canoe to Illinois where the honey was sold at fifty cents a gallon. Later a camp was set up two miles northeast of Fairfield.

Bees figured prominently in an early boundary dispute between Iowa and Missouri. The disputed section was known to have many bee trees in it. One summer evening a Missouri farmer hitched his oxen and invaded the “no man’s land.” During the night he chopped down three bee trees and pulled them back across the line into Missouri. Eventually troops were ordered out on both sides, while Mis-

sourians taunted the Iowans by yelling that the honey had been very tasty! The Supreme Court ruled in 1849 that the bee-tree strip belonged to Iowa.

Actual beekeeping began about 1850 when settlers came in from regions where tame bees were well known. After the Civil War, beekeeping spread rapidly. Despite the lack of any transportation faster than horse and wagon, beekeepers operated rather large numbers of colonies. Tama, Bremer, and Benton counties reported beekeepers operating from 104 to 155 colonies apiece, while a man at Oskaloosa was said to be operating 260 colonies in 1874, and in 1878 one man was operating 500 colonies within the city limits of Burlington. Some of the territory which today is considered of little value for honey production was at that time quite satisfactory. One report from Madison County indicated a two thousand-pound yield from 25 colonies. Today a yield of fifty pounds from this area would be considered excellent.

By actual count, twenty-six varieties of wild flowers on the western prairie were a source of honey in 1867. None of them, however, was visited by the wild bee but only by the Italian bee. The basswood tree was placed at the head of the honey plants. Although the tree bloomed but a short period, it had a wonderful honey flow and apparently was so common that bees could store a considerable surplus. The second plant of importance was white Dutch clover.

Movable frames were just being introduced, to replace the home-made dome-shaped beehives of twisted straw. Hives were small, with only one story of eight combs. Only one hive body was used as brood chamber so that the number of colonies increased rapidly. As a result, colonies soon reached their maximum size of bee population. Swarming resulted, and bees established new units for the beekeepers or found a new home in a hollow tree.

Although the small hive meant larger numbers during the season and a sizable honey crop, it did not provide for wintering. Colonies occupied space which should have been devoted to honey storage for the winter. Fall flow was uncertain.

In winter, hives were moved into cellars or caves, where the temperature of 42 to 45 degrees required by the bee could be maintained. Severe winters meant long confinement. This in turn meant that the inadequate food supplies were soon exhausted, and bees starved to death. Even during summer many bees starved to death because of practices followed.

Little attention was given to the matter of improving the bees

themselves. Since wild bees greatly outnumbered tame bees, stock deteriorated. The first Italian bee, which today is the chief commercial bee, crossed the Mississippi River into Iowa in the fall of 1860. Edward Kretschmer, of Coburg, claims to have owned the first Italian bee in the state. This claim also is made by another correspondent, Dr. Jesse Orew, of LaPorte City. Since the Italian bee had reached the United States (Long Island) only that same year, its spread westward was fast. Five years later the Italian Bee Company was organized in Des Moines, with Mrs. Ellen S. Tupper and Mrs. Annie Savory as partners. Although the company did not last long, it supplied a good many queens during its existence. The process of Italianizing the colonies of Iowa has continued, but still is not complete.

HISTORICAL FIGURES

Mrs. Tupper was one of the outstanding Iowa beekeepers. Advised by her doctor to give up her home near Boston and seek outdoor work if possible, she came to Iowa with her husband in 1853. She obtained a colony of bees and studied them. An essay she wrote was published by the Department of Agriculture in its report for 1865. She was operating one hundred colonies of bees and reporting for the *Iowa Homestead*, of Des Moines, and for farm papers in Chicago, St. Louis, and New York. She was several times vice-president of the National Beekeepers' organization and at one time associate editor of the *American Bee Journal*.

Kretschmer, an immigrant from Germany, published a small pamphlet on beekeeping in German and followed it by a 244-page volume in English, *The Beekeepers' Guide*. He operated an apiary of substantial size, and he refers to extracting three thousand pounds of goldenrod honey in a single day from his apiary. Later he began the manufacture of beekeeping supplies. Kretschmer had charge of the state's honey exhibit at the Chicago World's Fair of 1893, where he also received a medal and diploma for his exhibits of extracted and comb honey. At one time he specialized in breeding of queens, selling them to California.

Elisha Gallup, of Osage, a pioneer who performed functions now carried on by experiment stations and book publishers, wrote hundreds of letters to beekeepers seeking information.

Associations of beekeepers came into existence between 1850 and 1880. Transportation difficulties restricted the area for each to three or four counties. The first report of such an organization, in 1861, records that beekeepers met on the third day of the State Fair at

Dubuque, in the name of the "Iowa Apirians' Society." Northwest beekeepers seem to have met usually at Lyons, while central Iowa men met at Cedar Rapids, and the southern district convened in Oskaloosa.

From 1880 to 1915 few changes took place except a steady expansion of beekeeping. Sweet clover as a source of honey was reported first in 1884 in Chicksasaw County. Leading beekeepers of this period were O. O. Poppleton and Eugene Secore, of Forest City, who were interested in the planting of alsike clover and probably the first to undertake careful marketing with special attention to the home market. Local organizations became less active, while the State Beekeepers' Association grew stronger.

PRODUCTION PRACTICES

"Backlot" production became common in cities after 1900. Fruit trees in the backlot furnished some honey, but since white clover was now the chief source of honey, the backlot producer could not be too far from rural areas. He produced chiefly comb honey, which could be handled readily for the grocery trade, and did not require extractors, settling tanks, or storage equipment.

In early days, farmers often felt that the more hives of bees they had, the more honey they would get. Beekeepers found this was not true. A certain amount of "overhead" honey is needed for every hive, but the amount doesn't increase as fast as the number of bees in a hive does. The number of bees in a hive was increased, and therefore the amount of "surplus" honey which could be taken from the bees was increased.

Whenever the bee population in the brood chamber reaches a certain critical size the bees automatically "swarm." A new queen appears and half the hive heads off with her to find a new home. Increasing the size of the brood chamber delayed this critical point. Brood chambers were made two stories instead of one, and more and more cells in each story were added. Bees in the wild state number about fifteen thousand to a hive. Today the ordinary colony numbers as high as seventy thousand. Another way of increasing production has been to do some things for the bees which they would otherwise have to do for themselves. A bee can make its own comb by converting honey into wax, but it takes sixteen pounds of honey to make a pound of wax. If a bee were building the cells itself, it might mix some large cells, for eggs, in with the honey cells and cause trouble when it came time to sell the honey. By furnishing the bee with ready-made cells of exactly the size he wants, the beekeeper gets the results he wants.

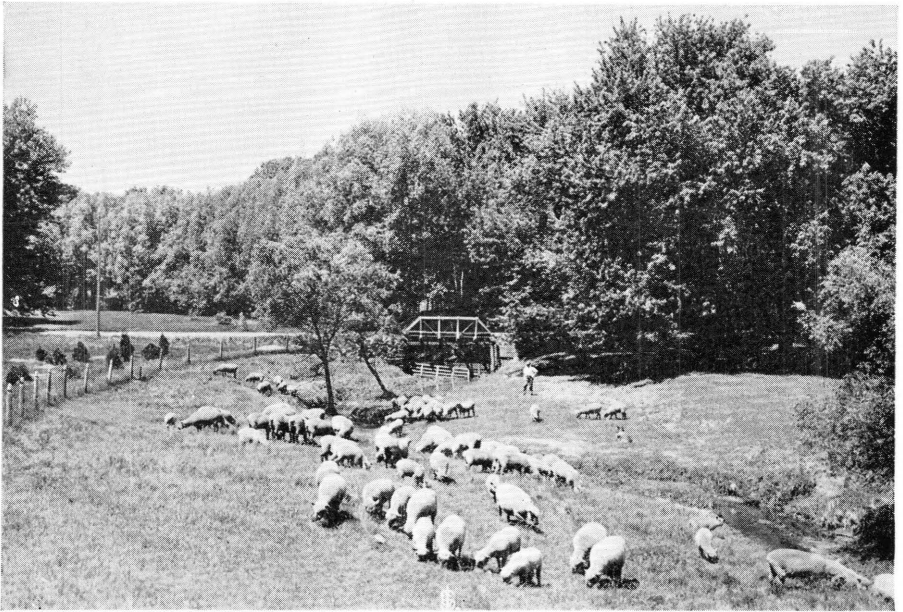
Among the most distinctive changes of the modern period of beekeeping, which began about 1915, is the change in the hive. Up to this time the one-story eight- or ten-frame hive had been used. The coming of World War I and the shortage of sugar brought a great increase in demand for honey. There was an almost immediate shift from production of section honey to extracted honey. At the same time there was a shift from the eight-frame to a ten-frame hive, and even suggestions of a two-story, ten-frame hive for a brood chamber. Apiarists were beginning now to use automobiles, which permitted them to put out more colonies than before throughout the countryside. Hives grew larger until it is advocated now that colonies use a three-story, ten-frame or a two-story, eleven-frame hive.

There has been a definite shift in the practice of wintering. The larger brood chamber has permitted a larger population, and special emphasis has been given to bees reared late in the season as a preparation for wintering. There also has been additional attention given to supplies of honey which accompany the colony into winter quarters. The matter of actual protection has changed definitely from cellar wintering to outdoor wintering.

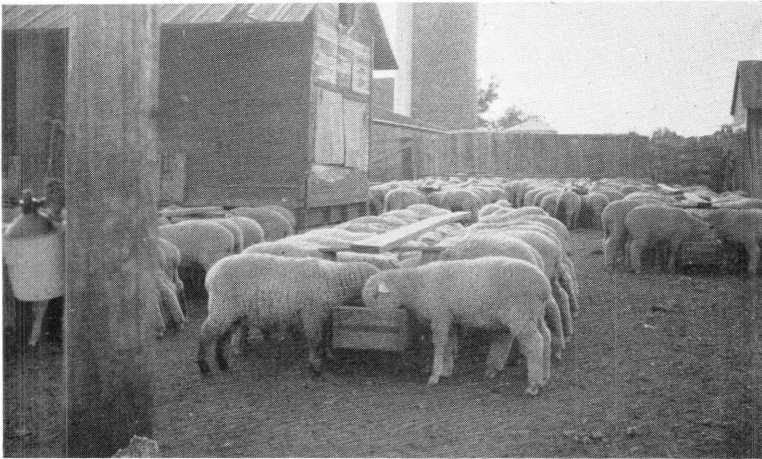
Another change has been the introduction of the package-bee business. Use of larger hives has tended to discourage a natural swarming, so it was a matter of purchase of bees to make up any deficiency due to winter losses or losses from other causes. It was a simple matter to maintain the desired number of units to be operated through the purchase of package bees. The South has found raising bees for the northern producer more profitable than producing honey.

Accessory equipment associated with the development of extracted honey production also has changed. This shift in demand called for larger extractors, development of uncapping machinery, and more investment in settling and storage tanks. More recently has come the demand for accessory equipment in the honey house for the preparation of honey for market. All of this has resulted in a definite shift in honey production from the kitchen or the operator's basement to a special structure called the honey house.

Probably the greatest change has occurred in the honey plants of Iowa. Basswood has continued to disappear each succeeding year. At present, there is little basswood honey obtained in Iowa. It can hardly be listed even as a plant of minor importance today in the total production of the state. White clover has gradually decreased in importance. This is not due to a disappearance in the acreage of clover available. It seems that there must be some correlation between climatic conditions or soil conditions which retard the production of



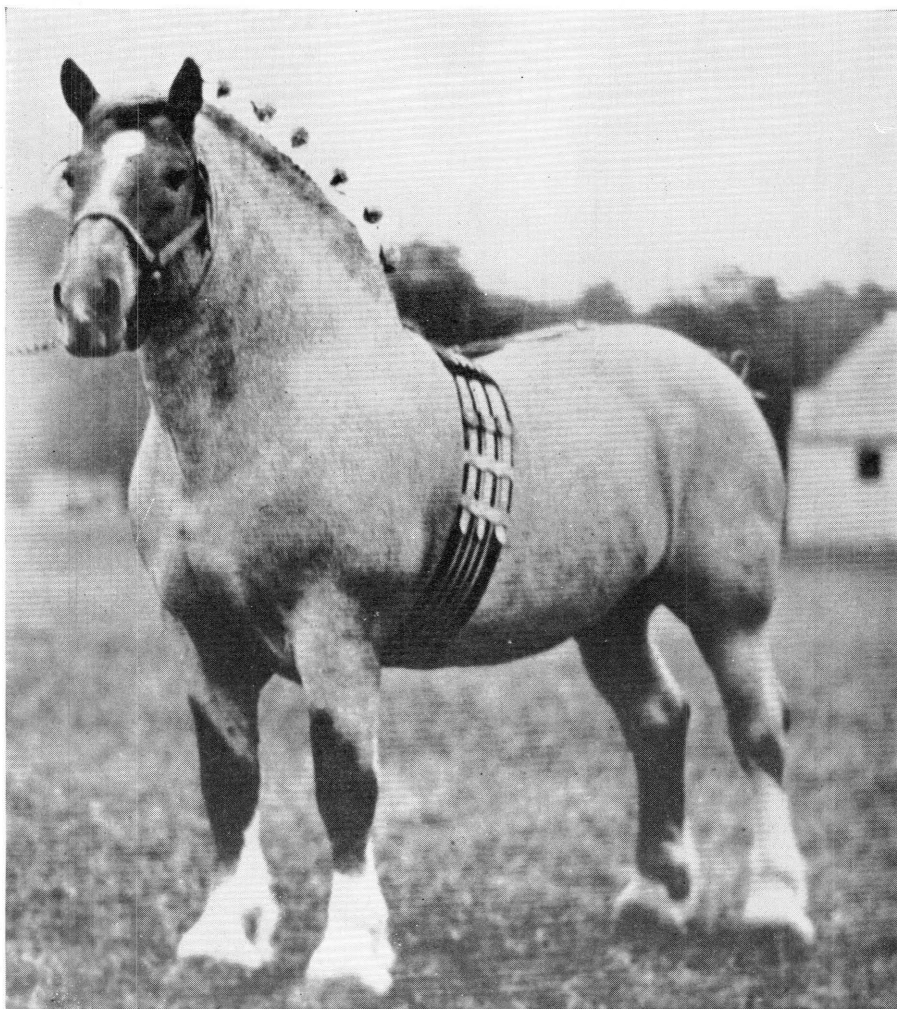
In 1891 and 1892 the trend toward a mutton-type sheep was growing stronger in the state. Henry Wallace in 1896 emphasized, "No state in the Union is better adapted for the production of mutton sheep than is the most of Iowa." The county reports of agricultural societies from 1895 to 1900 tell of the increasing interest of farmers in sheep. These reports stated that farmers were finding sheep of mutton breeding profitable, even more so than hogs and cattle.—CHAPTER 12, SHEEP PRODUCTION IN THE LIVESTOCK ENTERPRISE.



The feeding of western lambs has increased rapidly in Iowa over the last two decades. When the feed in the fields is no longer adequate, the lambs are finished on suitable rations in the dry lot. Adequate shelter is provided against storms.—CHAPTER 12, SHEEP PRODUCTION IN THE LIVESTOCK ENTERPRISE.



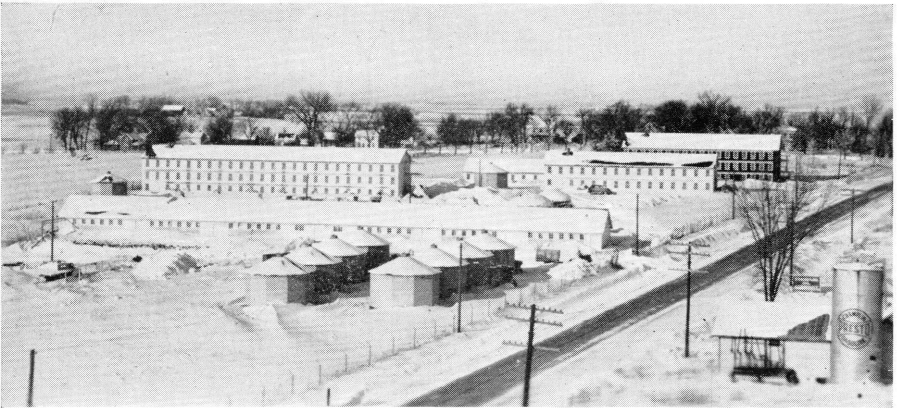
The powerful draft horses for which Iowa has long been famous deserve much of the credit for Iowa's prominence in agricultural production. It was these heavy horses and mules that for more than seventy-five years furnished the power needed for every farming operation from plowing to harvesting and even for transporting the produce to market.—
CHAPTER 13, HORSES PULL IOWA INTO PROMINENCE.



Outstanding Belgian stallion in the history of the breed in the United States was Farceur 7,332, imported from Belgium in 1912 by William Crownover, of Hudson, Iowa. He was purchased by C. G. Good, of Ogden, at the dispersion of the Crownover stud in 1917 at \$47,500, the highest price ever paid for a draft horse in this country.—CHAPTER 13, HORSES PULL IOWA INTO PROMINENCE.



About 95 per cent of Iowa farms now have some poultry. Most farms have had "pin-money" flocks of 50 to 100 hens, or "grocery-bill" flocks of 100 to 200 hens. — CHAPTER 14, EGGS AND MEAT FROM IOWA POULTRY.



Commercial hatching of eggs took away from the farm poultry raiser not only the incubation of the eggs, but also the breeding of the birds. Whereas the farmer might put up with mistakes in breeding of his own making, he was much less inclined to do so with the hatcheryman from whom he bought chicks. This is a modern breeding farm maintained by one of Iowa's hatcherymen. All of the large buildings in the picture are used for housing the breeding stock.—CHAPTER 14, EGGS AND MEAT FROM IOWA POULTRY.



In the fight against hog cholera, much of the fundamental work in the development of control measures and immunization has been done in Iowa. Experiments demonstrated that vaccination is a practical procedure, not for eradication but for insurance against loss.—CHAPTER 15, COMBATING ANIMAL DISEASES—AND WINNING.



More than a thousand acres of grapes once grew on the hills of western Pottawattamie County. This is a typical vineyard scene in southwestern Iowa in 1921.—CHAPTER 16, GROWING FRUITS, VEGETABLES, AND FLOWERS.



The Pleasant Valley district in Scott County, north of Davenport, is the earliest commercial onion-producing area recorded in the state. Henry Schutter of the vicinity sowed the first crop of onions in 1856.—CHAPTER 16, GROWING FRUITS, VEGETABLES, AND FLOWERS.



Organized extension work in forestry has been conducted in Iowa since about 1906. It has included assistance to the farmer on problems of woodlot management, reforestation, planning and planting farm shelterbelts, control of erosion, use and marketing the products from the woodlot, and assisting in boys' and girls' club work. The trees shown above are White Pine planted on steep land to stop excessive sheet erosion. At this stage they were thirteen years old.—CHAPTER 17, TREES OF OUR TIMES—AND PIONEER TIMES.



Among the distinctive changes in the modern period of beekeeping, which began about 1915, is the change from the one-story eight- or ten-frame hive to use of larger hives.—
CHAPTER 18, BEES—THE BENEFICIAL INSECT.

nectar by the plant. It is barely possible that this is also associated with the change of white clover from a seed crop to a hay crop or pasture crop. White clover is frequently available in what would appear to be ample profusion for a fine crop of honey, but the beekeepers' experience with this plant has been definitely disappointing.

Sweet clover, which has taken the place of white clover, came into the state from the Northwest through Woodbury County. Beekeepers said it was possible to keep two hundred colonies of bees in a yard at every two-mile intersection. Production of honey stepped up in this county and in this section of the state so that it was shipped out by carloads. The white sweet clover spread from this area until it has covered at least the western two-thirds or three-fourths of the state, where it is the major honey-producing plant. Sweet clover seemed to lend itself especially well to the production of extracted honey.

Due credit must be given to accessory sources of nectar and pollen in the spring, although these sources are of value only as an aid in colony development for surplus gathering during the summer. Few fall-blooming plants have been available in recent years. This is due mainly to the changed agricultural conditions, especially the more efficient operation of land with the consequent reduction of waste and wild areas.

The earlier tendency to market extensively in an adjacent area has given way to wider marketing with the coming of truck transportation. High specialization of honey production in the hands of fewer individuals, with the consequent enlarged tonnage, also has extended marketing by truck beyond state borders. This period has seen the development of independent honey packers around the large consuming centers, mostly in the East. They have taken the product from the producer in bulk and prepared it for retail trade.

Another development in this period has been the co-operative marketing of honey. The outstanding example of this for Iowa is located at Sioux City. A small group of producers found themselves confronted with restricted outlets for their product. Consequently, they developed a co-operative marketing organization, which has now developed into one of the biggest marketing agencies in the United States. Members are scattered over many states and the co-op sells throughout the middle two-thirds of the United States.

DISEASE PROBLEMS

Today there is much interchange of bees from one location to another and from southern states to northern states. Such movements of bees and honey have complicated the disease situation for the bee-

keeping industry. One disease in particular, American foulbrood, is a serious handicap to honey production and demands a constant fight to keep it under control.

The Iowa law for control of foulbrood differs from that of any other state in that it is fundamentally an educational law, based on the assumption that if the beekeeper knows how to control the disease he will, for his own good, prefer to do so. This law is largely the work of Frank C. Pellett, a native of Atlantic, who has become a national leader of the beekeeping industry, and since 1915 a staff member of the *American Bee Journal*.

IMPROVEMENT PROGRAM

The Iowa Beekeepers' Association has continued its existence after reorganizing in 1912. In that year the association decided to co-operate with Iowa State College in an educational program which would include the teaching of beekeeping, at the college and throughout the state through the Extension Service, and an adequate research program.

The research work, under the supervision of O. W. Park, has centered around fundamental projects such as the gathering and storing of nectar, nectar secretion of plants as affected by weather factors, and development of a strain of bees resistant to American foulbrood.

Two state apiarists have served as supervisors of apiary inspection, F. Eric Millan for two years, and the present writer since 1919. In 1919 a system of demonstration apiaries was established in several counties where method demonstrations brought to beekeepers the value of the best known methods in honey production. More recently the demonstration apiaries have been established in those counties where inspection work has been organized. Now thirty-six counties in the state help finance local control programs.

During the latter years of this period, the honeybee has again taken its place as a part of agricultural production through the realization of its services for the pollination of fruit and the production of seed, especially legume seed. The need for bees for pollination has been less than in states that grow more commercial fruit. But a general distribution of bees is necessary to make home orchards and gardens more profitable.

Effort is under way now to increase production of legume seed as a basis for a balanced agricultural program as developed by the Soil Conservation Service. This will require an increase in the number of bees for pollination. It will simultaneously increase honey pro-

duction. Current production goals call for an increase of 18 per cent in number of bee colonies in Iowa, as compared with an increase of but 8 per cent for the nation as a whole.

Complete pollination takes a lot of bees. With complete pollination of alsike clover, for instance, one could harvest seed up to twenty bushels an acre. But an acre of alsike clover contains some four hundred million individual florets, each of which must be visited by an insect to get 100 per cent pollination. Complete coverage is out of the question. It is practical, however, by increasing the number of bees to get eight bushels of clover seed to an acre—a lot more than the 1.6-bushel average in Ohio where such studies were made. Red clover seed can be increased from one to four bushels an acre. Insects other than bees aren't of much help in pollination. It has been found that of flowers pollinated in a field, 15 per cent were pollinated by bumblebees, 3 per cent by other insects, leaving 82 per cent for honeybees.

Up to World War II, beekeepers increased honey production by operating more and more colonies farther and farther afield. War-scarce labor and transportation reversed this tendency. Instead, beekeepers tended to operate fewer units, but more efficiently. This in turn required better stock, a greater investment in equipment. The average producer has equipment adequate for only 120 to 180 pounds of surplus honey per unit—far less than the 500 pounds per unit which is possible. Labor-saving devices are needed, for there have been no improvements in equipment for colony manipulation or honey extraction in the last forty years. Numbers of bees and amount of honey both may increase as legume crops increase. However, tying honey production to such crops will mean that drastic reduction in hive operations will result if farmers ever shift to legumes which are of advantage to soil and to livestock, but of no value for honey production.