TWENTY-FOURTH ANNUAL REPORT

OF THE

Illinois State Beekeepers' Association

Organized February 26, 1891, at Springfield, Illinois

Compiled by
M. G. DADANT
Hamilton, Illinois

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LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY.
HAMILTON, ILLINOIS, *March 1, 1925.*

To His Excellency, Len Small, Governor of the State of Illinois.

SIR: I have the honor to transmit herewith the Twenty-fourth Annual Report of the Illinois State Beekeepers' Association.

M. G. DADANT, *Secretary.*

TWENTY-FOURTH ANNUAL REPORT

OF THE

Illinois State Beekeepers' Association

FOR 1924

OFFICERS OF ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR 1925.

J. R. WOOLDRIDGE . . . . . President
Chicago.

A. L. KILDOW . . . . . Inspector of Apiaries
Putnam.

C. H. ROBINSON . . . . . Vice President
Normal.

A. G. GILL . . . . . Vice President
Chicago.

W. K. GALEENER . . . . . Vice President
Marion.

S. A. TYLER . . . . . Vice President
San Jose.

ELMER KOMMER . . . . . Vice President
Woodhull.

M. G. DADANT . . . . . Secretary
Hamilton.

L. R. ALLEN . . . . . Treasurer
Carbondale.

List of members in back of report. Also index.

LIST OF ASSOCIATIONS FOR BEEKEEPING IN THE STATE OF ILLINOIS WITH THEIR OFFICERS.

CHRISTIAN COUNTY BEEKEEPERS' ASSOCIATION.
E. F. BERRY, President, Rt. 4, Taylorville, Ill.
W. H. STUMM, Secretary, Rt. 3, Edinburg, Ill.

CLARK COUNTY BEEKEEPERS' ASSOCIATION.
FERRY KANNAMACHER, President, Marshall, Ill.
S. W. GALLATIN, Secretary-Treasurer, Martinsville, Ill.

COLE'S COUNTY BEEKEEPERS' ASSOCIATION.
CHAS. WALLACE, Secretary, Charleston, Ill.

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A. G. GILL, Secretary, 230 W. Huron St., Chicago.

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HERMAN MCCONNELL, Secretary-Treasurer, Robinson.

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H. A. DEWERFF, Secretary-Treasurer, Benton, Ill.

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WILLIAM OSBURN, President, Morris, Ill.

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E. J. BAXTER, President, Nauvoo.
J. H. LLOYD, Secretary, Carthage.

HENDERSON COUNTY BEEKEEPERS' ASSOCIATION.
R. R. BANTA, President, Oquawka.
L. LOGUE AKIN, Secretary, Oquawka.

HENRY COUNTY BEEKEEPERS' ASSOCIATION.
AXEL PETERSON, President, Galva.
ELMER KOMMER, Secretary, Woodhull.

ILLINOIS & INDIANA BEEKEEPERS' ASSOCIATION.
MR. VOIGHT, President, Danville.
C. O. HERRON, Secretary, Rt. 8, Danville.

JOHNSON COUNTY BEEKEEPERS' ASSOCIATION.
J. G. MCCALL, President, Vienna.
C. W. MILLS, Secretary-Treasurer, Vienna.

KANE COUNTY BEEKEEPERS' ASSOCIATION.
E. G. WAGNER, Secretary, 85 S. River St., Batavia.

LOGAN COUNTY BEEKEEPERS' ASSOCIATION.
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FRED F. BELLATTI, Secretary, Mt. Pulaski.

MACON COUNTY BEEKEEPERS' ASSOCIATION.
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W. H. SNYDER, Secretary, 2121 N. Water St., Decatur.

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EARL WAGGONNER, Secretary, Alton.

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H. BARKER, President, Centralia.
FRED THRAILKILL, Secretary, 536 S. Locust St., Centralia.

MCLEAN COUNTY BEEKEEPERS' ASSOCIATION.
DR. H. B. HENLINE, President, Bloomington.
MISS ELIZABETH SEIBEL, Secretary, 47 White Place, Bloomington.

MOULTRIE COUNTY BEEKEEPERS' ASSOCIATION.
PAUL SMITH, President, Lovington.
C. C. TURNER, Secretary, Sullivan.

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COURT S. HUGGANS, Secretary, Polo.

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J. E. MCCULLOCH, President, Golconda.
MISS MINNIE MICHEL, Secretary-Treasurer, Golconda.

PULASKI COUNTY BEEKEEPERS' ASSOCIATION.
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L. E. LINGENFELTER, Secretary-Treasurer, Ullin.

SALINE COUNTY BEEKEEPERS' ASSOCIATION.
C. H. WILEY, President, Harrisburg.
EVERETT WEAVER, Secretary, Rt. 5, Harrisburg.

SOUTHERN ILLINOIS BEEKEEPERS' ASSOCIATION.
C. J. THOMAS, President, Carbondale, Ill.

TAZEWELL COUNTY BEEKEEPERS' ASSOCIATION.
GEO. SCHWINN, President, 1917 Caroline St., Pekin.
J. B. F. SCHOWALTER, Secretary, Pekin.

UNION COUNTY BEEKEEPERS' ASSOCIATION.
L. S. FOOTE, President, Anna.
GLEN HINKLE, Secretary-Treasurer, Dongola.

WARREN COUNTY HONEY PRODUCERS' ASSOCIATION.
SAMUEL GOODSELL, JR., President, Cameron.
GLEN GLASS, Secretary, Cameron.

WILLIAMSON COUNTY BEEKEEPERS' ASSOCIATION.
W. K. GALEENER, Farm Advisor, President, Marion.
OTIS KELLEY, Secretary-Treasurer, Rt. 5, Marion.

WOODFORD COUNTY BEEKEEPERS' ASSOCIATION.
J. P. SCHEID, President, Eureka.
BENJ. H. FISCHER, Secretary, Rt. 1, Roanoke.

ADDRESS OF WELCOME.

(President Wooldridge)

Ladies and Gentlemen:

It gives me great pleasure to welcome you to this, our Twenty-fourth Annual Convention of the Illinois State Beekeepers' Association.

We hope you will derive great benefits from this meeting. Your presence here is an inspiration to me and it spurs me on to a desire for greater achievements in the future.

One year ago you did me the honor to elect me President of this Association, and I have attempted, in my feeble way, to bring about certain things and changes for the benefit of all the beekeepers of the State, regardless of the fact whether they belong to an Association or not; they have my sympathy and respect, with a desire to help them.

We hope to point the way to several things beneficial to our beloved industry of the entire State where all beekeepers can share and share alike.

We thank you all for your presence and hope when we part at the close of this Convention that you will have reasons to be glad you were here, leaving here with a full determination to co-operate more than ever before.

With this resolution in mind, backed by activity, success is ours!

I thank you.

FATHER LANGSTROTH,
1810—1895
Inventor of the Movable Frame Hive.

SOME OF THE THINGS THAT SHOULD BE DONE IN 1925.

(By J. R. Wooldridge.)

Largely increase the membership of the State Association.

Twenty-five unorganized counties to be organized and affiliated in 1925.

Each organized county to have a demonstrative yard and inspector.

Petition the State University for an extension man to have charge of all demonstrative yards with a general plan of Educational work.

Petition and urge Director Davison to give the State Association $3,000.00, instead of $2,400.00 as at present, in order that the President's office can have the services of a stenographer at least part of the time.

A committee to be appointed to urge a larger appropriation for inspection of apiaries.

Reorganize all organized counties now organized and affiliate them.

The State Association should hold two short courses in addition to the established short course at the State University, Urbana, Ill., until each county can support its own.

A committee formed of the five Vice Presidents, appointed to take charge of organizing all counties of the State, the chairman of committee making a monthly report to the President of all efforts and success accomplished.

A committee of three to be authorized to prepare lectures to be given at different places and times, from broadcasting stations.

State Association to petition Prof. J. I. Hambleton, Apiculturist, Washington, D. C., to give to the State of Illinois an extension man for 30 days or longer if possible to start extension work and to attend a series of educational meetings arranged for, by the State Association.

REPORT OF THE SECRETARY OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

Your Secretary reports a very successful season for the Illinois State Beekeepers' Association with a total membership of 702.

We have now 30 county and district associations enjoying affiliation with us, members being affiliated at a net rate of fifty cents each.

The cloth-bound annual report for the year 1923 was issued in July and a copy sent to every member.

During the year some fifty sectional and county meetings have been held in the State, part of them arranged for by your Secretary and attended by outside invited speakers, and part of them arranged and carried out by the county association officers themselves.

Your President, Mr. J. R. Wooldridge, has also been responsible for another considerable number of meetings which he has arranged in different counties, and personally attended.

Several meetings were also held by State and deputy bee inspectors.

During the year, three two-day bee schools were held, one at the University of Illinois at Urbana, one at Carbondale, in the south part of the State, and one at DeKalb, in the northern part. These were very well attended and very successful.

The increased funds available for bee inspection have done a great deal towards helping the foulbrood situation. Inspectors have attempted cleanup areas in nearly all sections where they had the corporation of local associations and such attempts have met with very good success.

There, however, are many counties which could not be given sufficient attention with the funds available and reinspection is, of course, necessary in all known infected areas.

Your Secretary wishes to commend especially the efforts of President J. R. Wooldridge. His activity is tireless and he has continually promoted interest with loss of time to himself and no cost to the Association.

Mr. Wallace Park also has helped make our Bee Schools a success and is doing excellent work at the head of the Bee Department at the University of Illinois.

The foulbrood appropriation of $7,475.00 per annum, while

insufficient, has been wisely expended. The amount should be augmented to insure thorough and State-wide inspection.

Respectfully submitted.

M. G. DADANT,
Secretary Illinois State Beekeepers' Ass'n.

FINANCIAL REPORT OF THE SECRETARY OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR THE YEAR ENDING DECEMBER 1, 1924.

Balance on hand December 1, 1923	$268.99	
March 3, memberships	131.85	
April 7, memberships	66.00	
June 2, memberships	60.25	
August 12, memberships	70.75	
September 17, memberships	39.00	
December 1, memberships	45.56	
		$682.40

ORDERS DRAWN AS FOLLOWS:

No. 1, Jan. 5, Pellett and Porter	$ 12.75	
No. 2, Jan. 19, Hoenig Electric	112.40	
No. 3, Feb. 14, Pellett and Porter	33.25	
No. 4, March 6, Edward Winkler	6.00	
No. 5, March 12, G. H. Cale	40.25	
No. 6, March 19, W. Park	25.37	
No. 7, Oct. 7, M. G. Dadant (salary)	100.00	
		$330.02
Balance on hand		$352.38

Respectfully submitted,

M. G. DADANT,
Illinois State Beekeepers' Association.

REPORT OF THE TREASURER OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR THE YEAR ENDING DECEMBER 1, 1924.

Balance on hand December 1, 1923	$268.99
Received in dues from secretary	413.41
	$682.40
Paid seven orders during year	330.02
Balance on hand	$352.38

Respectfully submitted,

GEORGE SEASTREAM,
Treasurer.

REPORT OF EXPENDITURE OF STATE FUNDS BY THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

The total appropriated by the State for the Illinois State Beekeepers' Association is $1,200.00 per year, or $2,400.00 for the biennium. Of this amount, $1,250.00 has been spent during the first year of the biennium. Roughly divided, it was expended as follows:

Exhibit at State Fair, $136.75.
Annual report and mailing same, $757.00.
Expenses of annual meeting, $151.75.
Office expense, bulletins, postage, etc., $205.00.

Unfortunately, this appropriation is insufficient to allow of extension work in organizations, attending meetings, holding demonstrations, etc., and such of this work as has been done is being attempted by gratuitous outside speakers or by members of the State and county organizations.

We should have an extension specialist in beekeeping in Illinois who could devote his time to the organization of meetings, delivering of lectures on better beekeeping, and who could cooperate to the fullest extent with the inspectors so that beekeeping in Illinois could, in a few years, be on the very highest plane.

We still have many sections of Illinois in which large numbers of box hives are kept and many other sections which could support many more bees were they properly informed on beekeeping.

Respectfully submitted,

M. G. DADANT,
Secretary Illinois State Beekeepers' Association.

MINUTES ANNUAL MEETING ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

At Springfield, Ill., Dec. 9 and 10, 1924.

The Illinois State Beekeepers met in annual session at the St. Nicholas Hotel in Springfield on Dec. 9 and 10, 1924. Meeting called to order 10 A. M., Dec. 9, by President Wooldridge.

Minutes of previous meeting read and approved.

Report of Secretary and Treasurer read, and on recommendation of auditing committee, approved.

Papers were read or addresses made by the following: J. R. Wooldridge, Prof. Wallace Park, Huber H. Root, Morley Pettit, W. H. Snyder, Dr. A. C. Baxter, C. P. Dadant, A. W. McKay, and J. I. Hambleton, of the Division of Bee Culture at Washington, D. C.

Report of State Apiary Inspector A. L. Kildow read and adopted as read.

Report of J. R. Wooldridge on Cook County cleanup inspection, read and approved.

Letter read from Director of Agriculture Davidson to the effect that the budget allowance for bee inspection had been cut off by committee and it would be necessary to carry the appropriation through in the form of a separate bill as before. On motion made and carried that the Chair appoint a legislative committee of three to introduce and secure passage of such a bill, with annual appropriation of $10,000 or $20,000 for the biennium.

Motion made and carried that a committee of three be appointed by the chair to get an extension man for beekeeping in Illinois at the University of Illinois.

Motion made and carried that we ask the American Honey Producers League to secure a national law on grading for the U. S. A.

Resolution adopted commending the good work of the Bee Culture Division of the Department of Agriculture at Washington to the good will of Congress.

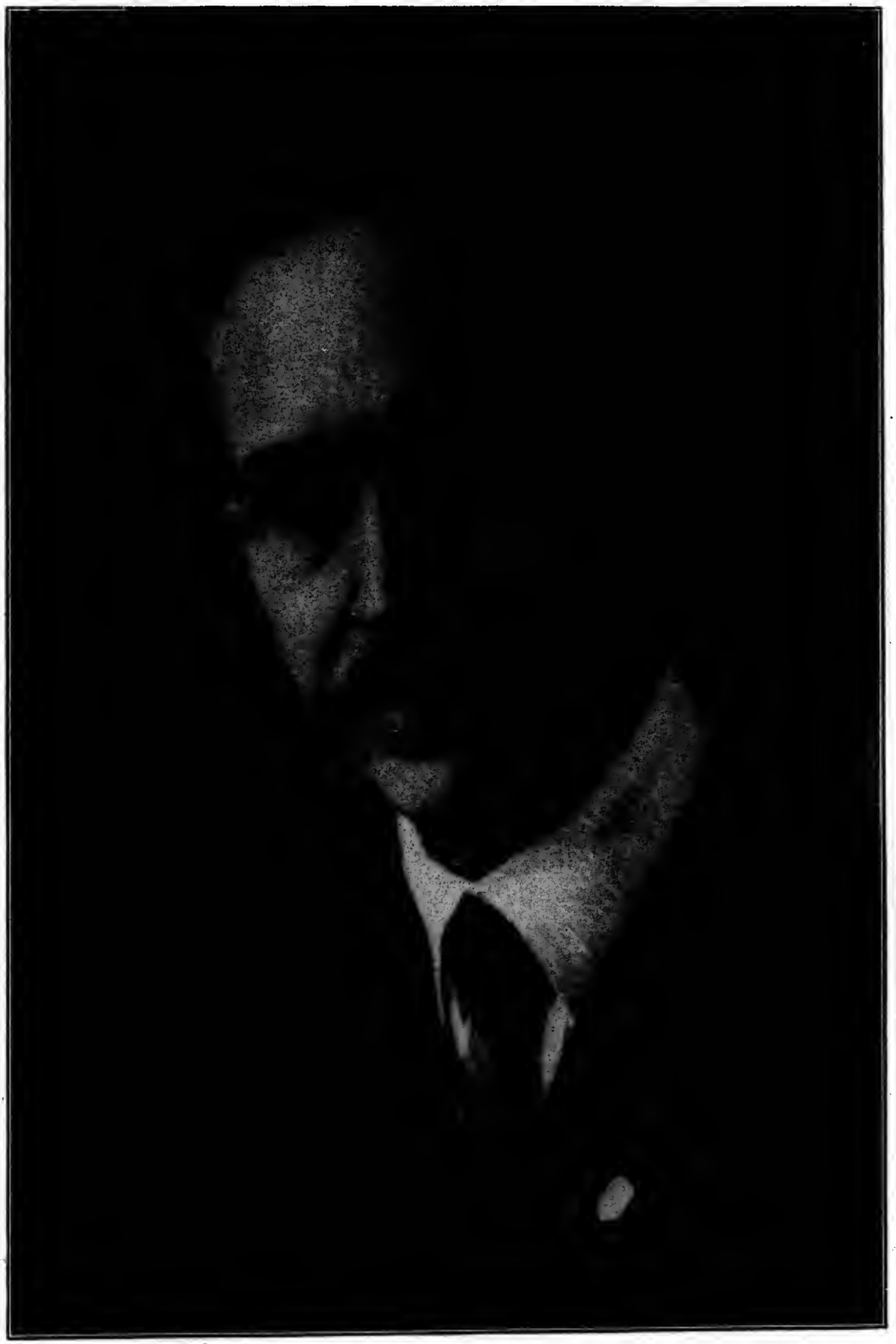
Resolution adopted that we tender our support to the efforts of the American Honey Producers' League in the securing of Government help in National foulbrood eradication plans put into effect co-operatively between the United States and the various states involved.

Motion made and carried that we continue our State Fair exhibits and educational work there.

Following officers were elected for 1925: President, J. R. Wooldridge, 2021 W. 70th St., Chicago; Secretary, M. G. Dadant, Hamilton; Treasurer, L. R. Allen, Carbondale; Vice Presidents, C. H. Robinson, Normal; A. G. Gill, 230 W. Huron, Chicago; S. A. Tyler, San Jose; W. K. Galeener, Marion; Elmer Kommer, Woodhull.

Being no further business, the meeting then adjourned.

M. G. DADANT, *Secretary.*



A. L. KILDOW,
Chief Inspector of Apiaries.

STATE BEE INSPECTOR'S REPORT.

(By A. L. Kildow.)

The principles outlined in the last report remain the basis of bee disease control, this plan consists in county organization, with an inspector to look after foulbrood and apply control measures for disease. Also to have demonstrations and educational meetings for the general good of the industry.

Up to July 1st, 1924, the close of our year's work, we had 22 counties with inspectors, and most of these have been appointed at the suggestion of the county associations. The counties are Adams, Crawford, Cook, Christian, Douglas, Edgar, Franklin, Grundy, Henry, Henderson, Hancock, JoDavies, Kane, Livingston, Mason, Macon, McLean, Pope, Pulaski, Sangamon, Williamson, and Woodford. Since July 1st we have inspectors in Marion and Jefferson Counties, some of the inspectors also look after their neighboring counties and some go where we receive calls for assistance.

Cook County has had eight inspectors appointed for the work, but unfortunately only four have been able to stay on the job. Two of those appointed did nothing, or at least sent in no report. One, Dr. Kragness, was unable to work the first part of the season on account of sickness. But from July 1st, 1923, to July 1st, 1924, in this county there were 211 apiaries visited with 2,095 colonies; about 10% of these were diseased. This is the greatest per cent in the State, but there are two causes for so much disease around the cities—the small indifferent beekeepers, and the city dumping ground.

Many of the beekeepers have only three or four colonies and these are situated in some obscure place, so they will be unnoticed by passersby and of course are difficult for the inspector to locate. Mr. Wooldridge, who is supervising inspector of Cook County, has put forth great effort to get the inspectors of that county to clean up and watch their assigned territory and the work is pushing toward success.

The southern part of the State is more thoroughly organized and is freer from disease than the other portions. Yet they still have many box hives, but with the educational movement they are gradually adopting the standard hive and modern equipment.

The southern part of the State is not as well adapted to commercial beekeeping as other parts, but what beekeepers there are aim to get good results and take more interest in their bees than is generally shown in the upper half of the State.

Last fall an inspector made an investigation of the conditions in the eastern part of the State along the Indiana line and found no disease to speak of, except near Danville. Since that time no reports from that locality have been sent in.

At present the disease seems to be centered in Kendall, Will, Dupage, Kane, Cook, and Grundy Counties. We only have inspectors in three of these counties, namely, Kane, Grundy, and Cook, and in these three the disease is being vigilantly looked after and where the disease is beyond safe treatment the colonies are destroyed.

This plan of county organization has brought more beekeepers together and has induced co-operation and a greater amount of interest than was ever before manifest, and we hope to succeed in getting every county organized that we may the quicker and better get the beekeepers of the entire State working as one great family for prosperity of apiculture.

The co-operation with the various Farm Bureaus has proven very beneficial, as the farmer has been able to see the real benefit the honeybee is to his crops. The field meets and demonstration meetings have been exceedingly well attended and everyone seems willing and anxious to work for the eradication of disease and for the advancement of our industry.

The inspectors worked on the real clean-up plan, and whereever disease was found that was not in condition to be treated the colonies were burned. This had the desired effect on some of our careless beekeepers. More colonies were destroyed in the north half of the State than elsewhere. Although the sections visited and cleaned up last year are in comparatively good condition.

Last year we visited 1,112 apiaries of 19,697 colonies and found 204 apiaries with A. F. B., and 125 with E. F. B. This year we visited 2,025 apiaries of 35,834 colonies and found 445 apiaries with A. F. B., and 226 with E. F. B. Of course our visits were mostly to infected and uncertain localities, rather than where they were already cleaned up. One thing the beekeepers have learned is, that the inspectors come to help them instead of destroying their industry. Very little opposition has been shown the inspectors the past year.

Now, to make our work more beneficial we would ask that the following clauses be inserted in our foulbrood law.

1. That no bees be permitted to enter the State without a certificate of inspection from the State inspector, or other proper officers.

2. That no bees be moved from one locality to another without first being inspected by an inspector of apiaries and a permit given.

3. Eradication of all box hives, gums or other receptacles to hold bees, other than movable frame hives.

Date	No. Apiaries visited	Number Colonies	No. Apiaries having A. F. B.	No. Apiaries having E. F. B.	No. Colonies destroyed
1923					
July	398	10,558	137	66	122
August	283	3,591	49	42	32
September	198	3,363	38	10	13
October	9	127	2		
November					
December					
1924					
January					
February					
March	9	150	2		
April	67	1,563	7		47
May	489	8,219	107	57	33
June	554	8,263	103	51	40
Total	2,025	35,834	445	226	287

J. R. WOOLDRIDGE,
President Illinois State Beekeepers' Association.

AREA CLEAN-UP CAMPAIGN OF AMERICAN FOULBROOD IN COOK COUNTY.

(By J. R. Wooldridge.)

Some of the things done and the results of same:

Five hundred and ninety-two apiaries located and inspected by department inspectors and myself.

Deputies under instruction issued by me.

Eight thousand five hundred and ninety-three colonies inspected.

One hundred and fifty-six apiaries infected with American and European foulbrood.

Five apiaries infected with European foubrood now all clean.

One hundred and twelve of the one hundred and fifty-six apiaries treated by owner or inspector. before season too late. Eleven of the one hundred and twelve infected apiaries treated still show infection of A. F. B., caused by careless work or the use of infected equipment. This alone establishes the fact the mode of treatment now being recommended by the State in the control of A. F. B. when carefully done is a success.

Forty-four infected apiaries found after being too late to treat, and eleven returns. In all cases instructions were given how to handle until springtime when they can be treated. These are included in the 156, a total of 55 infected apiaries which should receive first attention in the spring.

A number of apiaries found where the solution was being used or had been used, free from American foulbrood.

A number of apiaries found having been treated with a solution show infection.

This shows the solution in the hand of the careful will exterminate American foulbrood.

Some 3,000 brood frames were ordered destroyed, with many box hives, as well as some standard hives when old.

Our chief inspector, Mr. A. L. Kildow, is to be commended for his generous act by giving us six deputies, some proved to be valuable inspectors, others tricky and detrimental to the service and one failing to work at all, which all proved to be a handicap to the completion of the work. Deputies are not paid enough money by the State to justify them to remain away from their daily work, and competent men with nothing to do are decidedly scarce, this coupled with the unusual season of rain and cold winds retarded much of our work that had been planned for and time allotted but unable to finish, hence our poor showing, but I hope by springtime we may find some reliable men com-

petent to inspect when some available time can be found, when much more can be accomplished.

As a matter of personal report I beg to advise I inspected 192 apiaries containing 2,287 colonies. Sixty-two yards diseased containing 263 colonies. Forty-seven yards treated with 43 now clean, with four returns. In addition to the above inspection work I personally organized 11 counties and affiliated same with the State Association, held 23 demonstration meetings, recommended 14 deputies who received appointments, made four trips to Springfield on Association work, besides keeping up the correspondence of the office, which proved to be a heavy burden. Helped to establish two short courses which were held at Carbondale and DeKalb, Ill.

REPORT OF T. A. KRAGNESS.

The excessive rain, almost daily, throughout the spring and summer months, prevented a close and careful inspection of the known hives of bees situated in this district. For the bad weather kept the field workers in a constant state of unrest and they were ever ready and willing to fight without other provocations. This district always gets more dew and rain than any of those around the Lakes and those districts that are contiguous to them. The reason: This district lies quite within the lowest part of the basin of Lake Michigan, and for that reason more dew and rain fall here than there.

Many of the beekeepers here secrete their hives away from casual discovery. This makes bee inspection here difficult and uncertain, because the hidden hives must be found before they can be inspected. Performing the dual duties of bee-hunter and an inspector of bees requires and demands of inspectors the talents and patience of a Chaco Indian, who spends much of his time in searching for the nests of wild bees, from the honey of which and the seeds of the algorobia he distils a pleasant but highly intoxicating drink. To his credit, uncivilized as he is, he uses this but sparingly, and only upon grand occasions of ceremony—how different from the moonshine revellers of civilization.

The Chaco Indian looks for the bee's nest by observing the flight of the bee, as it passes back and forward over the wild parterre; and his keenness of sight—by far surpassing that of the untrained eye of his civilized brother—enables him to trace the bee's movements in the air, and follow it to its hoard. He alleges that he could not do this so well were he encumbered with eyebrows and lashes, and offers this as one of his reasons for extracting these hirsute appendages. There may be more in what he says—strange as it may sound to the ear of one who is not a bee-hunter nor an inspector of bees, and whose eye is adorned with brows and lashes and, quite too often, with eyeglasses.

The bee district of Chicago and Cook County is quite unlike any other known to man. Here is the largest aggregation of railway terminals in the world. Freight is received here from, and is shipped from here to, every place on the earth where man goes and is. And the greater part of the honey crop of the United States contacts, directly or indirectly, with this district; for thousands of cars and retainers of honey come in and pass through Chicago, and a deal of the honey is repacked, and great amount is consumed here. The cars and cans and jars and bottles in which honey has been are invariably disposed of in a way that makes them easy of access to bees. This affords ample and manifold ways of infecting the bees here and spreading the infection from here into other districts. The importance of bee inspection here should be patent to all beekeepers.

Apiaries visited, 49.

Colonies visited, 1,002.

Apiaries with American foulbrood, 13.
Colonies with American foulbrood, 73.
Apiaries with European foulbrood, 1.
Colonies with European foulbrood, 2.
Colonies destroyed, 9.

It is with much pleasure that I can report that there is much less American foulbrood among the bees of this district than at any time heretofore; and the European foulbrood is practically nothing. These good results come from the cooperation of both beekeepers and inspectors, and this kind of work should be extended.

Sweet clover is the chief honey plant here.

T. A. KRAGNESS, *Chicago.*

REPORT OF W. C. YOUNG.

My work as inspector for the year 1924 was confined to Cook County, beginning May 1st, to September 6th.

I visited 89 apiaries, comprising 838 colonies; found 24 apiaries infected with disease. Total number of diseased colonies, 82 A. F. B.; two colonies E. F. B.

Destroyed 52 colonies and several hundred frames.

Had beekeepers transfer all box hives, kegs, etc., to standard hives.

Apiaries still infected are due to failure to follow instructions, others treated but it broke out again and they will treat in the spring.

The greatest handicaps were: Difficulty in locating apiaries, lack of authority, and lack of cooperation on the part of the beekeeper. As a remedy for same I would suggest: Have every beekeeper register, strict enforcement of laws, and full power to burn diseased colonies after same has not been cleaned up after first visit.

W. C. YOUNG.
Des Plaines, Ill.

REPORT OF ELMER KOMMER.

Woodhull, Illinois, Jan. 19th, 1924.

M. G. Dadant,
Hamilton, Illinois.

Dear Sir: For my inspection report for this territory of Illinois, I will report as follows: I worked in six counties and visited 215 apiaries, containing 1,979 colonies, out of these there were 73 apiaries that had A. F. B. in 314 colonies, and 67 apiaries that had E. F. B. in 147 colonies.

Out of this inspection there were 74 colonies that were destroyed and burned, but the most of them were treated.

I did not get to do any inspection in Rock Island or Mercer counties this year as I only found E. F. B. last year in either

county, and if the beekeepers followed out the instructions and requeened, they have got it cleaned up.

I spent one day in Bureau County but found no American F. B., but one yard had E. F. B. and queens were ordered at once.

One trip was made into Henderson County, where I shook one yard, and the other man cleaned his own yard, so is clean in territory where I inspected.

The most of my inspection was done in Henry County, where I found plenty of A. F. B., this was mostly in territory where no inspection has ever been done before, and it was pretty well cleaned up this year; however, there may be a few that did not shake as it was too late to do so successfully and save the bees, but these will be taken care of soon as the weather permits.

Warren County had quite a sprinkle of A. F. B., but cooperation from the beekeepers caused the disease to be stamped out at once. I had one or two exceptions where the bees and all had to be burned in order to get them clean. At present I don't know where I could find a case of A. F. B. in that county.

In Knox County I found a little A. F. B. in the northern part; this county will need some more looking through for disease next year, and shall expect to find quite a lot of box hives.

Whiteside County will also need a lot of inspection next year, if the northern part is as badly infected as the southern part was, as almost half of the apiaries had some A. F. B. in them.

I held two demonstration meetings this year in apiaries where A. F. B. was present, demonstrating how to shake infected colonies with the disease. One meeting was in Warren County and the other was in Henry County. I think more of these meetings should be held so as to educate the beekeepers how to proceed when the disease appears.

The demand for good Italians is gradually increasing, as there were more Italian queens shipped in from the Queen Breeders than any other year before, but it does take a long time to convince some beekeepers that it pays to Italianize their yard.

ELMER KOMMER, *Inspector*,
Woodhull, Ill.

REPORT OF GEO. WATT.

Owing to the late cold spring this work at inspection did not get under way until the clover flow was on. Attempts made during fruit bloom had to be stopped on account of robbing. In Hancock County special care was given to yards where disease had been found on previous inspections; only three yards had become reinfected.

It was getting late in the season when I got to McDonough County. The most disease was found in and near the City of Macomb. The gasoline burning method was used very effectively, and I believe on the next inspection it will show good results.

GEO. WATT,
Hamilton, Ill.

REPORT OF JAMES D. BENSON.

I am satisfied we accomplished a great deal this season with foulbrood. We have so many beekeepers that do not know what is wrong when their bees die in the summer and early spring. And, furthermore, do not pay much attention when they die, which makes it very bad for the man that is in bee business on a large scale. When they have it explained to them how handicapped it is for the man with a large investment, they get busy on the job and clean it up.

This work is very necessary in this part of the State. I called on a hundred and twenty-five beekeepers, which had from one to two hundred and thirty-four colonies. Some of them, very interested beekeepers, met me with a glad hand and very anxious to hear the conditions in the counties, and especially in their neighborhood.

At the close of the season I found the southwest part of Stephenson County in very bad condition with A. F. B., which should be looked after as early as possible in the spring.

Trusting we have a still more prosperous year 1925, I remain

Yours truly,

JAMES D. BENSON,
Galena, Ill.

REPORT OF R. C. MEREDITH.

Some time in April I was appointed Inspector of Apiaries in Franklin County, Illinois. May the 5th I started inspecting. The weather was very rainy, and I worked very little in May. June was some better and I did a good bit more work in June. July was better and work went on very nice. Some foulbrood showed up, though not many cases. The honey flow started in May and lasted until July 15 or 20, and the bees went on with honey gathering and swarming, and foulbrood did not spread very much.

As there is about 10 box hives with combs built fast to the sides and top and top nailed on, in most cases bottom nailed fast, it was then pry off the top and cut out some comb, or smell at the entrance or a crack the best I could. and either of these ways is a very poor way to find foulbrood when it first starts.

The latter part of July and the first of August there was no honey flow, and foulbrood spread very fast, and I think there is foulbrood all over southern Illinois and will be as long as the old box hives are used in great numbers like they are now.

The latter part of September we burned some 12 or 15 hives that were very bad with foulbrood. I lost a small book that had the report in it and do not remember the correct amount. Foulbrood is here and will stay here until the beekeepers learn what it is and keep their bees in better hives, and in better shape.

There was a great change here in 1924, although some spent some money on their bees and got no honey, this cooled the bee fever on lots of them.

R. C. MEREDITH,
Whittington, Ill.

REPORT OF JAMES D. ARVIN.

Enclosed find report for work done in 1924. My work was done in McLean, Tazewell, and Woodford Counties. In this work I found beekeeping in a generally backward condition. Box hives and colonies in good equipment, but with cross-built combs totaled slightly over 25% of the total number of colonies. Some areas were practically all box hives. During the season I visited 59 apiaries of 627 colonies, 12 of these apiaries had a total of 33 cases of A. F. B. Eleven apiaries had a total of 49 cases of E. F. B. I found one apiary in Woodford County which contained about 10 colonies which had died with A. F. B., and one colony living which was rotten with A. F. B. This neglected apiary was the source of considerable trouble. A small part of above totals was reinspected.

Our local associations need to arouse more of an interest in apiculture in this section of the State. With a more favorable season in 1925 we can do much toward the eradication of bee diseases.

JAMES D. ARVIN, *Inspector of Apiaries*,
Lilly, Ill.

REPORT OF BENJ. H. FISCHER.

In answer to your request herewith is the report of my inspection work during the year of 1924. I inspected in Woodford County, 49 apiaries, with a total of 427 colonies. There were 47 colonies infected with American foulbrood in 10 apiaries and 38 colonies were infected with European foulbrood in 13 apiaries. Of the apiaries infected three of them had both American and European foulbrood. 20% of all the colonies inspected and 47% of the apiaries inspected were infected.

About 92% of the colonies were in movable frame hives.

Due to unfavorable weather conditions and press of other work I was unable to get over all of the county, but found American foulbrood mostly in the western part of the county and European foulbrood in the south central part.

Of the colonies inspected the disease has been treated and cleaned up in most cases. Only a few second inspections were made.

Yours truly,
BENJ. H. FISCHER,
Roanoke, Ill.

FOULBROOD INSPECTION RESULTS, 1924
(Some reports not recorded)*

County	Number Apiaries inspected	Number Colonies inspected	Number Apiaries A. F. B.	Number Colonies A. F. B.	%A. F. B.
Adams	87	1,767	32	114	7
Brown	54	884	9	15	2
Bureau	7	88	0	0	0
Champaign	1	56	1	2	4
Christian	135	1,303	14	37	3
Clark	2	63	2	5	8
Cook	592	8,593	156	680	8
Crawford	63	580	11	30	5
Edgar	36	407	10	46	11
Ford	6	152	1	1	1
Green	9	113	0	0	0
Franklin	300	2,734	12	38	2
Grundy		3,000		145	5
Hancock	72	1,220	12	88	7
Henderson	53	725	22	98	14
Henry	109	999	36	129	13
JoDaviess	57	1,200	2	15	2
Kane	142	1,380	113	161	13
Kankakee	1	264	1	30	11
Kendall		150		15	10
Knox	10	46	4	13	30
LaSalle	9	194	6	23	11
Livingston	37	627	8	22	4
Logan	44	704	12	37	5
McDonough	45	800	7	22	3
McLean	31	373	4	12	3
Mason	8	207	6	34	17
Mercer	1	20	0	0	0
Morgan	26	357	3	8	2
Pope	20	195	1	1	1
Pulaski	26	297	4	5	2
Sangamon	36	497	1	4	1
Schuyler	22	143	4	8	6
Scott	7	119	0	0	0
Stephenson	68	1,807	10	35	2
Tazewell	27	361	7	20	5
Vermilion	1	40	1	8	20
Warren	44	304	14	68	20
Whiteside	38	451	17	98	20
Will		800		20	3
Woodford	55	468	12	50	11
Total		34,485		2,137	7

*Report covers Season 1924, whereas State Inspector's report covers fiscal year July 1, 1923, to July 1, 1924.

McLEAN COUNTY ACTIVITIES.

(By Elizabeth Seibel)

The annual outdoor meeting of the McLean County Beekeepers' Association was held on July 25, 1924, at the apiary of Mr. J. L. Wolcott, of Normal, Ill. As Mr. Wolcott lives quite a distance from the main road, he thoughtfully marked a trail that led to where this interesting meeting was to be held.

In the absence of our president, Mr. William Brigham, who, owing to school duties, found it impossible to be in attendance, the meeting was ably conducted by our vice-president, Mr. C. L. Albee. Forty-five were in attendance.

The speaker and their subjects were: Mr. G. H. Cale, of the Dadant Company, "Foulbrood"; Mr. Geo. H. Rea, of the A. I. Root Company, "Requeening with Young Queens," he also told us how the meetings are conducted in the east; Mr. A. L. Kildow,

of Putnam, State Inspector of Apiaries, gave a talk on his method of treating foulbrood, and Mr. W. H. Snyder, of Decatur, Deputy State Inspector, gave a brief sketch of his work, and told of some of the conditions encountered. All of these talks were very instructive, and greatly enjoyed by all. The meeting was an inspirational one and it was unanimously voted to give Mr. Wolcott and the speakers a rising vote of thanks for their part in making it such a success.

A meeting had been planned for December 16th to 19th last, to be held in connection with the annual Poultry Show at the McLean County Farm Bureau; elaborate preparations had been made, but owing to the sleet storm it was impossible to carry out the program as planned, but our dependable Mr. William Stickler, of Lexington, was in attendance (as per schedule), with a very fine and comprehensive honey exhibit. He made the trip daily, coming down in the Ritter bus. Messrs. J. L. Wolcott and C. H. Robinson also had some fine exhibits, consisting of beeswax, equipment, and accessories.

LOGAN COUNTY.

(By Fred F. Bellatti)

During the last year we have had two meetings of the Logan County Beekeepers' Association. One was the annual meeting and election of officers in which S. A. Tyler, of Emden, was elected for president; Louis Mann, of Mt. Pulaski, vice president; Fred F. Bellatti, of Mt. Pulaski, secretary-treasurer.

During this meeting S. A. Tyler was recommended for county bee inspector, and later was appointed for the place.

In July we held a field meeting in Middletown which was well attended, and a very interesting meeting was held.

In these meetings it seems to arouse a great deal of interest among those present in regard to the work of the necessity of control of foulbrood diseases, and also in the control of prices of the finished product.

We hope to accomplish more in the years to come.

REPORT OF WARREN COUNTY HONEY PRODUCERS' ASSOCIATION FOR 1924.

The Association held a demonstration in Monmouth during the summer for showing how to eradicate foulbrood. Mr. Elmer Kommer inspected a large number of apiaries after we organized an Association in this county. We held our annual meeting in September and re-elected the old officers. A resolution was passed to recommend our president, Samuel Goodsell, as a State inspector. Our Association, under the direction of our president, staged a honey and bee demonstration at the Fall Festival of our county seat.

GLENN GLASS, *Secretary.*

COOK COUNTY ACTIVITIES.

(By A. G. Gill)

Our Cook County Beekeepers' Association was organized four years ago to promote good beekeeping and combat disease particularly in Cook County and surrounding territory. It aims and desires also to extend its influence to help promote the beekeeping industry throughout the State.

During the year 1924 one hundred and fifteen beekeepers in our territory became members of our Association, all of which were affiliated with the Illinois State Beekeepers' Association. We held five public meetings, three indoor and two field demonstration meetings.

We aim to make our meetings good socially as well as educational and instructive affairs. This year we had outside speakers, Dr. E. F. Phillips, of Washington, D. C.; Prof. H. F. Wilson, of Madison, Wis.; E. S. Miller, of Valparaiso, Ind., and Prof. G. H. Cale, of Hamilton, Ill., in two of our meetings. Home talent gave the program in three meetings.

Questions pertaining to wintering bees, proper management throughout the season, and eradication and control of disease were among those considered and discussed. During the past year our association recommended as inspectors, W. C. Young, E. A. Meineke, H. M. Cronk, and Geo. Herrick. Each was appointed and along with Dr. T. A. Kragness and J. R. Wooldridge, formerly appointed, gave at least a few days' time with one exception to the work. J. R. Wooldridge was appointed by State Bee Inspector A. L. Kildow, to head up inspection work in Cook County.

REPORT OF WOODFORD COUNTY BEEKEEPERS' ASSOCIATION.

The second annual meeting of the Woodford County Beekeepers' Association was held at the Eureka High School, Eureka, Ill., on the 4th of January, 1924. The business session and the election of officers was held in the usual manner. Talks and demonstrations with live bees in a screened tent and practical demonstrations on extracting of honey were given by Prof. O. Wallace Park, bee specialist of the University of Illinois. Free honey sandwiches were served. Stereopticon views and moving pictures of bees were shown.

Through the efforts of the officers and the active members of the Woodford County Beekeepers' Association we have been successful in securing a local bee inspector for the county of Woodford to aid the beekeepers in the eradication of foulbrood which is getting a strong hold in the apiaries of Woodford County.

During the year of 1924, there was a total of 34 members in our Woodford County Association. Several news letters were sent out to the members during the year.

On the 21st of July a field meeting was held at the apiary of

Alfred E. Thomas of Secor. Talks and demonstrations were given by Geo. H. Rea, of the A. I. Root Co., E. W. Atkins, of the G. B. Lewis Co., A. L. Kildow, chief inspector of Apiaries, and John F. Smith, of Eureka. The meeting was enthusiastic and well attended and everybody went home well pleased with the day. One party drove a distance of sixty miles to attend this meeting.

Much interest has been aroused in beekeeping since we were organized and the bee industry is growing. The Eureka High School has organized a bee club and have an apiary on the school grounds.

The co-operative purchase plan has saved for the members 12% on their bee supplies, which makes the amount of $86.30 saved for the members during 1924. Quite a number of our members have saved many times the cost of their membership. Many of the members have also taken advantage of the reduced prices on the bee journals by ordering through the secretary.

Several resolutions were passed at our meeting to be presented to the Illinois State Beekeepers' Association and to our State Legislature to the effect that we should have a larger appropriation of at least $20,000, for the bienium or $10,000 per year for bee inspection.

BENJ. H. FISCHER, *Secretary.*

UNBALANCED CONDITIONS IN BEEKEEPING.

(By H. H. Root.)

Perhaps no other phase of the beekeeping industry is so out of balance as the relation between comb and extracted honey in the various honey markets of the United States. It is a sad fact, but one none the less true, that comb honey is slowly but surely disappearing from our honey market. This situation is of real concern to everyone connected with the industry—to the manufacturer, because his bread and butter depends upon the success of the industry as a whole; to the honey producer (whether he runs his bees for comb or extracted), because the price he secures for his honey depends upon the popularity of honey as a food. All have a vital interest in the balancing up of this unbalanced condition.

Many beekeepers have not realized that the objections to comb honey production are being overcome by certain changes which have been going on—changes that have taken place so quietly that some have not realized that a new day has come.

Out-apiaries, by reason of good roads, automobiles and automobile trucks, are almost as accessible as the home yards used to be.

The use of the automobile has cut down the amount of unproductive hours which the beekeeper formerly had to spend on the road. This has made it possible to transport the honey easily and quickly to a central point, where it can be scraped and prepared for market, fully a month earlier than would have been deemed possible a few years ago. This has meant that comb honey can reach the market quicker than it could a few years ago, when much of it was shipped after the keenest demand was over.

Modern methods of swarm-control have overcome the former difficulties experienced by comb honey producers. Comb honey colonies are almost as free from swarming as those run for extracted honey.

Proper loading of comb honey shipping-cases in a car, or the proper use of comb honey carriers for local shipments, as the case may be, have eliminated much of the troublesome breakages in shipping that used to cause the comb honey producers much anxiety and loss.

Earlier marketing, combined with the more thorough education of the buying public regarding the keeping and storing of comb honey, tend to lessen the loss on account of granulation.

There is an old saying which is as true today as it was years ago; that is, "Comb honey almost sells itself." In fact we can

now say, "Comb honey sells itself and extracted honey, too." In a market accustomed to the presence of comb honey, as most of our honey markets are, extracted honey needs comb honey. It is actually true that comb honey sells extracted. Its beautiful appearance, known to man, woman and child—its long, unbroken reputation for being distinctive, unimitated and unequaled, place comb honey in a class by itself, away beyond the average food product on the market today. A luxury—yes, but so are strawberries, except for a week or two, and yet strawberries sell because there is nothing like them; because their flavor is as good as their appearance.

Ninety-nine out of one hundred housewives, when asked the question, will say: "O yes, we like honey. We buy it in the little square boxes." Thousands of honey consumers, if "the little square boxes" of honey disappeared from the market, would cease to eat honey. They would stop eating it, not because they disliked honey in the liquid form, but because their attention is not called to it—because they do not think of honey.

With all due deference to liquid honey in glass jars, attractive as it frequently is, such honey from a distance, at least, does not look very different from olive oil or from the various cheap syrups. Comb honey, on the other hand, as far as the eye can see, tells a story of the sweetness of the flowers. It makes an impression upon the mind of the observer. It tells a story of the genuineness of the article, of the delicacy of the flower, and of the purity of the product. Very few people can resist the temptation to buy comb honey when it is attractively displayed in a window or on a counter. Comb honey contains the best and most convincing selling arguments. Many grocers have testified to the value of comb honey as a means of selling extracted honey. It reminds the buying public of honey. People would buy more honey if they thought of it oftener. The housewife thinks of sugar. That is why she buys so much sugar that every man, woman and child in the United States is eating more than a hundred pounds of it in a year. She seldom thinks of honey, and why she buys so little that the per capita consumption of honey is probably not over two pounds in a year.

There is no logical reason why every extracted honey producer should not produce some comb honey. In fact, it is not going too far to say that there are many colonies that can produce just as much comb honey, pound for pound, as they could of extracted. This is not true of all colonies, of course, nor is it true all seasons, year after year. The day is not far distant when the well prepared beekeeper will produce both comb and extracted honey, as the conditions warrant.

Of course, no beekeeper could afford to be completely equipped to produce entirely comb or entirely extracted, as the season turned out. Manifestly, that would be impractical. It is not impossible, however, for extracted honey specialists to produce some comb honey every season, without additional cost.

It is likewise true that every comb honey producer should have some extracting supers of comb on hand, for even under the best of management, there are likely to be some colonies which can produce no surplus in comb honey supers, but which could, if the extracting supers were available, produce considerable surplus.

A careful consideration of the whole subject should result in a more varied equipment, which will make possible the securing of the maximum amount of honey of the kind most valuable in dollars and cents. This will ultimately do much to correct the unbalanced condition and put the industry on a better, sounder basis.

THE VALUE OF THE DIFFERENT SWEET CLOVERS AS HONEY PLANTS.

(By Edw. A. Winkler.)

There are several species of sweet clover that are valuable honey plants and provided that atmospheric conditions are right for honey production, they will all secrete nectar very abundantly. All sweet clover honeys, with the exception of Hubam or annual white sweet clover, have a very decided greenish color when first extracted and leave a strong, metallic taste in one's mouth after tasting them. This taste and greenish color mostly disappears after the honey has been stored in cans for a time and is usually totally absent after the honey has been reliquefied and bottled or pailed during the winter months.

Leaving the botanical names of the different varieties of honey producing sweet clovers out, we have the common or wild sweet clover that grows along the roadsides, Hubam, Grundy County, and yellow sweet clover. All of these clovers, with the exception of Hubam, are biennial, requiring a second year's growth before producing nectar and setting a seed crop.

The common sweet clover without a doubt is the beekeeper's best standby in the regions where it grows in the wild state, and has in many years past been the only source from which beekeepers have harvested a crop or saved them from complete failure or starvation.

This common sweet clover, beginning to set bloom just before the end of the alsike bloom is over, usually lasts from six to eight weeks when the weather is favorable and very seldom fails to freshen up again after about two weeks and set a second bloom with a little nectar, allowing the bees a last swing and leave a good taste in the mouth of the bees as well as the beekeepers before the season closes.

Growing abundantly along the road and hillsides and not yet quite out of the realms of the noxious weed class, dairy farmers have found that it has been a great salvation to them in the latter part of July and August when their pastures have dried up and sunburnt, to turn their stock out on the roadside to the sweet clover.

This sweet clover along the roadside which has been cut back by foraging retards the blooming period from two to three weeks, which makes this plant the more valuable to the beekeeper.

With the enforcement of the Volstead act, the many men who hardly know how to spend their leisure hours and who, for

want of some pastime, must drink, and who formerly would drink beer, wine, etc., now step up to the fountain of a drug store and order either buttermilk, sweet milk or some other drink made of milk.

As a result, dairying has been put on a very paying scale and with it more attention has been paid to feeding rations for the cattle.

A test made last winter by a large Joilet dairyman, Mr. Harry Eaton, to determine the value of Hubam clover hay in comparison with alfalfa hay, reported practically no difference in milk production from his herd other than a very slight gain during the two weeks period that the herd was placed on the Hubam hay.

As a result of the increased activity in dairying, farm bureau agents throughout the State have been advocating the planting of sweet clover for pasturage. It makes an unequalled pasturage for both milk cows and other stock, if pastured properly; not too early when the ground is in a boggy condition in the spring and not too many head of stock per acre nor not enough stock, which is just as bad. About 2 head per acre is about right or enough stock to keep the clover cut down to about 2 or 3 inches.

The Grundy County clover is an early blooming clover, which sets bloom during alsike bloom and which has a blooming period of short duration of about one-half that of alsike. It has an exceedingly heavy bloom coming all at once almost, and if atmospheric conditions are just right during its time, the bees are unable to harvest but a portion of the bounteous secretion of nectar in the fields, but as with the alsike bloom, too often the weather is not warm and settled enough to allow for a good crop of honey to be harvested from this early variety of sweet clover. This has been the case the past season of 1924, as was also the case with Hubam clover, the weather during its blooming period in the fall being too cool for nectar secretion, the bees were unable to work it only at intervals.

It has a smaller rooting system compared to the common variety and is not as valuable as a pasture of forage crop for stock, its main asset being an exceedingly heavy seed yield, reports of as high as 16 bushels per acre being made.

There is another variety of biennial sweet clover that has also come to the attention of sweet clover enthusiasts, but which has a less value as a honey plant. This is a late variety of the common white sweet clover and has been found growing abundantly in the State of Ohio. This is rather a bushy type and grows very tall, but owing to its late blooming period will not be of any great value to beekeepers.

The yellow biennial is also a very early maturing clover of short blooming period and a short bushy type, grown very little in the northern part of Illinois.

Hubam has not been a large honey producing clover the

past two years owing to too cool weather during the fall of these years.

This had curtailed the production of seed of this variety to such an extent that there has been very little Hubam seed harvested during the past two years.

The common biennial, white sweet clover is without a doubt the beekeepers' best bet today and cannot be recommended too highly nor advocated too strongly for the farmer as a forage plant and soil builder, for it fits in splendidly with the modern system of crop rotation and with proper methods and very simple rules to follow, its usefulness makes it one of and, I believe, our best of leguminous plants.

JUNIOR CLUB WORK IN ILLINOIS.

(By C. E. Gates.)

There was enrolled during 1924 in the agricultural projects a membership of 4,844 club members, between the ages of ten and twenty. 3,372 of these completed their projects and handed to their local leader a final report of the work. In addition to this 2,875 girls were enrolled in home making projects, with 2,164 completing the work. This makes a State total of 7,719 enrolled and 5,536, or 71.6 per cent completing their projects.

An encouraging feature of the work has been the increased number of local clubs, 376 having been organized this year, as compared with 57 last year. A local club elects officers, has an adult leader and with his assistance plan and carry out a definite program of work. This program of work includes discussion by club members of problems concerning their work.

The projects this year included the Baby Beef Calf, Dairy Calf, Pig, Sow and Litter, Baby Chick, Flock Management, Colt, Corn, Alfalfa, Soybean, Strawberry, and the Home Garden. The ones having the largest enrollments were the Pig, Poultry and Baby Beef Club. Another project started in two of the counties this year and which gives promise of being well adapted specially to Southern Illinois is the Bee club.

A Bee club organized in Williamson County this year held six meetings. One of them was held to order supplies and explain modern methods of transferring bees. Other meetings were held to show a moving picture of bees, to discuss a bee exhibit for their county fair, etc. The members of the club made an exhibit at the county fair of the glass sided bee hive, showing the entire work of the bees in the hive. They received a prize of $5.00 for this exhibit. Cash prizes were also given for their exhibit of honey. Mr. W. K. Galeener, the county adviser, writes, "The members of our club are very enthusiastic and plan to continue the bee work another year."

A bee club has also been organized in Calhoun County. This work in these two counties has not been definitely outlined as a project, but due to the publicity received by these clubs several additional counties will take up the work this year. The Club Specialists are planning to work out a definite Bee club project this year.

LARGE BROOD CHAMBERS, HONEY PRODUCTION AND PREVENTION OF SWARMING.

(By C. P. Dadant.)

It may appear like a repetition of old arguments to again discuss the question of large brood chambers, but this matter is still kept at the front, in magazines.

Lately, a number of statements have appeared from scientific students, with exact reports of figures, showing that the average queen does not exceed 2,000 eggs per day, of laying, and is usually under that number. I wish to discuss that question.

There is no denying of the facts brought out by Dr. Brunnich, Dr. Merrill and others, showing a laying of less than 2,000 eggs per day, in the busiest season, in the hives which they used for experiment. Neither is there any doubt about the figures given in the early years of the past century, by such men as Hamet, Collin and others, showing that the average laying of a queen in the busy season was between 400 and 600 eggs per day. Neither can we deny the assertions of Dzierzon, Quinby, Langstroth, asserting that queens often lay 3,000 eggs per day. Chas. Dadant estimated their prolificness at 3,500 eggs and Doolittle went as far as to say that a queen could lay as many as 5,000 eggs per 24 hours.

Why this discrepancy? Why a laying of as few as 400 eggs in the busy season?

Did you ever see a man try to put a bushel of apples into a peck measure? Is it possible for a queen to lay more than 400 eggs in a diminutive straw skep?

We should not ridicule or find fault with the experiments of others. But we should ask the question whether their experiments on egg-laying have been conducted in the most favorable circumstances.

We know that some colonies, in good seasons, harvest as much as 200 to 400 pounds of surplus honey. We know also that in the time of Hamet, Collin and others, the little straw skeps in which queens laid a maximum of 600 eggs per day, in the busy season, were rarely expected to yield over 20 to 30 pounds of surplus honey.

The solution of the riddle is to be found in the possibilities of the hive, in the prolificness of the queen and in the weather conditions.

What we need to know is, how much honey may be expected from a colony whose queen does not reach an average of over

2,000 eggs per day in the breeding season. This should solve the riddle.

Personally, I have never tried to count the number of eggs laid by the queen, even approximately. But I have known, for 50 years past, that it is impossible to expect a large crop of honey from a diminutive colony or an unprolific queen. I do not wish to throw cold water upon the scientific studies and experiments, but I assert that it is impossible to get as good results from colonies that are often disturbed or that do not find themselves in favorable circumstances as from thriving colonies. In a word, I do not believe the immense results achieved by some of us in good seasons came from colonies whose queens were, for some reason, limited to less than 3,000 eggs of production per day.

I feel the more disposed to reassert the need of spacious brood chambers, because I have lately seen results, to me unexpected, in unexpected localities. I propose to give a detail of this.

First let me say that, if I am brought to speak of the Dadant hives and the Dadant system, I must remind the beekeepers that the urging was brought about by others. Here are some facts:

Some eight or nine years ago, Mr. F. C. Pellett became a member of the editorial staff of the American Bee Journal. He had kept bees for years in Langstroth hives. He became enthused with our apiary methods. Finally one day he came to me and asked: "Mr. Dadant, why don't you recommend your hive and your system in the columns of the American Bee Journal? You never say anything about it. Yet your system is the very best I have ever seen."

I replied that we gave our hive and our system of beekeeping in the "Hive and Honeybee", the revision of the Langstroth book, and that it was with the assent of Mr. Langstroth, after he had seen the result of our methods. But I did not feel that it was best to recommend our system of hives to beekeepers who were accustomed to the Langstroth hive, as a change would cause much expense and they could succeed with the shallower hive, although for my part, I would not accept the shallow Langstroth hives as a gift if I had to use them.

"Well," said Mr. Pellett, "If you do not believe in urging beekeepers to change their system, I do, and I am going to urge it wherever I go." He did; he spoke highly of the Dadant system and of the large hives everywhere at conventions. The upshot of it was that the system began to be discussed. At the Short Course of February 24th, 1919, at Cornell University, Dr. Phillips placed upon the program the following subject: "The Dadant System of Beekeeping" by C. P. Dadant. This compelled my attendance. I defended our system to the best of my ability. Enquiries became so numerous that I decided to publish a little book: "The Dadant System of Beekeeping," which has attained great popularity, 500 copies of it having been sold before it was out of the printer's hands. It is now published in three lan-

C. P. DADANT.
Editor American Bee Journal.

guages, English, French and Italian, with a translation about ready for publication in Spanish.

The above will explain that, if I have spoken favorably of our methods and the hives we use, it was not for my own satisfaction, or to draw public attention, but because a demand was created.

But there have been people who objected to the system, as also to our method of swarm prevention which is connected with the system. One of the most capable scientific beekeepers, Mr. F. W. L. Sladen, now deceased, who was at that time in charge of the Dominion Apiary of Canada, at Ottawa, told me and published the statement that the large hives were not practical in those northern countries, because the season was too short. He said also and also wrote that it was impossible to prevent swarming in a locality like Ottawa, where the winter ended so suddenly, for the bees became excited and invariably began preparations for natural swarming as soon as the crop began.

Mr. Sladen, who was a very serious student, appeared so positive of his assertions that I began to doubt whether I was correct in assuming that our system was successful everywhere, although I knew that a great many people appeared to succeed with it in as cold a country as Russia, where the Dadant hive has been largely adopted.

During the trip that I lately made into Canada, I had opportunity to visit at Ottawa, and there I met a beekeeper who has had the greatest success with beekeeping by using the Dadant hives, the Dadant system and wired foundation. Mr. Tissot is now fairly well known, for a picture of his apiary was published in the November number of Gleanings for 1924, page 730, showing the immense results which he has attained, and I have it from his own statement that he did not attain those results until he adopted our hive and our system. Mr. Tissot uses the large brood chamber, but he has not discarded the Langstroth hives, for he uses them as supers. At the time when I was there, he had 3 colonies on scales which showed weights of 449, 480 and 482 pounds. His apiary was tiered up all the way from 4 to 8 full stories.

Swarms? He gets so few that they have discontinued watching for them. They do not amount to more than 3 or 4 per cent of the number of colonies. He follows our system exactly in this also. But he realizes that the large brood chambers are not the only requirement to prevent swarming, since many colonies would swarm if the queens were old and likely to be superseded during the swarming season.

We have also been told that the Dadant system will not do in southern climates. Yet I recently received a letter from a New Smyrna beekeeper, whose apiary was flooded, in which he says that the only trouble with the large hives is that they are generally too heavy to carry around easily in times of flood.

As a support to my views, I will call the attention of the

beekeeping public to the fact that the late Dr. Miller made his record crops when he used two 8-frame Langstroth hives for brood chambers during the heavy laying, reducing those brood chambers to one hive when he put on supers. He found that an 8-frame hive was too small for the laying of a prolific queen. My experience indicates that not less than 12 Langstroth combs are needed for the laying of a prolific queen, and that it is only the colonies containing prolific queens, whose laying is not impeded, that supply large crops of honey.

APIARY MORALE.

(By Morley Pettit.)

During the great war we read in the press reports from day to day of the "morale" of our brave fighting men, or of the lack of it in the armies of the enemy. This has given us a name for a desirable condition which we have come to call "colony morale". Now it would seem fitting to apply the same term to the beekeeper and his helpers, and speak of Apiary Morale. As workers of the bee colony are kept in working mood by proper conditions, so the morale of the human workers is maintained by good management.

Success in beekeeping depends largely on the mental attitude of the beekeeper. He must have faith in his business as a business, and not regard it as a side line, or an experiment, or a stepping-stone. What attracted me most in the teachings of our good Doctor Miller, who has gone from us never to return, was the fact that he resigned both a musical and a medical career, in each of which his prospects were bright, and taught the world that beekeeping, a far more obscure calling then even than now, is one good road to health, happiness and a comfortable income.

The beekeeper who has made a right start by facing the fact that he has tackled a man's job worthy of his best efforts must have faith in his locality, or move to a good one. I am coming to think more as the years go by that there is less variation in localities than in the beekeepers who occupy them.

The beekeeper who would succeed must have faith in himself and his methods, and not be turned about by every wind that blows. In order to have this faith he must have within himself the elements which make for success in any line: Good health, diligence, foresight, close observation, careful attention to details, but a sense of proportion. He must have the will power to do the profitable things and to leave undone the unprofitable. He should be willing to take a chance when it is a chance of increased profit, but never when it is a chance of ordinary success versus failure. The really successful beekeeper knows the "Why?" of the various operations; he understands the principles involved in good beekeeping, and bases all his methods and appliances on these principles, and not on what he "prefers" or someone else "says".

Success in beekeeping requires a willingness to work, to work hard and to work fast. I have personally worked at beekeeping all my life, and have employed quite a number of different men,

so that it does not take me very long to decide whether a man will make a successful beekeeper or not. There are so many small duties that the man who is slow or indifferent will while away his time, producing less than half the honey that will be produced by one who is quick and alert. Just one rule that has helped me all my life. When nearing the completion of one job, begin to plan how the next one will be done. Every man has his gait, like a horse, and it is next to impossible for him to change it. Occasionally a young man who dreams through his late 'teens and early twenties wakes up, but it is the exception rather than the rule. If a man or woman has the will to develop a beekeeping business and is just naturally slow-gaited, the next point I am going to discuss should appeal to him even more than to the active hustler.

Everyone should work out a system of management which will keep the work running like a clockwork and all hands alert, even in the most difficult of seasons. This takes very careful planning on the part of the chief and quick, active, willing loyalty in the helpers. Work well planned and equipment well prepared in advance, coupled with an earnest desire to see things go on the part of the help, makes a pleasant and profitable summer for all concerned.

At the Pettit apiaries the plans center in the little office next to the carpenter shop upstairs in the main building. It is just a small room plainly finished with a good desk and other necessary standard office furniture. There is an electric heater for chilly evenings and a fan for sultry ones, also a steam radiator for use when needed. Around the walls are shelves of books, Journals and bulletins, and files for records and letters. The windows face southeast and southwest so as to give me all the sun there is when I am spending daylight time at my desk. On the wall opposite are some college group photographs which I prize very much, and when I lean back to think out some problem my eyes wander to the faces of my boys, who are boys no longer, some are professors, and some are farmers, and some are beekeepers. Some are at the ends of the earth and some lie sleeping beneath the fields of Flanders.

We have seven hundred colonies of bees in a dozen different apiaries which are supposed to be visited every eight to ten days during the active season. Practically all supplies are kept at home to be overhauled, cleaned, sorted, etc., and taken to the different yards on the regular trips as needed. To simplify the work we have standardized equipment as far as possible without throwing away too much material that is still useful, or refusing to adopt changes which are sure to increase profits. In fact, we keep an experimental department going all the time.

Transportation is by means of a ton truck, a light truck, and a Dodge touring car. I have not personally driven either of the trucks for some years now, as I find that it pays me best to have this done by reliable help and to always go to the yards in a

passenger car. This carries my personal equipment and a great deal of other material, besides extra men, and makes me independent to sometimes oversee the work of more than one crew. With rapid improvement of roads I am arranging the yards in series, either directly on or just off main highways, and a truck load of supplies going out in addition to the passenger car can take care of two or three yards in a day. The driver is of course a beeman as well.

There has been a great deal of boasting on the part of beekeepers about how many colonies one man could manage alone. It is true that efficiency in this line should be cultivated to the fullest extent. At the same time I feel that a season spent in apiary work is just that many months measured off my life. If I have spent those months toiling harder and longer hours than my strength warrants, they have been wasted, but if I can profitably employ help and equipment so as to make the work pleasant, how much better it is! On the other hand, I think it pays to employ help enough so I can attend to details for which many producers say they have not time. I endeavor to strike the happy medium between management which is too intensive and that which extends so far as to become unprofitable.

Besides having the best of equipment and plenty of it, we study constantly for the best and simplest of methods. These also are standardized as far as possible and are based on sound principles of bee-behavior, so far as they have been determined. Not only is each colony given individual attention, but varying conditions of each location are noted on the different trips. For this purpose we have a set of records which, though exceedingly simple, enable me to plan intelligently for the next trip. The individual hive records pertain almost entirely to the queen. Perhaps detailed colony records as to strength, brood and stores are valuable for experimental purposes, but I do not feel that I have time for them. At each visit we do what seems best for the colony. If the colony does not do well I blame the queen and treat her accordingly. So I keep pretty close watch on the queens. For this purpose I have the hives all numbered and after each visit carry home with me the numbers of the colonies which have had or need various things done to their queen condition. Coupling this record with the queen-rearing records shows me what further should or can be done to these colonies next trip.

The record of visits to each apiary is kept on a plain 3″x5″ card, which bears a letter representing the name of the yard in question, such as N for the North yard, R for the Riverside yard, and so on. At first the names were local names, such as Speyside for the four corners near which the yard was located, but when a yard is moved bodily it usually retains its name, and now the S yard is miles from Speyside yet the boys find it convenient to still call it by that name. The yard cards are filed in the desk according to the dates on which the next visits are to be

made. Each visit to the N yard, for instance, is recorded on the N yard card, with a few words showing what was done and the nature of conditions found: e. g., "May 11, finish clipping, supering". "May 26, unpack and super, all have 1 and many 2 supers". When the record shows a yard well supered and no swarming impulse, and if the weather is backward, the next visit may be delayed, provided nothing else requires attention.

To avoid extra trips we must be sure to take all supplies that may be needed on the regular trip. While at the yard I jot down on a piece of memorandum paper, besides the queen records already mentioned, items of importance to remember when preparing for the next trip, such as the nature of work just completed, special notes on conditions of bees and supers, and supplies needed next day which are being left stored or must be brought. I find this absolutely necessary, and yet sometimes have to drive myself to it, as it is usually a scramble to get through in good time, and it is all so plain then that there seems no danger of forgetting it. But tomorrow it will be different yards and the next day more still, until the memory of details becomes scrambled. There is a particular pocket where these memoranda go, and this pocket is emptied into a certain wire basket on the desk, and this basket is overhauled almost every evening to write up the records and notes for future trips. Records go on the yard cards concerned as already indicated. Notes of supplies stored or needed and of temporary queen-conditions are pinned to the yard card with a wire clip.

As the day approaches for the next visit to any one yard, these notes are carefully gone over during the evening hour in the office, and a "List", as I call it, made out ready to hand to the man who is to take the trip. If he is a senior man, he is given full particulars of the work to be done and advised to supplement the list with any equipment he thinks may be needed, then he is responsible. If a junior man going with me, I take the responsibility and make the list very explicit. For example, "List for K. Mon. June 28. Light Ford, water rad., oil motor, tires, 55x60, 24 supers combs, 20 Excluders, 1—cloths, smokers, veils, lunches, saw, hammer, nails, hive-tools, drinking water." When he has completed the load he is to hand the list to me, or carry it with him and give it to me at the first opportunity. It is used for recording the yard notes so that it goes back to the office to be posted up for next trip. All details are there on the one piece of paper.

When requeening is going on the week-to-week record of colonies is kept in detail and the man going out to a yard is given, on the same sheet as his load list, a statement by colony numbers of what colonies are "K. Q." (queens killed last trip), "R. Q." (queens introduced), "Y. B." (young brood introduced as test), and so on. There is also a place prepared on the sheet for him to fill in colony numbers and other details for his report on conditions as he left them. When a colony is O. K. and requires no

M. G. DADANT,
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further attention, no report on it is required. The point I wish to make is that instead of keeping a record of all colonies whether it is going to do any good or not. I try to keep a record of certain conditions in which I am interested and the numbers, that is, the names of the colonies falling under these conditions. The records are marked permanently on the hives by a shorthand system which I have been developing and takes very little time. The small letter "q" always means that the colony is queenright, "noq" indicates that the absence of the queen has been discovered unexpectedly and is used in place of such terms as "q-out" or "kq" which show what became of her. "Keg" was used by Dr. Miller when he destroyed queen-cells having eggs only, but I use "neg" to show that there are no eggs in the hive at all. And so one might go on through the list, bearing in mind that it is only exceptional or special cases which require a mark at all. The ordinary run of colonies are examined, given necessary treatment and passed.

One of the best things about beekeeping is the frequent changes of occupation. This may be opposed to factory efficiency where speed is acquired by long repetition of certain simple motions, but it tends to the rounding out of the man or woman engaged in the work to have a complete change every little while. We open up the season with shop work in April. Packages are received about the end of this month and May is for queen clipping and general building up operations. Colonies are unpacked about the first of June and supering and swarm control and queen-rearing start the latter part of the month. July is our main honey month and August is for extracting it. These are also requeening months. In September we remove and extract the last of the fall supers and start to pack and feed. October is for feeding and November for finishing up.

I find more advantages in the central-plant system from year to year. Specializing is essential to the highest success. Very few men succeed in practicing law and medicine at the same time. I would not know how to manage without a fairly well equipped office. Others may be able to keep in mind a picture of conditions at all their yards, and carry their plans in their heads, but where so much has to be crowded into a few months, it is risky. Then we have a variety of locations and always changeable seasons. With plans well charted and work well up, we are ready for emergencies. Otherwise, one is liable to see what should have been done after it is too late.

WISCONSIN HONEY GRADING.

(By C. D. Adams.)

In the early days of comb honey production in Wisconsin the beekeepers quite naturally fell into careless ways of marketing their honey. They knew the flavor was good, and so they thought little about the appearance.

With the extracted product they followed the teachings of such good authorities as Doolittle, at least to a certain extent. In those days it was considered unnecessary to let the honey be capped before extracting, as it was considered just as well to ripen it in "ripening tanks." The result was that this ripening was not always properly done and the market was flooded with unripe and fermented honey. Neither were they careful in keeping the containers of white and dark honey separated and the result was that the buyer often got a sad mixture of ripe and unripe as well as all known colors of honey when he bargained for a shipment of good white honey. But the demand was such for a while that it all went.

Then something happened rather suddenly, but it was years before the beekeeper realized what it was. The western beekeeper began shipping his product, both comb and extracted, to the honey-buying centers and the merchants were offered a much finer appearing product at a lower price than they had been paying for the local product. They tried it and its appearance sold it. The beekeeper was slow to understand it, for, strange to say, the retailer did not always know it was not Wisconsin honey he was selling.

The more progressive beekeeper improved his product, but found it did not command a much better price when put on the local market. Many of the larger ones continued to ship their honey to eastern markets and those who sold a good product found a sale for it. Others were sooner or later forced out of the business.

Many had advocated grading their honey for years but to no effect. About 1920 the State Department of Markets began to function and the beekeepers were among the first to ask for assistance. A committee of beekeepers drew up some grading rules which were adopted and so all Wisconsin honey had to be graded or sold "ungraded." Honey produced outside of the State had to indicate in some way on every package that it was not Wisconsin honey. A blend of local with outside honey had to be labeled "Produced in Wisconsin and Other States."

Considerable confusion and agitation resulted. The bottlers

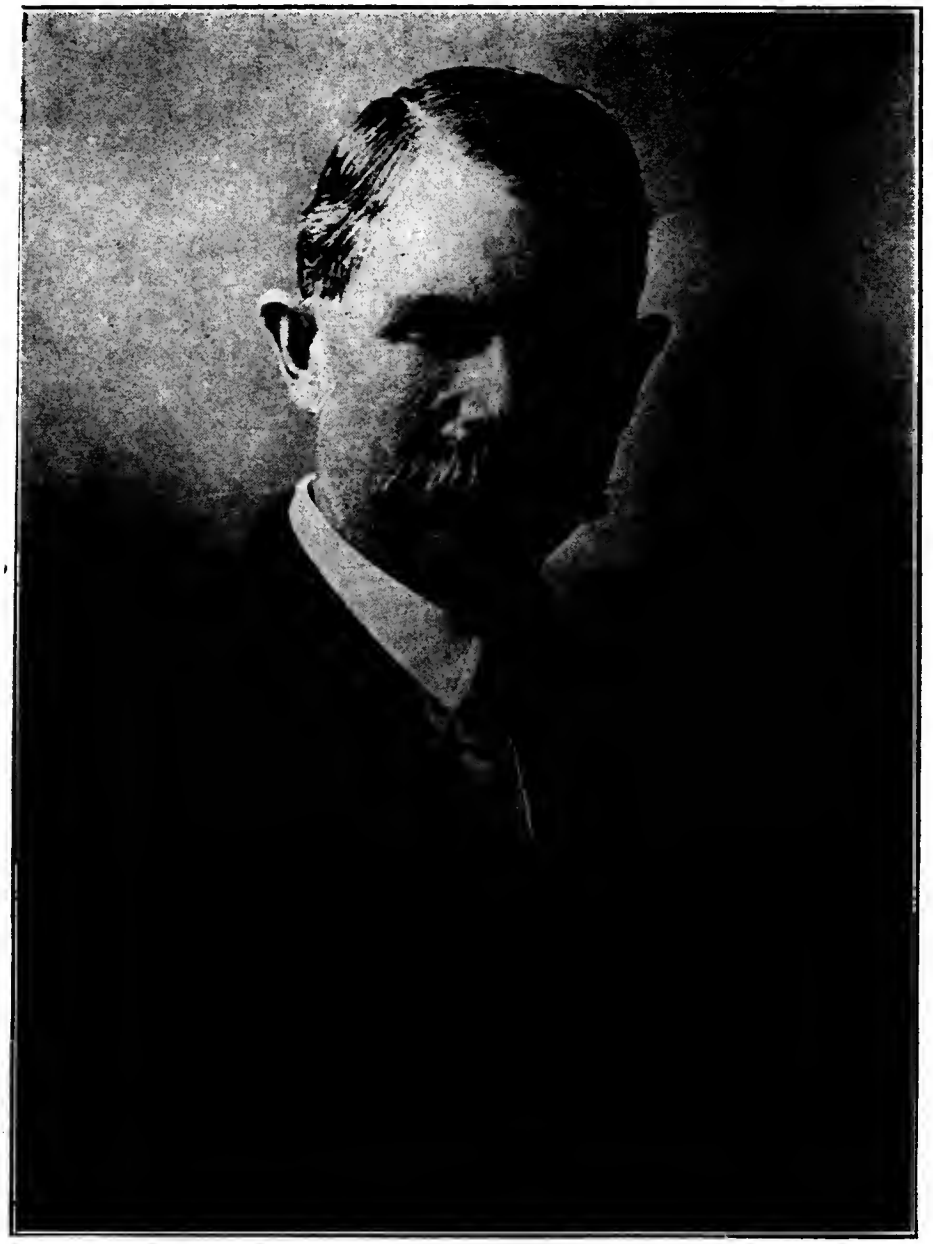
of honey who had been forced by business principles to use outside honey had found the western honey lacked just one thing. That was a clover-basswood flavor which the local trade demanded. They had at least partially satisfied this by adding about 20% of Wisconsin honey to the more uniform, and it must be confessed, better ripened western honey, and selling it for pure Wisconsin honey. These men with the best of intentions plainly said they could not comply with the rules and made plans to fight the law. But better judgment prevailed and they labeled their honey properly but under protest. Slowly they began to realize that the law might after all be a help to them and most of them began to take advantage of it. Now when they receive a shipment of graded honey that is not what it is represented to be they report to the Department of Markets and an inspector investigates. The result is the beekeeper is often required to take back the honey and adjust all claims of the buyer.

If the honey is marked "Ungraded" the buyer is reminded that there is no guarantee back of it, but that if it does not comply with the pure food law, which classes unripe honey with adulterated honey, they do not need to keep it.

The result is that very little Wisconsin extracted honey is now shipped outside the State before bottling. One bottler is still bottling western honey and labeling it "Produced outside of Wisconsin." His trade is mostly outside the State. The largest bottler in the State who was the principal kicker at the start now boasts that nothing but Wisconsin honey goes out under his trade-mark.

But the most noticeable effect has been in the product found on the counter and shelves of the local grocer. When the law became effective only two or three beekeepers in the State were using private labels. Practically all of the bottled honey sold was put up by bottlers and the honey had passed through several hands before it reached the consumer. Today very little of such honey is found. The local beekeepers are supplying about 95% of the honey found outside of two or three of the larger cities. This honey is put up in bottles and pails ranging from 8 ounces to 10 pounds. It is all nicely labeled either with a good private label, a State Association label, or a State Association lithographed pail. The honey is ripe and clean. The grocer is satisfied because the honey is guaranteed by the State, and it satisfies his customer because it has the flavor he has been used to. Still another reason for this satisfaction is that a settled policy of the Association members is that the grocer takes the beekeepers honey at the wholesale price and sells it at the retail price agreed upon.

With comb honey the result has been even more noticeable. While one or two of the producers continue to supply a few of their old customers outside the State with comb honey they do not have to do it. Local dealers are glad to take all produced. Western comb honey was not on the local market for two years.



L. R. ALLEN,
Treasurer Illinois State Beekeepers' Association.

But the season of 1924 was so unfavorable for Wisconsin comb honey men that they simply could not supply the Milwaukee market and a few small shipments of comb honey came in. The beekeeper has found that it pays him to produce Fancy and No. 1 comb honey and he takes a pride in it. Yet there is considerable comb honey stamped "Ungraded"—and most of it looks it. But some of it is first-class. One grocer in Madison we asked why he bought "Ungraded" honey when he could get the graded product. His answer was illuminating. He said, "When I find a man offering good honey as Ungraded I know he is a poor business man and I can drive a better bargain with him." Yes, we still have some unbusiness-like beekeepers.

Good comb honey from adjoining States is often found on the market properly stamped Iowa Honey or Illinois Honey, but not graded. We do not discourage it for it keeps the local producer on his toes. He still has competition.

The results of the grading rules has had many effects, but probably the best one is that honey is no longer shipped, either into or outside the State in large amounts. More of it is produced and consumed, but there is practically no freight nor commissions paid on it. Another of less importance to us is that Wisconsin extracted honey is frequently quoted on the Chicago market as selling from one to two cents higher than that of other States. We wonder if some of our competitors still sell unripe honey. It is poor business.

HONEY RADIATOR SOLUTION.

(By Russell H. Kelty.)

Honey solution has now been used long enough to show conclusively that a proper mixture will withstand even the most severe winter temperature. It has also been shown that the lower the per cent of honey the better the circulation, so that, for instance, in the latitude of Ohio and Illinois, it would be better to use a fifty-fifty mixture by volume than a mixture made of sixty parts of honey to forty parts water, even if the fifty-fifty mixture did slush a little on the coldest mornings and require a few extra moments of "warming up" before taking the car out of the garage.

One of the criticisms of the use of honey-solution in the past has been that there was no means of testing the freezing resistance of the solution after it is in use, such as the hydrometer test for alcohol mixture.

However, it has been found that an ordinary battery testing hydrometer will give a sufficiently accurate test for general purposes. In fact, every batch of solution should be tested with a hydrometer before it is put on the market to make sure that it is not too thick or too thin, as a result of variation in the length of time the solution is boiled in the making. At room temperature a fifty-fifty solution will read from 1,200 to 1,250 and the sixty-forty solution will read from 1,250 to 1,300 on the ordinary battery testing hydrometer. It is suggested that the hydrometer be rinsed with warm water each time it is used.

If the reading is higher than 1,300, the solution will not circulate readily in warm weather without a water pump. If it is thinner than 1,150 it will not resist zero temperatures without slushing.

We have had some trouble from the fact that the solution was unintentionally boiled a little too long, making it so thick that it had a tendency to boil over in warm weather after fast driving.

To analyze trouble from boiling one should draw off a sample of the solution and test with a battery tester as before mentioned, and if too thick add more water, and if it is thin, in which case the solution probably boiled because of slushing, add more thick honey-solution.

We have also had samples of solution under observation that did not circulate well because there was too much foreign matter present. The use of one quart of alcohol to three gallons of

solution causes the precipitation of a brownish, floculent mass in the liquid after the solution has stood for a few days.

Although we have not been able to determine the exact nature of this mass, it seems to be pollen and dextrin and the fact that a solution made of fall honey, and especially honeydew honey, shows the formation of an unusually large amount of this brownish precipitate, seems to indicate that the precipitate is really pollen and dextrin. Anyhow, if this brownish mass is allowed to remain in solutions made from honeydew honey and from other fall honeys, circulation is retarded.

Obviously it is not advisable to try to make honey-solution from any sort of honey that contains a large proportion of gum and pollen, but if a batch of solution has been made up from dark honey and is apparently full of sediment, the best thing to do is to allow the solution to stand for two or three days, during which time the sediment will settle to the bottom, leaving a clear liquid on top which can be safely used. The remainder should be strained through cheesecloth and again allowed to stand as before.

Our experience indicates that although a solution properly made and properly used gives satisfaction in cars without water pumps, as well as cars with water pumps, the fact remains that there is more difficulty and trouble to be expected when no water pump is present. This is especially true of Ford cars.

We do not recommend the use of the solution with old radiators that have a tendency to leak unless the radiator is cleaned out first thoroughly. The fact that quite a number of trucking concerns are equipping their fleets of trucks with honey-solution indicates that there is a demand from this source as well as from so-called pleasure cars.

We do not maintain that the last word has been said about the preparation and use of honey-solution as an anti-freeze for automobile radiators. In fact, experiments now being carried on by several State institutions should bring to light additional data regarding the behavior of the solution in actual use. It has already been demonstrated by thousands of satisfied users that the possibilities of honey-solution are sufficient to warrant careful and thorough investigation and experimentation to perfect the process of manufacture.

HOW CAN THE ILLINOIS BEEKEEPERS' ASSOCIATION BEST SERVE THE BEEKEEPERS OF ILLINOIS?

(By J. R. Wooldridge.)

This is a difficult question to answer, requiring some discussion and a united effort on the part of all members.

The first thing to do, in my opinion, will be to formulate a plan suitable to all, then use our united effort to bring these conditions about.

Some of the things that should be done:

The membership of the State Association must be increased. How can this best be done? In my opinion by County Associations. And why? Because County Associations are cheaper in yearly dues. Members can attend more meetings, having a voice in what shall be done, with voting power in Springfield when present, and should have Proxy voting power at Springfield when absent.

At present about one-fourth of the counties in Illinois have an Association.

Is the State Association going to stand idly by and allow three-fourths of our counties to remain out of the fold, with a number of counties now asking for help? If they do they are not functioning the office as they should.

Cannot this Association take the initiative by seeking some active beekeeper of any unorganized county, he to secure a suitable room with light, heat and 110 voltage. This can be done with a small effort, by interviewing the officers in charge of Public schools, High schools, Colleges, City Hall and picture show people. All free on the ground of educational work and a direct community good.

I am pleased to say that I have personally done this a number of times and never failed once and always got the best in town free. No good reason why this practice cannot be continued to every unorganized county in the State, this having been done, cannot we secure practically all the names and addresses of all beekeepers in the county being organized, then cannot the officers of the State Association get up an attractive program to interest the most indifferent beekeepers and the non-interested as well where our ranks are usually filled from and many leaders originate.

What will the program be? Invitation to be present with program attached. What the meeting is for; what will occur at meeting? Benefits by being organized for either the buyer or

seller, educational, a community good. For non-interested at present, films, slides of all kinds showing the bee in activity, and don't fail to have a funny on beekeeping at the last.

WINTERING BEES IN ILLINOIS.

(By Wallace Park, University of Illinois.)

Too little attention has been given to the matter of proper wintering of bees in the State of Illinois. In traveling around during the winter, one rarely finds bees that have been given any protection whatsoever. They are usually left on their summer stands to survive if they can; but many perish for the lack of stores and protection.

During the period of one hour, the writer, observing from the window of a train, traveling through central Illinois, noticed eight apiaries containing a total of one hundred twenty colonies of bees. Half of these colonies were in one yard. The other sixty were in apiaries of from one to twenty colonies each. In only one apiary was there any evidence to show that the owner of the bees had made any effort to conserve the vitality of his bees by providing protection. This apiary comprised twenty colonies placed in a long row with entrances to the south. Leaning against the rear of the hives was a windbreak of corn fodder, with more or less fodder pushed in between the hives. The other one hundred colonies had been left entirely to the mercy of the weather. Think of it! Only one colony in six had received protection—or, rather, partial protection.

The conditions just described for central Illinois are not peculiar to that section, but are duplicated in every quarter of our fair State. Neither are they confined within the boundaries of this State, but are to be found in many of the States of the Union. Failure to give winter protection to bees is particularly widespread throughout the region where the winters are not severe. Central and southern Illinois lie within this region.

It is true that about nine out of ten colonies will manage to live through the ordinary winter in this region even if unprotected. Many beekeepers argue from this that it is unnecessary to trouble about giving protection, and are convinced it would not pay. The weak spot in this line of argument is the fact that such beekeepers do not fully appreciate the difference between a colony that manages to come through the winter with a few hundred worn-out bees, and one that comes through with ten to twenty thousand bees whose vitality has been conserved by the use of proper protection. The former is a liability; the latter, an asset.

Some of you are familiar with the experience of the Bee Culture Laboratory at Washington in connection with modern methods of wintering. Up until the time when these methods

were first employed, the region was considered one of the very poorest in the entire country, so far as honey production was concerned. As soon as proper wintering methods were put into practice, a surplus of about 100 pounds per hive was obtained from tulip poplar, a source which had never been recognized as important, simply because the colonies had never before been strong, early enough in the season to take advantage of this valuable source of nectar. Washington, D. C., is about the same latitude as southern Illinois.

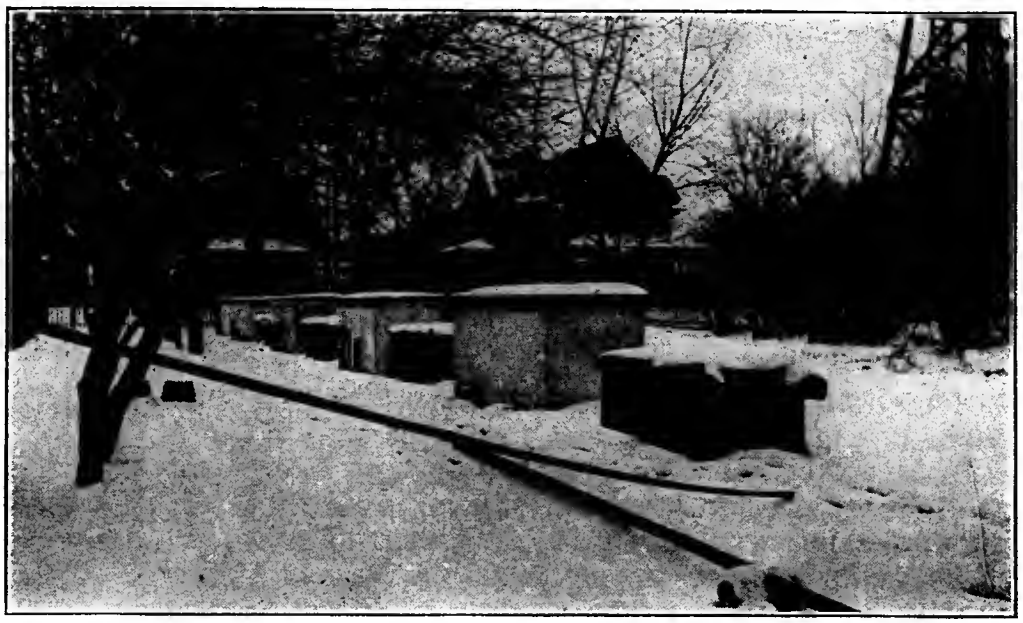
Wintering experiments have been conducted in Kansas by Dr. J. H. Merrill, for more than five years, and in every case the results have shown that it pays to give proper winter protection in that region. It will be recalled that winter conditions in Kansas are almost identical with those in central and southern Illinois. Tests made in Tennessee and in northern Texas have shown that it pays to give winter protection even in these places, both of which are farther south than the southernmost part of Illinois.

In an exceptionally favorable season, everybody gets a crop —even the man who gives no winter protection. But when you find a beekeeper who rarely fails to secure a crop, you can be very sure he gives his bees every possible care in fall and winter as well as in spring and summer. One fair trial of the two methods side by side rarely fails to show the advantages of winter protection. For fear there may be those who are in doubt as to just what is meant by modern methods of wintering, a brief review of the important considerations will be given here. It should be understood that in order to have the bees in good condition for going into winter quarters, it is necessary to begin working toward that end considerably before cold weather sets in.

The first step is to introduce a young queen, in order to produce a large number of young bees late in the season whose energy has not been used up at field labor. Bees may be likened to a dry-cell battery. They are created with just so much energy. The less they work, the longer they live. Bees that work through the harvest, live only five or six weeks, while those which emerge after the harvest may live six to eight months under favorable conditions. A queen that is more than one year old ordinarily restricts her egg laying greatly during August and September, but a young queen continues to lay until late in the fall. In order to insure the presence of a larger number of young bees for the winter clusters, a vigorous young queen should be introduced six weeks or more before the first killing frost.

The second step is to provide ample stores of good quality. Healthy bees void their feces only when on the wing, but if their winter stores are of poor quality, the accumulation of waste products is rapid. In regions where the weather is such that bees have opportunities for cleansing flights every two or three weeks during the winter, the quality of the stores is not so important a factor as in regions where flight days are less frequent.

Imagine, if you can, a man operating a heating plant under conditions such that the space available for storing ashes is limited to one small bin and that it is impossible to have this bin emptied except at long intervals. Will it make any difference to him whether the quality of the coal he has to burn is high or low?



Bees in winter quarters at the University of Illinois.

The quantity of stores is perhaps even more important than the quality where flight days are frequent. In determining the amount of stores needed for wintering, two points must be considered: the amount required to sustain life in the adult bees of the colony, and the amount required for rearing brood during early spring. There is even a third consideration. That is the fact, first pointed out by Phillips and Demuth, that whenever the amount of stores in a hive falls below about fifteen pounds, the colony begins to curtail broodrearing. It is evident then, that each colony should be provided in the fall with at least fifteen pounds more stores than it can possibly use up before the arrival of the next season's honeyflow.

Records obtained at the Iowa Experiment Station show that it is not unusual for a colony to consume fifty pounds of stores between the close of the fall honeyflow, and the beginning of the spring honeyflow. And that amount was in addition to whatever supplies the bees were able to obtain from the fields in the meantime. More than half of the total amount was used for broodrearing. It appears, therefore, that sixty-five pounds is not too much to leave with a good colony in the fall. Mr. Demuth once remarked that if he could compel every beekeeper in the country to leave sixty pounds of stores on every colony in the fall, he would guarantee that honey production in the United States would be doubled the following season.

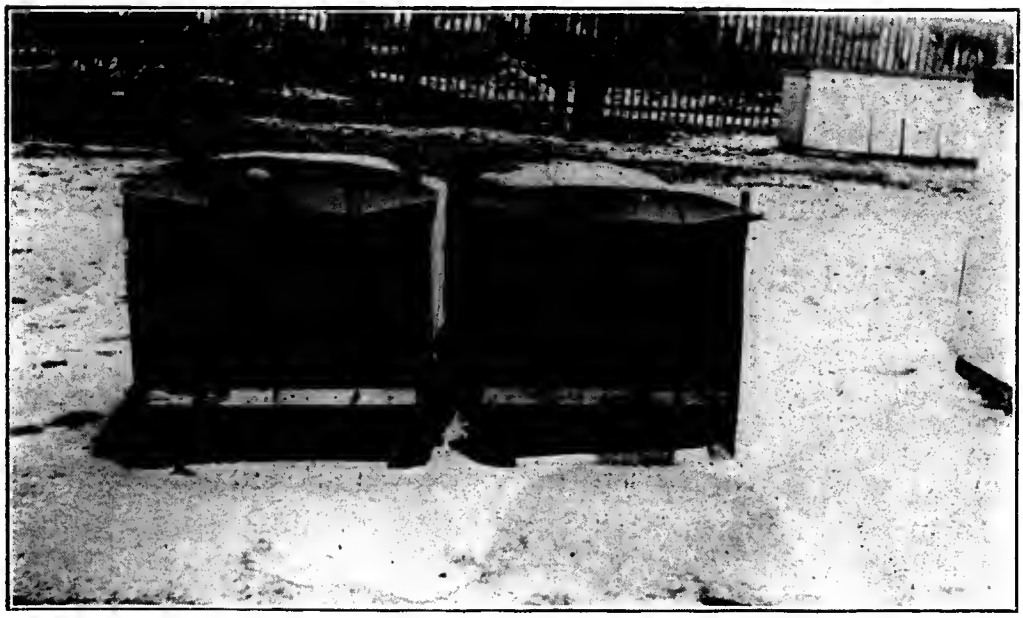
It is out of the question to get sixty pounds of honey into a

single ten-frame Langstroth hive body and still have room for a strong colony of bees; so it has became common practice among up-to-date beekeepers to winter bees in two stories or in some cases, a story and a half. This additional room is valuable also as brood-rearing space in the spring. We now know that a brood-chamber containing ten Langstroth frames is not large enough to accommodate the full laying capacity of a high-grade queen.

The third step in modern wintering practice is that of providing adequate protection throughout winter and early spring. So far as is known, honeybees are the only insects that cannot hibernate. They must, therefore, maintain a relatively high body temperature even in winter. To do this they consume honey, which is a heat-producing food. And in order to conserve this heat to the utmost, the bees of a colony cluster together in the form of a sphere, with the bodies of the bees forming the outer layers packed closely together. In this way a sort of crust or shell is formed which helps greatly to prevent the escape of heat from the cluster.

The temperature within this cluster is never permitted to go below 57 degrees Fahrenheit. As the weather becomes colder and colder, the bees in an unprotected hive are compelled to consume larger quantities of stores in order to maintain a temperature of 57 degrees. The energy expended in keeping themselves warm greatly reduces the life and vitality of the bees. Moreover, the consumption of larger quantities of stores is attended by the accumulation of a corresponding amount of waste products. This results in restlessness on the part of the bees, which leads to the consumption of still more stores, and so on in an increasingly vicious circle, until a flight day relieves the situation or the bees die of dysentery.

On the other hand, the vitality of a colony which is well insulated and sheltered from the wind, will be conserved to a marked degree. Such a colony will breed up much faster in the spring than the unprotected colony for two reasons. Its bees are more vigorous and can do more work; and, having the benefit of the insulation during the period of early brood-rearing, a much larger brood nest can be maintained. When it is recalled that the temperature necessary for brood-rearing is above 93 degrees Fahrenheit, the value of insulation in early spring will be recognized.



Colonies Packed in Tar Paper.

Probably the best way of providing proper insulation is by the use of one of the various types of packing cases which have been developed. One of the most satsfactory is the quadruple case advocated by the Bee Culture Laboratory at Washington. It is described in Farmers' Bulletin 1012, "The Preparation of Bees for Outdoor Wintering," and to this the reader is referred for further details.

For those who feel they cannot afford permanent packing cases for their bees, the following inexpensive case is recommended:

Construct a rim around the lower part of the hive 4 inches wide on the sides and rear, but only about 2 inches wide across the front. This rim provides a form to which the paper may be fastened and forms the tunnel to the entrance. Measure the total distance around the outside of this rim. Add a few inches for lapping and cut off the required length of single-ply tarred paper or slaters' felt. Stand the paper on edge, allowing it to rest on the ground, and fasten it to the rim by nailing through strips of lath. An upright 4 inches wide placed edgewise against one side of the hive provides a good place to fasten the ends of the paper where they lap; or the ends may be pinned together with a couple of nails. Pack with dry forest leaves or chaff, packing it firmly at the corners, and gently along the sides to prevent bulging. A collapsible form placed around the paper case while packing is a big help. After 6 to 10 inches of packing is placed on the top of the hive, the upper edges of the paper case are neatly folded in, and the entire top is then covered with a sheet of two or three-ply roofing paper. To fasten this down securely, run two strands of heavy twine or bailing-wire over the top in both directions, fastening the ends to nails driven into

the rim near the bottom of the hive. Cut an opening about 3/8 by 1½ inches through the paper for the winter entrance, and the job is done.

Few beekeepers realize the importance of a good windbreak in wintering bees. Experiments conducted by Dr. Merrill of Kansas showed that colonies which were packed but not sheltered from the wind did not winter as well as those that were not packed, but were protected from the wind; while, for best results in wintering, it was found that both packing and windbreaks were needed.

The southeast slope of a wooded hill is usually an ideal location for outdoor wintering. A few rows of close-growing evergreens make an excellent windbreak. But buildings and tight board fences are not satisfactory as a rule, because of the tendency of the wind to whirl around and over them, instead of having its velocity checked as is the case with woods and hedges. A very good windbreak can be constructed at a very moderate cost by nailing lath to a frame-work, spacing the lath nearly an inch apart. Such a windbreak, made up in panels is very useful, as it can be set up or taken down quickly and can be moved or shifted at will.

Summary.

It has been found that bees need winter protection in regions even farther south than the southern part of Illinois.

It can scarcely be doubted that bees in all sections of Illinois need protection in winter.

Every beekeeper in Illinois is urged to give a fair trial to modern methods of wintering bees.

AMERICAN HONEY PRODUCERS' LEAGUE GROWING RAPIDLY.

(By S. B. Fracker, Madison, Wis.)

Among the two thousand or more trade associations in the United States, the beekeepers have organized one of the youngest. Since 1920 those interested in the production and sale of honey have followed the steps of the grocers, automobile dealers, hardware men, canners and those engaging in hundreds of other occupations, by forming a national organization to look after all the business interests of the industry.

The man on the farm is notoriously hard to get into an organization and any attempt to line up all the beekeepers of the United States in one organization in a few weeks is out of the question. Nevertheless, the number of members in the League has been increasing every month for several years and the total members in good standing in January, 1925, is 1,650. Many have not been reached in any way or solicited even by mail for their membership, and as soon as it is possible to present the matter the membership should rapidly become three or four times as large as it is.

The work of the trade association depends largely on the nature of the trade represented. League work is divided into a dozen or so different projects each handled by a volunteer committee based on instructions from the officials and members of the national organization.

National Honey Week is one of the most important undertakings of the League. This was held for the first time in 1924, and while the crop was light and advertising not so important as it had been at times past, the interest was pronounced. The week was observed by beekeepers and dealers in all parts of the United States. The greatest attention was given to it in the central section, but the Pacific Coast and the extreme southern and eastern States celebrated it also.

It has now become established as a permanent institution by the League and the dates for the one in 1925 have already been fixed. It is understood that the week before Thanksgiving will usually be used, so the dates for this year are November 16 to 21. By pushing national honey week the sale of honey in the fall can be increased greatly and the troubles of the beekeeper who carries over hundreds of pounds month after month because he cannot readily dispose of it will be eliminated.

The bonding of bee and queen breeders, upon which the League has been working for two or three years, is now an ac-

complished fact and at the time of writing applications are being received by the attorney of the surety department. Under this plan the names of the bonded breeders will be published in the bee journals and the display ads will include the League trademark showing that the breeder is covered by the League guaranty. When any member of the League suffers on account of delayed shipments of bees, unmated or mismated queens, short weight or the introduction of disease through the purchase of nuclei or combless packages, he writes the breeder stating his claim and if he cannot adjust it satisfactorily with the shipper the surety department of the League will settle the claim. Every member of the League is protecteed in this way in his purchases from bonded breeders. It is recommended that those who are buying bees and queens and wish to protect themselves from intentional or accidental loss make their purchases from bonded shippers.

The most important feature of this breeders' bond is not so much the protection of the individual purchasers as it is the impetus it will give the business of shipping bees from the southern to the northern States. The breeders are expected to get as much or more from it as the northern beekeepers. It has been shown over and over again that the purchases of three-pound packages or of nuclei in the early spring is a most profitable undertaking for northern beekeepers and as soon as they feel confident that shipment will be made at the specified time and that disagreements with the shippers will be satisfactorily adjusted, this business can be increased immensely. Southern breeders report that they can produce bees as rapidly as they can sell them within any reasonable limits and that they can double or treble their present production as soon as the demand justifies. The whole transaction is therefore one which will help out northern honey producers and southern bee breeders alike.

Advertising honey is another line of work of the League to which a committee is giving its best efforts. Advertisements in magazines of national distribution are so very expensive that they are out of reach of honey producers. The League has, however, engaged in one campaign of this kind in a series of advertisements in "Good Housekeeping" and this resulted in the distribution of about twenty thousand honey recipe booklets to consumers in the United States and other countries. An additional fifteen thousand or more of these booklets have been distributed through beekeepers themselves to their customers.

The present plan of honey advertising as worked out by the League consists of a scheme which has been called "Maximum Advertising at Minimum Cost." Under this plan all the means of publicity available without great expense are continually employed. The advertising committee is working out a poster for use in grocery stores and also on roadsides throughout the country. It is also working out uniform labels and lithographed

containers to be employed by members of the League in every section. In addition to that, stationery will be offered to League members at about the cost of printing, the stationery to bear the League trade-mark and a statement that the beekeeper using it is a member of the national organization. Reading matter, stories on honey as a food and the methods used in its production are also supplied beekeepers who promise to see that they are run in their local papers. The experience of several States in plans of this kind shows that the continual discussion of honey keeps it before the public and immensely stimulates sales.

The legal department of the national organization has accomplished much, both in legislation and in aid to beekeepers in different sections of the country. In connection with the latter work it has prevented the enactment of ordinances in many cities prohibiting the keeping of bees within city limits. By providing the beekeeper with precedents and references to show that such ordinances are unconstitutional many cities have been deterred from passing such ordinances and in other cases where they have already been passed, no attempt has been made to enforce them. The legal counsel has also gathered together all the laws affecting beekeepers and has published them in a book entitled, "The Law Pertaining to the Honey Bee". This is written in a popular style, but covers all the legal decisions affecting bees which are on record in the English-speaking world. It is of value therefore not only to the beekeeper in letting him know what his rights are, but also for the lawyer who has a beekeeping case to handle and who, without its aid, has difficulty in finding the various precedents upon which his action must be based.

An increase in the tariff on honey importations from one-third of a cent a pound to three cents a pound, which was secured by the legislative counsel of the League, has been in effect about three years. Its result has been the virtual disappearance of foreign honey from the American market and it has been one of the most important factors in keeping honey prices steady during the depression.

Grades and standards take a long time to work out and the standardization committee has been in touch with the Bureaus of Agricultural Economics and of Entomology of the United States Department on this subject for two or three years. At the St. Louis meeting of the League the colors were determined upon and since that time the department has been working on a color grader. This proved unusually difficult, but the mechanical obstacles have now been overcome and the official color graders will be placed on the market shortly. The committee has also worked out the standards for quality of comb, extracted and bulk honey, and at the Chicago meeting of the League in January, 1925, went over them in detail with the people from different sections of the United States in attendance at that meeting. The federal department will now present the conclusions to the

honey buyers and as soon as the different groups get together, federal grades will be established. It is hoped that they can be announced in time to apply to the 1925 honey crop.

Freight rates on honey have discriminated against this product for years, as the beekeepers have never been organized and have never presented their cause to the railroads. A comparison of rates on honey with those on sugar, corn syrup, preserves, pickles and maple syrup show that the trade associations back of these other products have been active in securing favorable classification for them. The traffic committee of the League is organized for work on this subject and one hearing on the classification of granulated honey has already been held. A compromise has been proposed by the railroads and the traffic committee is now engaged in negotiating with the railroads on the compromise. This committee is permanently organized to handle all matters relating to the transportation of comb and extracted honey and the methods of packing for safe shipment.

A popular feature of League service is the warning poster, which has been effective in many cases in preventing robbing and marauding in apiaries. The League has had printed a supply of large posters, which are for sale at one dollar each. The poster offers a reward of $100 for anyone supplying information which will lead to the arrest and conviction of persons molesting the posted apiary in any way whatever. The receipts from the sale of these posters are kept in a special fund to provide for the payment of the reward when it is claimed. One such reward has been paid by the League to a lady in western New York who discovered who had stolen a gasoline engine from an apiary and whose information led both to the return of the gasoline engine and the arrest and conviction of the thief.

Bee disease is the most serious problem of honey production in many sections of the country. An attempt is being made by the League through the committee on federal bee disease cooperation to secure assistance to the States from the federal government in driving out American foulbrood. Support by most of the inspectors of the country and many of the beekeepers' associations has already been assured and the committee is now working with the department of agriculture on a bill which would make the necessary provisions and which would still protect the interests of all sections of the United States.

It seems impossible that all these different lines of work can be carried on with the meagre resources of the League and that would not be possible if it were not for the loyal, self-sacrificing activities of the different committee members. The officials and committeemen of the League, who come from all sections of the country, are interested only in one question: "How can I help the other fellow on his own job?" It is realized that cooperation is not a panacea which will cure all the troubles of beekeeping just by furnishing some sort of machinery for doing it, but when we all get together for the benefit of the industry, paying small

dues, and each doing his share in the legislative, traffic and advertising branches, the results cover a tremendous field.

The work the League has done for and by the beekeepers and the work it has laid out to do could not be achieved by separate State associations. The League does not take the place of local associations; it is a combination of them together with the independent beekeepers, to work out national problems in the honey industry.

It is doing this work for one dollar a year, two cents a week from each individual beekeeper. The more there are who join, the greater and more rapid will be the results in improving conditions of honey production and improving the demand and price.

The readers of this report are all cordially invited to join the other beekeepers of the country in accomplishing these ends.

WHY I PRODUCE EXTRACTED HONEY.

(By Edw. A. Winkler.)

The main reasons why I produce extracted honey almost exclusively now, I believe to be the swarming problem and the desire to produce more honey and a foresight to the disposal and marketing of my crops.

Notwithstanding the impression that has been created, that one can produce just as much comb honey per hive as one can extracted honey, with a chain of sixteen out-apiaries and our system of 1½ to 2 story colonies for strong wintering and fast spring building, I firmly believe after trying out all the latest kinks in comb honey production, I can produce more extracted honey per hive with less work, less equipment, dispose of my entire crop much more readily and with much better satisfaction and make more money than I could producing comb honey.

What little comb honey we produce is produced on colonies headed with young queens or which are ideal for comb honey production.

Operating a large chain of apiaries such as we have, we have learned that to properly produce comb honey, it would necessitate a visit to each apiary every 4 or 5 days during a heavy flow. This is impractical for us with the help we have. One of our main issues is to keep the operating expenses down to a minimum. And when one spends half of the day riding from yard to yard, very little work is accomplished. And a beekeeper with any amount of inventive nature, soon acquires a system of management that must eliminate every unnecessary operation with the colonies and other work.

In the season of 1916 I decided to operate one of my apiaries exclusively for comb honey. That year being a rather lean year with only a very light flow of honey coming in at any time during the entire year, my plan or insistence to produce comb honey only in that yard met with an entire failure, but becoming discouraged with the plan before the summer was over and finding the colonies mostly bent on swarming, I removed the comb honey supers on one-fourth of the yard and replaced with drawn combs, and as a result I harvested an average of over 50 lbs. of extracted per hive during the balance of the season from those hives, whereas the average of comb produced from the other hives was a little over 15 lbs. per hive for the entire season.

Not being satisfied with these results, we still determined to run partly for comb honey, mostly because we had such a large

equipment already prepared for comb honey and partly because we thought at that time that the production of comb honey entailed less time and labor than extracted.

The disposal and marketing of our large comb honey crop usually met with several mishaps. The forced early shipping and disposal of a large crop usually led to the commission houses in Chicago, and an unsatisfactory settlement. Small out-of-state shipments during the winter months have often been unsatisfactory and the inability to send a representative sample of comb honey also prevented many a sale, and today yet the grading of comb honey is not universally known enough to enable the producer and merchant to trade properly without a personal inspection of the comb honey. One who buys comb honey never knows just how the honey is going to look until he inspects it.

This is all entirely eliminated in the sale of extracted honey. Given a small sample of extracted and specify "granulated in new 60-lb. cans and cases", and the purchaser knows just what to expect to get when ordering.

The price of comb honey sections, foundation, and shipping cases, together with the many thousands of culls and off-grade sections to dispose of, has cut down the net profit of producing comb honey so materially that we soon decided in favor of extracted honey.

Comb honey can be found on the grocer's counter mostly in the fall and winter months usually and only too often becoming an eyesore if the grocer fails to sell the last few sections which some unthinking customer had poked a finger into and it has become running and messy. These objections are also absent with extracted honey, which can be found the year round on the grocer's shelves put up in neat, clean bottles and cans, and with a little attention being paid to proper temperature and bottling methods, it will stay in a liquid form for many months without granulation.

The public will, and is, becoming educated to the use of extracted honey in preference to comb honey, as it became accustomed to the auto in preference to the horse and wagon.

We are producing honey on a commercial basis only and not for pleasure, but the many pleasures we get from Mother Nature while in the pursuit of an occupation only adds to the almost irresistible force that leads one into the pursuit of beekeeping. There are other enterprises and lines of business that are much more remunerative financially than beekeeping, but few if any will give the follower the many pleasures, scenic beauties, attachment to nature, excitement, satisfaction of achievement, moments of quietude and restfulness, that beekeeping provides, provided one does not get too heavily into the pursuit, with too little help and is unable to enjoy the innumerable pleasures that can be found in beekeeping.

Our colonies are almost universally kept in 1½ and 2-story hives and about 100 colonies in new style jumbo hives.

Our system of beekeeping consists first, to keep a record of each hive. A new record is made each year so that we can look back in order to find the age of queen, the three disease inspections each year, honey production, breed or special markings of the strain and any other markings or special habits the colony may have, such as docility, color, heavy or uneven laying queen, prolific workers, etc. Without these records from year to year, we could not expect to get a maximum crop or to keep unproductive strains from heading our colonies and lack of keeping these records are one of the chief failures of many large and small beekeepers today, who are continually struggling along with only small crops to pay them for their toil.

All apiaries are visited at intervals of about one week to 10 days after fruit bloom starts. Each colony is inspected for queen cells and need for more super room by a glance between the two brood chambers. This is done by tilting the supers back.

Most of the brood is removed if queen cells are being drawn out. We use no queen excluders in our regular manipulations, as we consider a queen excluder to be also, in many cases, a honey excluder.

More ventilation is given by placing a piece of lath between the bottom board and hive body near the front of hive and one on each back corner later on if the colony requires more air.

We keep most of our apiaries in the sunshine, and protect them from the hot rays of the sun with an old discarded cover bottom board or constructed shade board.

The empty super of combs is always placed on top and never underneath another super.

All supers are placed back on their respective hives after extracting for the yard is done. This we do right at the outyard. In this way, we extract from 200 to 300 gallons per day. All of our help consists of experienced boys that have speed, courage and ambition.

All queens are allowed free access to all supers, but whenever one decides to occupy the third super she is immediately discouraged by splitting that brood apart and placing a few frames of honey between. We requeen whenever a colony needs requeening, but make a wholesale job of it during the latter part of September or first of October, and we leave about 40 pounds of honey for winter stores per colony, and always feed sugar water to stimulate brood-rearing the middle of April and usually again between fruit bloom and alsike. We have found this feeding to be very remunerative and believe we owe much of our large harvests to this practice.

We use full depth supers for extracting and have discarded all shallow supers for extracting use, finding that a colony that is in proper condition and strong enough to work can easily occupy a full super.

We have a battery of four Dadant uncapping cans and use two large cider presses to press the cappings after they have

stood two days. The hard cakes of cappings are stacked up and left until after the bees are packed for winter.

We have equipped and operate our apiaries for quantity production and with our system we do not crowd our colonies as is necessary when operating for comb honey. And our swarming problems the past season have kept us busy enough while running for extracted, for we aim to keep all increase down.

THE NECESSITY OF STUDYING THE EFFECT OF WEATHER UPON BEEKEEPING.

(By Jas. I. Hambleton, Apiculturist, Bureau of Entomology, United States Department of Agriculture.)

Scientific men have conducted investigations along two main lines on the meteorological conditions which induce the production of either good or poor crops. One of these is a determination of a cycle of meteorological phenomena occurring at regular intervals, accompanied by the simultaneous occurrence of some agricultural phenomenon, such as an unusually bountiful or lean harvest; the second is a study of the effects upon certain crops of various weather conditions preceding the growing season. Of these two lines, more has been done on the latter, and the practical value of this work has already been proved. Not only is the collection and study of data along this line useful in predicting with considerable accuracy the character and quantity of crops, but much light is thrown upon the methods of correct culture for those crops. The knowledge of the relationship between a specific crop and its optimum weather conditions will often enable one to determine without trial the geographical limits of its profitable cultivation.

The relationship between weather factors and the production of honey is a subject upon which little scientific work has been done. The uses to which such knowledge could be placed are many and varied. Although beekeeping is practiced successfully in most parts of the country, there are still large areas where commercial honey production has not been adequately tried. Today the only method of learning whether a location will prove profitable for extensive operations is to test it. With the scant knowledge available concerning the influence of various weather factors upon the behavior of bees and plants, it becomes necessary to try out a new locality for a number of years before one is justified in classifying that particular locality as to profitableness from a beekeeper's standpoint. The delay involved is expensive in many ways. One could not well afford to make a start on a large scale in an untried locality. The risk would be too great, and, with only a small beginning commercial production would be reached only after long delay. A knowledge of the relation of weather and honey production might also be used in determining the character of the beekeeping work one could most profitably pursue, and much information might be obtained on methods of manipulations best suited to a particular locality.

Today we know little regarding the influence of weather factors upon either nectar secretion or the behavior of bees. We

have undoubtedly learned through years of experience many manipulations that are in harmony with both nectar secretion and bee behavior, which we find profitable, but which we use blindly, without knowing the reason. This has been true in various phases of beekeeping during the past years, and we undoubtedly must continue to work in the same fashion for many years to come. We cannot, however, say that meteorology has not received attention from apiculturists. Many articles on the effect of weather upon the behavior of bees and upon nectar secretion have been written, and several valuable scientific contributions have been made, especially on nectar secretion. Bonnier and de Layens have studied the subject carefully and made valuable contributions on these phenomena; and in our own country Kenoyer has published some interesting data on nectar secretion and honey production. With all that has been written we still know little regarding nectar secretion, and scarcely anything regarding the activities of bees, in so far as the relation of weather factors are concerned. There are two principal reasons for this lack of knowledge; first, comprehensive data on factors other than the weather are lacking, and, secondly, the deductions that have been made have too often been based on insufficient observation. These in turn have generally been of such a nature that no tangible conclusions can be drawn from them. Those who have worked on nectar secretion have been compelled, on account of the nature of the problem, to confine themselves to a limited number of species of nectar-producing plants, and, moreover, have been able to study only a limited number of individuals of any one species. The technique employed has also limited the scope of these investigators. It is therefore not to be wondered that so little information is available concerning nectar secretion. The method of procedure in most cases has been to remove the nectar from a number of blossoms by means of a pipette at regular intervals, the variation in volume of nectar from hour to hour being then compared with the attendant weather factors. From such data conclusions are drawn, and in some cases the variations in the activities of the bees have also been noted, to amplify the conclusions. In this field of investigation temperature and humidity have received most attention. Some investigators claim that an inverse relation exists between nectar secretion and temperature, and a direct relation between relative humidity and nectar secretion. Others, however, do not accept such conclusions. Whether investigators agree or disagree, the fact remains that so far none of them have been able to state quantitatively the effects which various weather factors have on nectar secretion. Even if such figures were available, the beekeepers would still know little regarding the influence of weather factors on changes in weight of a colony of bees. It is not safe to assume that factors influencing nectar secretion necessarily influence changes in weight of a colony. We cannot assume that conditions which

stimulate bee activity in the field are the same as those which stimulate the secretion of nectar; and in making this assumption beekeepers have probably been misled. It must be kept in mind that an increase in weight of a colony of bees is the result of conditions favorable to secretion of nectar and to field activity of bees. It is easily possible, however, that certain weather conditions may be unfavorable to one and because of the strong stimulating influences on the other the adverse influence may never be noted.

At present we practically do not know how the weather affects our industry. Who can say what influence temperature has upon the production of honey? Does the production of honey depend upon high temperature or low temperature, or upon a combination of both, or is temperature at all one of the important factors? The amount of sunshine or the relative humidity may be far more important than temperature. It has been stated that an alternation of high temperature by day and low temperature by night is favorable to the secretion of nectar. How, on the other hand, does this alternation affect the behavior of bees?

The forecasts of the Weather Bureau are of benefit to many industries, saving them thousands of dollars annually, but in every case the value of the service rests upon knowledge of the manner in which the predicted weather affects particular industries. Without such knowledge, already acquired, the forecasts are valueless. Beekeeping has not yet taken its place among these beneficiaries. We do not have sufficient information concerning the various influences of weather upon beekeeping to make much use of the weather predictions so generally broadcast over the country. Today we cannot even approximately predict the size of the honey crop. We are obliged to wait until the crop has been harvested and actually placed on the market. We cannot predict market conditions, and we know practically nothing about the crop until the greater part of the honey has been sold and is beyond the beekeepers' control. Not only in the matter of marketing, but in many other phases of beekeeping, great advantage would be gained if we knew with certainty how the bees and the phenomenon of nectar secretion react to certain weather conditions. Beekeepers often find themselves suddenly confronted by the honeyflow without being adequately prepared, and, conversely, supers are frequently placed on the colonies too far in advance of the honeyflow to permit efficient work by the bees when it actually begins. The time at which bees should be packed in the fall, or moved into the cellar, depends upon weather conditions, but we now largely guess in choosing our time for doing such things. Manipulations in the spring are also determined to a large extent by the condition of the weather. The success of various methods of swarm control and of manipulations during the swarming period is determined to a large extent by the prevailing weather or the

weather which immediately follows. The isolation of the queen from the brood-nest at the beginning of the honeyflow proves disastrous when followed by a prolonged period of inclement weather. The same is true of the practice of spreading brood. If weather conditions are favorable the brood may be spread with impunity, but we are always taking a chance, for we know that when followed by certain weather conditions a great deal of brood will become chilled and will later be carried out by the bees. Do we know at present under just what conditions a colony of a certain strength should be manipulated to spread brood advantageously? This question, like many others, has never been answered other than in the most general terms.

We attempt to answer too many of our beekeeping problems in "general terms," and this is especially true with regard to the weather. It is a favorite topic of conversation. Beekeepers watch the weather closely; it is not at all unusual to hear a beekeeper either give it credit for a successful season or point to unfavorable weather as the cause of failure. If a beekeeper were to be asked to write a dissertation on beekeeping and the weather, and there have been such articles, little could be written in other than "general terms."

Before much can be known about this subject beekeepers in the various honey-producing regions must take an active interest in ascertaining how the weather affects our industry. It will not do to confine a study of this sort to any one honey-producing area, for the results obtained in one region may not apply to others; to determine any fundamental laws concerning the influence of weather, it will therefore be necessary to make a comprehensive study under widely varying conditions of beekeeping. One of the most promising lines of research available today is a study of weather and its relation to beekeeping. Closely related is the problem of establishing the climatic limitations of extensive beekeeping. Probably beekeeping is greatly influenced by local climatic factors. For instance, the honey crops this year seem to be "spotted" in distribution. Excellent returns are reported from one locality, while a neighboring area reports a subnormal crop. Before proper deductions can be made a large aggregate of data must be collected, obviously by the beekeepers themselves. Further, beekeepers must make their observations available for others. Beyond question, much material relating to this subject, which has never seen the light of day, is now in the hands of beekeepers. Accurate figures and reports of carefully made observations are always welcomed by the bee journals and by scientific institutions interested in beekeeping. These institutions are unable to solve many problems of apiculture, such as the one here considered, unless they have the assistance and cooperation of beekeepers.

Washington, D. C.

USE BETTER BROOD COMBS.

(By George E. King, University of Illinois.)

Producing perfect brood-combs is not a gamble, it is an art. Now that well-made comb-foundation can be readily secured, there no longer remains a plausible excuse for any beekeeper continuing to use imperfect brood-combs. It would appear, from the type of combs most frequently met with, that too many beekeepers have formed the habit of using only partial or full sheets of comb-foundation "wired" into the frames, and of leaving the result very largely to the bees themselves. The results, with this haphazard procedure, are often disappointing. The combs which result are sometimes buckled, part of the comb-foundation perhaps gnawed away, and drone cells are built in the spaces. Still more frequently the comb is only partially or not at all attached to the bottom bar of the frame.

From actual counts the number of worker cells in a perfect brood-comb, Langstroth size, varies from about 3325 to 3400 on each side, with only a few imperfect cells along the edges. Perfect combs must always be attached solidly all around and should have no passages through them; though sometimes one or two small holes are left by the bees.

In apiaries almost everywhere, the average brood-comb is seen to lack reaching the bottom bar of the frame, by the width of about three rows of cells. Often, too, the lower corners of the comb, as built, are occupied by a considerable number of drone cells. Each row of cells extending lengthwise of the frame represents about 2.25 per cent of the total space within the frame. The loss, on the average, of three rows of brood-cells along the lower edge of each comb, then, represents a total loss of 6.75 per cent of the comb surface. Drone cells occupying additional room not only increase this loss of worker brood-space, but invite the production of useless drones, the nursing and feeding of which is a direct loss of much labor on the part of the workers.

Since the practice of using a double brood-chamber has become very general other serious difficulties have arisen. With the two chambers the queen is necessarily obliged to cross the intervening gap between the lower and upper set of brood-combs. This of itself is not necessarily a serious objection, so long as the combs are all completely built of perfect worker-cells from the top to the bottom bar. The queen has the advantage of a passage from comb to comb right in the middle of the brood-chamber.

The distance, too, is not so great as to be a serious handicap to her, if we can judge by practical results. When, however, in addition to the space occupied by the top and bottom bars of neighboring frames and the bee-space between them, there is an additional space three cells deep where no comb is built, the gap between the parts of the brood-nest in the lower and upper chambers represents a loss of room approximating 11.25 per cent. When we consider that in order to maintain the correct temperature in the brood-nest all of this extra space must be kept warm, the loss to the bees becomes very significant. A mercantile or other business could not tolerate such a loss of efficiency for very long. Why, then, should the beekeeper continue to use imperfect brood-combs with the consequent heavy loss, when they can be replaced by better ones?

How shall we secure and maintain perfect brood-combs? It will be contended by many, no doubt, that the bees have a tendency to cut away the lower edge of the brood-combs, thus leaving a continuous gap between the comb and bottom bar of the frame. Such a thing often happens where the comb has not been built solidly to the bottom bar. Cutting away seldom occurs where the comb has been fully built and solidly attached at the bottom. If anyone supposes that solidly built combs will remain ungnawed when they are placed in the lower brood-chamber directly over the shallow side of a regulation bottom board, he will likely be disappointed. Plenty of space between the lower edge of the frame and the bottom board is the best preventive of this trouble. It is recommended that the deep side of the bottom board be left up at all times.

The use of the very best artificial comb-foundation alone will not cure the ills which result in faulty brood combs. The way the comb-foundation is used, the season, strength of colony, temperature and other factors also enter into the determination of just how nearly perfect the resulting combs will be. As all factors to be considered here also enter into successful bee-culture from other viewpoints, they should be well worth considering here briefly.

Comb-foundation, even from the same mill, varies to a certain extent, so that absolute uniformity is not attained. When newly milled it is somewhat more acceptable to the bees than when it is older, but it is more prone to buckle and sag if new. Older comb-foundation is perhaps somewhat tougher and less likely to be gnawed by the bees. The age of this product, however, is never of as great importance as is the way it is handled and prepared for the bees by the beekeeper.

Almost any ordinary carefully made "Weed Process" comb-foundation, of the weight which runs 7 to 8 sheets to the pound, can be successfully employed in the production of first quality combs. Of course for those who prefer them the "vertically wired" and "three-ply" foundation can be used with most excellent results. From actual tests with several different

"makes" of comb-foundation, by the writer, it is perfectly evident that most satisfactory combs can be obtained from almost any of them. Each beekeeper should choose the kind he prefers.

One of the important preparatory operations which greatly influences the nature of the resulting combs is that of fastening the comb-foundation in the frame. This must be done most carefully. For wiring the 28-guage wire offered for this purpose by dealers is very satisfactory. The wiring may be done in different ways, but the regular method with four horizontal wires, if carefully done, will give satisfactory results. With this method of wiring sagging frequently occurs near the top of the comb and buckling near the bottom. These defects both result from the same general causes. Most careful and skillful work in wiring the frames and embedding the wires in the sheet of comb-foundation will not always eliminate these difficulties completely, but it does form the basis for securing the best results when other necessary precautions are observed, as will be explained later. There is no use attempting to get perfect combs if the wires are not tight. As a frame is wired its corners must be absolutely square and the wires very tight. Embedding the wires may be accomplished either with the spur embedder or by electricity. Electric embedding looks better, is quicker and more firm, but it doesn't necessarily result in better combs than when the spur embedder is skillfully used. Whichever method is followed the results will at all times be proportionate to the thoroughness with which the work is done. Exposed wires frequently result in gnawed comb-foundation, stretching, or any of several other troubles. Well embedded wires seem scarcely to be noticed by the bees and hold most securely. Each wire must be evenly embedded throughout its entire length, avoiding imperfect embedding at any point.

To assure the minimum of drone cells along the lower edge of a comb the sheet of comb-foundation should reach within a little less than two worker-cell widths of the bottom-bar of the frame. A less distance may result in buckling. A greater distance invites the building of drone-cells. The wider sheets of comb-foundation used with split bottom-bars is a means to reduce buckling, but perfectly straight and fully built combs can be secured in the regular frames, providing the upper edge of the comb-foundation is securely fastened and wiring and embedding are correctly done.

Brood-frames, fitted with full sheets of comb-foundation, prepared in the very best manner, represent only the first stage in the process of securing perfect brood-combs. They merely constitute the skeleton upon which the bees are to build. The quality of the work which the bees are capable of performing is dependent not only upon the perfection of the skeleton offered them for completion, but also upon their own condition, including the size of the colony, age and fecundity of the queen, nectar

flow, and other factors. Frames of comb-foundation placed in the brood-chamber are seldom built solidly right down to the bottom-bar. The conditions there are not right for the best comb building. It is recommended, therefore, that comb building be done in a second story. There are well-known natural laws which govern, to a great degree, the building inclinations of the colony. Advantage must be taken of the conditions under which the bees are most inclined to build straight worker-comb.

Just as a colony headed by an old failing queen is more likely to rear considerable drone-brood, so is a colony headed by an old queen more prone to build drone-comb. A colony composed mostly of old workers always builds inferior combs. The colony which is best fitted to be used for comb-building will always have a good prolific queen. A large colony is better for this purpose than a smaller one. In such a colony there should be a due proportion of bees of all ages, including developing brood, to enable comb-building to continue over a period of time.

Comb-foundation given to a colony during a nectar-dearth will generally be gnawed by the bees. The season greatly influences comb-building as well as it does other bee-behavior. The frames of comb-foundation should therefore not be given to the colony until nectar is being collected freely, and the bees are prepared to begin working on them promptly. In case a long rainy spell or nectar-dearth comes on unexpectedly, it is usually better to remove partially drawn combs until conditions are again favorable, although for intervals of only two or three days they had better be left with the bees.

Sagging sometimes takes place, under certain conditions, after a new comb has been partially built and honey stored in it. Immediately beside such a comb another in which the queen laid eggs as it was drawn may show no sag whatever. Although the sagging in the one is generally attributed to the weight of the honey, we must not forget that even partially drawn comb will not often sag under the weight of the honey stored in it unless the temperature at some time becomes much warmer than it needs to be. To overcome this difficulty a large entrance is essential and other means for reducing the temperature within the hive are desirable.

In weak colonies the comb-foundation is sometimes drawn out near the bottom and honey is stored in the cells before the upper edge is drawn. Such a condition invariably places a considerable weight on the wires and upper part of the foundation, inclining it to stretch if too warm. At times, it is true, most excellent combs may be produced under such circumstances, but this condition had better be avoided by keeping all colonies strong. Very little stretching will take place in the cells toward the top and center of the comb if the wires are absolutely tight and excess heating of the chamber is avoided. A temperature most favorable for comb-building is necessary and must be maintained. But when the temperature rises much above that which

is normal for comb-building it softens the wax too much and the comb sags. Better ventilation of the hive, of course, is most helpful in all such cases.

The patching of brood-combs with small pieces of worker-comb has in the past sometimes been recommended. At best this results in many uneven cells and the larger commercial bee-keeper may not find it profitable. Combs which have been built perfect by the bees are always preferable to "made-over" combs.

A few reasons for desiring perfect brood-combs have been given. There are several other reasons for urging their use. In a colony with perfect brood-combs the brood-nest is more compact and the queen in consequence of greater comb-surface will lay more systematically. The workers are enabled to work to better advantage in nursing brood, ripening nectar, and ventilating. The queen is easier to find on well built combs than on combs which are uneven and have holes in them. There is an actual increase in the amount of storage-space available in the hive. This increase in available storage-space, together with the better conditions brought about in the colony, all tend to cause the storing instinct of the bees to be more dominant, and to reduce their tendency to swarm.

Perfect brood-combs, therefore, make it easier to manage the bees, and increase the profits from them. They are no more costly for the bees to produce than are inferior combs. The chief requirements for producing them are: carefully and correctly prepared frames of comb-foundation and correct management of the bees. Bees can be correctly managed only when the beekeeper has a thorough knowledge of bee behavior and the nectar sources of his region, together with the ability to apply this knowledge in an intelligent and skillful manner for directing the natural instincts of the bees to best accomplish his purpose.

INSPECTION IN ILLINOIS.

(By W. H. Snyder.)

There has been great changes in the inspection work in the last few years, not only in this state but in every state in the Union that has an inspection law. When we look back at the time when our chief inspector, Mr. Kildow, took up his duties as inspector of apiaries, one can hardly realize what was to be contended with at that time, for then we did not have our county associations, and very few in the state association, and the publications treating on beekeeping did not have the circulation that they have today and most of their circulation was with the commercial beekeepers.

The beekeeper that most needed to be enlightened was the farmer and back-lot beekeeper who never heard tell of a bee magazine, and most bees were kept in anything that happened to be empty on the day of the issuing of the swarm.

The people in general knew little if anything about the managing of bees, beekeeping, or anything about the diseases of bees, and in fact, hardly could we expect them to. To educate them along the line of beekeeping, and show them the diseases that bees are liable to contract, was a task undertaken by Mr. Kildow.

In all prior years this has been more of an educational work than an inspection work, for it was necessary to educate the beekeeper to brood diseases, and also to educate the people to the use of a hive that could be handled, so as to get the bees out for inspection.

There yet is a great field for this work in certain parts of the state, as we find bees in most any thing that happens to be handy. I found a man in Champaign County who was keeping his bees in some old boxes that had been nailed and patched till there was enough lumber used to make about two more hives of like size, while out by a shed were ten hives of standard make of which five were put together and five in the original package all out in the weather deteriorating with age. When asked why he did not have his bees in standard equipment, he said that his father said that if he put his bees in that kind of a box they would all die and he began to cite me to several instances where the bees in that kind of a hive were all dead. I found that his bees had all been dying and that he had been placing new swarms in the old diseased boxes.

We are very lax in not having a law prohibiting the shipping

of queen bees to our state, or package bees or bee supplies that have been used, as I found three cases of American foul brood, two cases in the north part of the state and one in the central part, and each of the three cases could be traced to the shipping of queens, and the nurse bees not being released, in each of these cases the disease was confined in the yard to which the queens were introduced and I was unable to find any trace of any disease in any other colonies for several miles around. I further find that in localities where there are no commercial or up-to-date beekeepers and where there never has been any bees, queens or used equipment brought into that locality, there is very seldom, if ever, any disease.

In the inspection work we find many things of interest, many things to do that are hard to do. We find many who would like to do if they knew how and many that know how that will not do, and these latter are the ones that are the hardest to get to do the things that you wish done. I have made it an iron-clad rule that when I have found a man that has been visited by an inspector, and he has spent his time cleaning up his yard and left him in as good a condition as possible and this man does not respect the good work that the State has done for him, then I believe that we are doing him justice in destroying all of his diseased colonies, and about once is all that you have to do it and he is ready to do the work after that himself if he has any bees left.

Through the State and County organizations we have been able to reap a wonderful harvest in education to the smaller beekeeper and getting him to work at his bees as an asset in place of a liability, and yet we find a few who persist in keeping bees in the old log and box for a hive just because his grandfather did.

I made some extended visits this year, re-covered some of the same territory that was traversed last year through the north end of the state. I made a hurried trip through DeKalb County, where I destroyed 166 colonies and found a very little reaction. In some parts of the trip I found no American foulbrood where some had been reported, but found European in the most virulent type, and about every yard had it, some of the better beekeepers are beginning to requeen, which will stop this type of foulbrood.

In Grundy County there is a lot of work to be done, yet there has been a vast difference in beekeeping in that county in the last year. Will County is about 50% better than it was when we first went in there, the foulbrood is scattered in that county, but where it is it is very bad, and we found yards where every colony was affected and those were burned.

In and around Decatur the foulbrood situation is in the best of condition, we are not dreading it any more. There may be a case now and then show up here, but it won't get very far till someone will find it and report.

I have been in some 2,200 colonies of bees this past year and have only found about 100 with the American foulbrood. The downstate seems to be getting it well in hand due to the fact that we are getting more county beekeepers' associations.

ADAPTING SYSTEM TO LOCALITY.

(By Frank C. Pellett, Author of Practical Queen Rearing, American Honey Plants, Etc.)

Locality is a badly overworked word in our beekeeping literature. It is too often used to explain away differences of opinion due to careless observation or improper manipulation. While differences in bee behavior are not usually to be credited to locality, a different system of manipulation is often necessary to make the most of the flows arising under different conditions.

The fundamentals of beekeeping are few and easily grasped by the intelligent mind. Room, stores and protection have been shown to constitute the essentials which must be recognized under any conditions. With a proper understanding of these, it then becomes important that the beekeeper study his individual location in order that he may apply his knowledge to bringing his colonies to the peak of brood-rearing in time for the principal harvest of the year. In this connection a brief consideration of the peculiar conditions to be met in different parts of the country and the effect upon the plans of the beekeeper may be of some interest.

In Southwest Iowa, where the writer kept bees for several years, there was but one principal honeyflow—from white clover. This flow lasted from ten days to six weeks. If the bees were not ready when the flow came there was little chance of securing a crop from a later flow. Usually there was sufficient fall flow to fill the hives, and put the bees into good condition for winter, but no surplus worth while was secured. In a location like that the beekeeper must bend every energy of the entire year to bring his bees to maximum strength at the beginning of June and to prevent swarming till the brief flow is over. If the bees winter poorly there is little time for coddling the bees and building up weaklings to profitable strength. Good wintering becomes essential. It is also important that no time be lost in building up the colonies in spring. It was found that by wintering the colonies in two stories with the upper brood chamber well filled with honey that it was usually possible to turn the surplus of food into young bees and have the two stories well filled with brood and bees by the close of fruit bloom, always providing that the bees wintered well. With careful attention it was possible to get from two to four times as much surplus as the average farmer with bees in the neighborhood

was able to secure. There was seldom a season when it was possible to make increase ahead of the honey flow to any extent, without reducing the crop.

In contrast to this location there are places in the alfalfa districts of Colorado where the main flow comes in August, where it is the practice to make increase from the early flows and still have the bees in good condition for the principal flow. There some beekeepers practice wintering in two stories and as soon as the two stories are filled with brood in spring the upper story is removed and given a ripe queen cell. With the late flow it is possible to have two colonies instead of one for the gathering of the crop. In a situation of this kind, poor wintering is not nearly as disastrous, providing of course that the bees come through alive, as it is where there is only one flow and that very early.

In the vicinity of Washington, D. C., tulip-tree, often spoken of as "poplar" is the principal source. Because it blooms so early that the bees are seldom ready for the flow, it is generally regarded as a poor location for beekeeping. Yet an average of something like 100 pounds of surplus honey per colony is gathered at the Government apiary where careful wintering is practiced.

In the lower Rio Grande valley of Texas there are frequent flows from many sources. These flows are likely to come at almost any time after a rain. Heavy flows are infrequent and light flows coming so often it is difficult for the beekeeper to harvest much surplus, since the honey is largely consumed in the almost continuous brood-rearing. The writer found the bees to be very strong in well-kept apiaries in early March. There were reports also, that bees sometimes swarmed as late as December and found sufficient support to carry them through. In a location like this, commercial honey production is less profitable than the production of bees and queens to supply the demand of northern beekeepers. In North Texas, at Waxahachie, local beekeepers report that the bees are ready for business by April, yet the main flow does not come till June. They find it very difficult to keep down swarming during the intervening period. One man, T. W. Burleson, has solved his problem by selling his early bees in packages and still giving his colonies time to build up for the honeyflow from cotton. Until the demand for bees developed he found great difficulty in overcoming the swarming problem.

In such locations beekeepers often are very indifferent about giving attention to wintering. They say that no matter how weak the bees are in spring, there is still time to build up for the flow and that strong colonies in early spring are of no particular advantage.

There are other factors besides the time of the honeyflow that enter into the consideration of locality. The source and nature of the flows also determine to a great extent the system

which is best suited to the conditions. Comb honey cannot be produced to advantage except under specially favorable conditions. A slow or intermittent flow will result in poorly finished sections and a short crop, where a good crop of extracted honey might be secured. In some sections of Colorado there is much gum-weed (Grindelia squarrosa), which granulates very quickly, sometimes even before the honey is sealed. Where this honey is mixed with the alfalfa granulation is sure to follow within a short time and as a result the comb honey market gets a black eye. Granulated comb honey is a drug on the market and in such a situation extracted honey only should be produced. At least comb honey supers should be replaced with extracting supers during the flow from gum-weed. Enough of this gum-weed alfalfa mixture has gone to eastern markets to create a prejudice against Colorado comb honey in some places.

In several of the southern states, bitterweed (Helenium tenuifolium) is quite common. The honey is absolutely unpalatable and should never be placed on the market. Even a small quantity of this bitter honey is sufficient to spoil a whole tankful of good honey. There the beekeepers should remove all the good honey from the hive when the bees begin to work on bitterweed and give them empty supers of extracting combs. When the flow is over, if other flows are still to come, the bitter honey can be taken off and the other supers replaced. When the season is over the bitter honey can be given back to the bees for winter stores. No adverse reports have been found from the use of bitter honey for wintering the bees.

The available pasturage determines the number of colonies that can be successfully kept in one yard and this in turn influences the system of management. In North Georgia there is a large area where not more than twenty-five colonies are profitable in one apiary. There is a variety of sources of nectar available, but not enough of anything to support a large number of colonies. One beekeeper in that region keeps 800 colonies of bees in thirty yards. This requires a large amount of travel, but his returns are more nearly constant than in any other locality with which I am familiar. In contrast there are numerous locations in the sweet clover districts and some in the buckwheat regions where three hundred or more colonies do well in one location.

The presence or absence of a supply of pollen for brood rearing is also an important factor. In some places where there are heavy flows pollen is scarce and the beekeepers find it necessary to take the bees elsewhere to build up. This requires long distance moving which is tiresome and expensive.

The dependability of the forage is also to be considered. There are many places where good crops can be gathered occasionally with frequent seasons of failure. This necessitates migratory beekeeping if the apiarist is to harvest a crop every year. There are numerous California beekeepers who make

long moves from one to three or four times in a season, moving to such locations as promise an immediate harvest. This is practiced to a lesser extent in some of the Central and Eastern States. The Dadants find it frequently to their advantage to move their apiaries to the lowlands along the Mississippi River when the crop is a failure on the uplands. This requires a move of something like thirty miles, which can easily be accomplished in a day with their big trucks.

The above examples could be multiplied indefinitely, but are sufficient to show how necessary it is that the beekeeper be fully informed as to the conditions peculiar to his location and that he develop a system of beekeeping best adapted to those conditions.

THE POSSIBILITIES AND LIMITATIONS OF COOPERATIVE MARKETING.

(By A. W. McKay, Marketing Economist, Bureau of Agricultural Economics, United States Department of Agriculture.)

The volume of business transacted by cooperative associations in 1923 was more than three times as great as in 1915. A conservative estimate based on reports from 10,500 associations, places the total 1923 business at $2,200,000,000 compared with $636,000,000 in 1915.

The following table shows the amount of business in millions of dollars for the several geographic divisions of the United States in 1915 and 1923 and the percentage of increase for the eight-year period.

TABLE 1.

Geographic Division	Number of States	Amount of Business		Percentage Increase
		1915	1923	
East South Central	4	$ 7,000,000	$189,000,000	2,600
South Atlantic	8	10,000,000	145,000,000	1,350
West South Central	4	8,000,000	92,000,000	1,050
New England	6	7,000,000	68,000,000	871
Middle Atlantic	3	56,000,000	275,000,000	391
East North Central	5	90,000,000	339,000,000	277
Pacific	3	151,000,000	414,000,000	174
West North Central	7	287,000,000	636,000,000	122
Mountain	8	20,000,000	42,000,000	110
Total	48	$636,000,000	$2,200,000,000	245

It will be noted that the greater part of the cooperative business in the United States in 1915 was in the seven West North Central States (Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota and North Dakota), the three Pacific Coast States (California, Oregon and Washington) and in the five East North Central States (Ohio, Indiana, Illinois, Michigan, Wisconsin). Cooperative sales and purchases in New York, Pennsylvania and New Jersey amounted to less than $60,000,000. The volume of business transacted by cooperative associations in the New England and Southern States was comparatively small.

In 1923 the situation was materially different. While there had been gains in all the states which had reported a large cooperative business in 1915, the big gains, expressed in per cent of increase, occurred in the Southern States and in the New England States.

Considered by commodities, it will seem that the largest gains, between 1915 and 1923, were made with crops that showed little cooperative marketing in the former years. The following table gives a record of the business reported by the various commodity groups for 1915, the estimated amounts for the same groups in 1923, and the percentage of increase during the eight year period.

TABLE 2.

Commodity Group	Amount of Business		Percentage Increase
	1915	1923	
Cotton	$ 2,000,000	$100,000,000	4,900
Livestock	6,000,000	250,000,000	4,066
Tobacco	6,000,000	150,000,000	2,400
Dairy Products	89,000,000	400,000,000	349
Merchandise	12,000,000	50,000,000	317
Grain	290,000,000	600,000,000	107
Fruits and Vegetables	201,000,000	300,000,000	49
All others	30,000,000	350,000,000	733
Total	$636,000,000	$2,200,000,000	245

It must be remembered in reviewing all of these tables that the price level in 1923 was considerably higher than in 1915. (If the price level of 1915 is indicated as 100, 1923 is 129).

Up to October 29, 1924, the number of associations from which the United States Department of Agriculture had received reports totaled 10,554. This figure includes local associations, federations, centralized associations, terminal market sales agencies, but not service organizations which neither buy nor sell for farmers. There are perhaps 2,000 associations of which the Department has no record, making the total not far from 12,500. Over 2,000,000 farmers are members of these organizations.

(1)

This account of the growth of the cooperative movement is preliminary to a discussion of its possibilities and limitations. The rapid expansion in cooperative marketing has not proceeded without some acute problems arising. At the present time, however, the organization of new cooperative associations is not proceeding as rapidly as formerly. There is instead a healthy tendency to take stock of what we have in cooperation and to endeavor to increase the business efficiency of the associations.

In order to understand the possibilities and limitations of cooperation, it is necessary to get rid of two opposing popular misconceptions on the subject. It has been published widely that most cooperative enterprises fail; and the opposing belief, that cooperation is a panacea for all marketing troubles, has been disseminated almost as generally. The truth lies some-

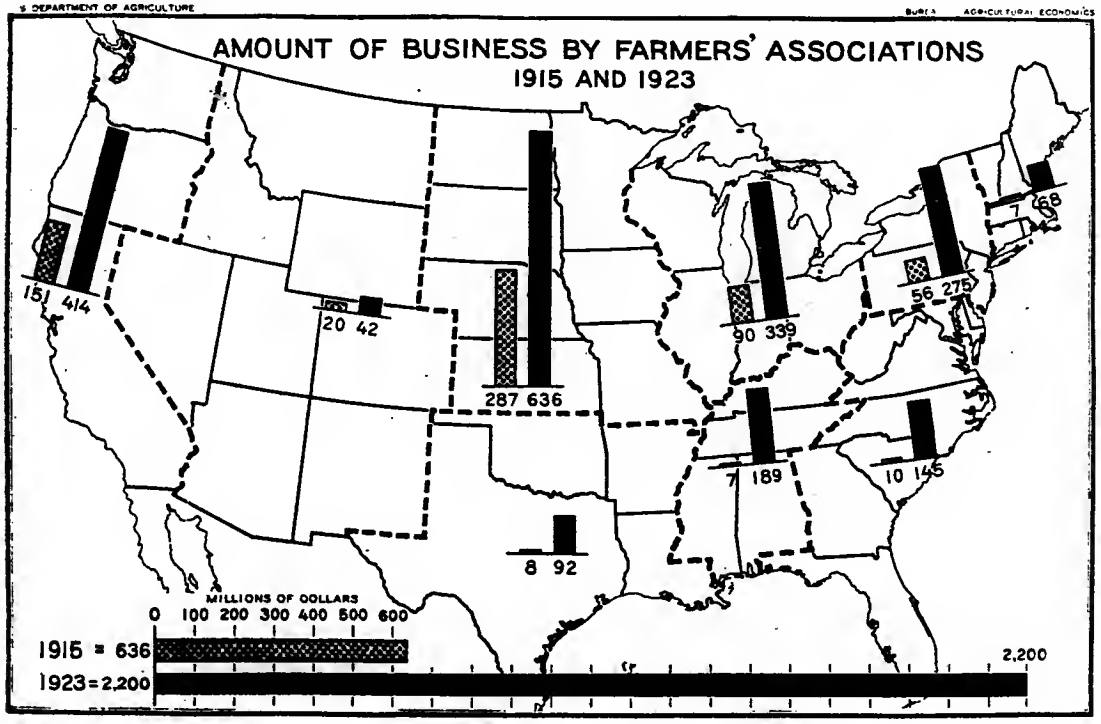
(1) For further information on this subject see Bulletin 1302, "Development and Present Status of Farmers' Cooperative Business Organizations", which may be secured from the U. S. Department of Agriculture, Washington, D. C.

where between these two points of view. Cooperative associations fail in about the same proportion, and for about the same reasons, as other business enterprises. On the other hand, there is nothing automatic or magical about cooperation. It is simply a plan whereby the farmer, if he wishes, can market his crops through an agency which he and other producers control. Marketing difficulties do not disappear when the producers set up their own marketing machinery, and an association can only succeed in the proportion that it meets and overcomes marketing problems.

One of the outstanding problems in marketing is the standardization of the product. Standard grades constitute a common language between buyers and sellers. They facilitate trading, permit wider distribution of the product and create good will. Cooperative associations have made progress in the grading and standardization of farm crops that would be impossible in unorganized communities.

A standard grade is the first step in sound merchandizing and the "without which you get nowhere" of a cooperative enterprise. It is only necessary to look back over the progress made in the last twenty-five years in the manufacture and sale of standardized products—from Ivory Soap to automobiles—to realize the importance of a uniform product.

In addition to the progress made in standardization, we can point to better methods of packing and processing farm products, better distribution and savings in marketing costs. These are real accomplishments of cooperation and the result has been, in many communities, to raise the basic price received by all producers. It is important to remember that a cooperative asso-



ciation often benefits the non-member as well as the member and that the benefits of organization are not measured by price comparisons.

It is possible also, in communities where real cooperative associations have operated over a period of years, to trace their effect on production practices. An association soon learns that it must sell by grade, and the next step is to make returns to its members in accordance with the grade and quality of the product they deliver. Members, who formerly produced inferior products because the buyers did not make grade distinctions, learn that by marketing through a cooperative association they receive a premium for quality. The result is an improvement in the quality and variety of products more in line with market demands. Right here large wastes that go to swell the margin between what the farmer receives and the consumer pays can be reduced.

Without recounting all the demonstrated advantages of cooperation, the inclusive advantage, from the farmers' point of view, is that he has a marketing agency which is not concerned primarily in making a profit but in serving his interests. Local associations can perform definite services and make real savings at the country points.

The large federations and centralized associations can attack the broader problems of transportation, distribution, the stimulation of demand and, in this connection, they are able to carry back to their members important information regarding the consumers' requirements. They have the opportunity to correlate supply with demand, not only by better methods of distribution, but by teaching their members the kinds and quantity of product which the markets will absorb at prices profitable to the producer. This is one of the big fields for cooperative marketing in the immediate future. It is a service that has in it the possibilities of benefits which far outweigh any temporary price advantage a man may secure by refusing to affiliate with the cooperative association in his neighborhood.

Cooperation, however, has some definite limits and it is desirable for the development of sound cooperative marketing that the limitations of the system should be as thoroughly understood as its advantages. The organization of an association is comparable to the manufacture of a tractor, or any other piece of farm machinery. A tractor is useless unless it is supplied with oil and gasoline and is guided by someone who knows what has to be done.

The most important limitation of cooperative marketing at the present time arises out of the limited control which even the largest associations have over the final distribution of the products they sell. Marketing services are so varied and complex that it is, for the present at least, impossible for any organization to attempt to distribute its goods directly to the consumer, or, in most cases, even to the retailer. Consequently, a

fruit association, as an example, sells to a wholesaler in a central market. The wholesaler resells the shipment to various jobbers who sell to a number of retailers who in turn supply hundreds of consumers. The most important and most costly services in distribution are not controlled by the organization. Savings derived from cooperative marketing, therefore, will have a comparatively small effect on the margin between the producer and the consumer.

The answer to this problem is not entirely cooperative distribution of farm products to the consumer. Existing trade agencies, even when not wholly efficient, cannot be displaced without an economic loss. It is doubtful also whether the cooperatives, because of the fact that they handle generally only a few products and those only for a portion of the year, would be able to operate as efficiently as agencies handling many products continuously. Cooperation between the cooperative associations and the trade, the development and promotion of better merchandising methods in the terminal markets by the cooperatives, seem the most practical lines of attack. Some steps, however, are being taken to bring the producer closer to consumer. Examples are direct sales by livestock associations to packing companies, by farmers elevators to flour mills, and by fruit and vegetable associations to chain stores.

The second limitation of cooperation comes from inability to regulate production so that it shall approximate the demand for the products. Anyone at all familiar with agriculture knows that seasons of high prices for certain products are followed by increase in the supply and correspondingly low prices. A cooperative cannot prevent an increase in production which may result in a supply out of all proportion to demand and nullify all its efforts to merchandise the commodity at a profit to its members. Indeed, the activities of the cooperative by expanding the market for the crop may lead to unregulated increases in production.

No system of marketing can be satisfactory when the product is produced in greater quantities than is necessary to meet the consumers' demands. From the standpoint of preventing wastes, as well as from the standpoint of making farming profitable, it is essential that some steps should be taken to coordinate the supply of farm products with market requirements. The cooperatives to date have been unable to cope with this problem.

However, from the very nature of the problem, the farmers must look to cooperation for even a partial solution. Weather conditions will always play a big part in determining the total quantity of any crop produced, but the production program of millions of farmers is, after all, the most important factor. An approach to working unity among millions of individual farmers can come about only through organization.

One of the big tasks ahead of the cooperative associations, therefore, is to interpret to their members the information re-

garding crops and markets, supply of and demand for agricultural products all over the world in such a way that the members can devise a program of orderly production. This is a process of education for which experience in the fundamentals of cooperative action is necessary. It is necessary, too, that some agency—the cooperative association—shall receive the statistical information collected from the Department of Agriculture and other sources, analyze it in the light of local conditions and serve as a gathering point for the farmers who wish to plan their production so as to meet demand as nearly as may be.

What has been said about cooperative marketing has not referred directly to the cooperative marketing of honey. It has, however, a direct bearing on the honey producers' problems. It is probable that the honey producers in the various states will plan to organize marketing associations, if not immediately, at least within the next five or six years. Problems of standardization, poor distribution and unsatisfactory prices are as acute with them as with any groups of farmers. Many of them feel at the present time that these problems can be solved satisfactorily only by cooperative action.

Enough has been said, however, to warn them against the danger of organizing without a clear understanding of what their problems are and what they may hope to accomplish through cooperative marketing.

The Department of Agriculture is ready, to the extent its facilities permit, to aid producers who plan to organize. Before setting up an association, the honey producers should avail themselves of this service. A careful survey and analysis of their production, handling and marketing problems, market outlets and demand should be made. The possibility of making costly mistakes either in organization or operating policies would thus be reduced to a minimum.

THE RELATION OF CLIMATE TO SPRING DEVELOPMENT OF BEE COLONIES.

(By V. G. Milum.)

In a general way the climate of a particular beekeeping region influences the development of the bee colonies during the spring period. It is a recognized fact that bee colonies of the warmer climates build up slowly after a winter period of more or less activity, while colonies of bees in colder climates build up their strength rapidly in the spring if they have undergone a period of rest or comparative inactivity. In any given beekeeping region like Wisconsin, the particular kind of spring weather of each year also influences the rate of spring development, but these effects can be modified by the thoughtful beekeeper who takes the required precautions. In other words, unfavorable weather conditions can be controlled by the beekeeper.

Why is it necessary that the beekeeper should attempt to control the unfavorable weather conditions that reduce the rate of spring development of the colony? In Wisconsin, the main honey flow begins about the middle of June, which is the time when each colony should reach its maximum strength in young vigorous bees in order that it may take advantage of the honey flow and store a large crop of honey. Brood rearing usually does not start before the first week in April. This means that in the short space of two and one-half months each colony must increase its strength from a small wintering colony of 15,000 to 25,000 bees to a large producing colony of 75,000 to 100,000 young vigorous bees, besides rearing bees to take the place of those that die during this period. For this rapid increase the most desirable conditions must be provided in order to make the colonies independent of the unfavorable weather conditions.

What are the favorable conditions that lead to rapid spring development? Colonies of bees are able to build up rapidly in the spring when they are strong and populous with young vigorous workers; when each colony has a young prolific Italian queen; when there are abundant stores properly located near the brood nest; when there is room for expansion of brood rearing on good worker comb; when the colonies are properly protected in the spring in order to keep up the high temperatures necessary for brood rearing; and when there is favorable weather for gathering water, fresh pollen, and nectar.

Let us consider these favorable conditions more carefully.

The wise beekeeper is able to create the most important of these conditions by a little effort long before the results become apparent. During the previous summer, sometime before August 15th, he sees that every colony is supplied with a young vigorous Italian queen and that the colony has a plentiful supply of stores. This means that after this date, during the fall brood rearing period, a large force of young vigorous worker bees will be produced. If a colony is to have three pounds of young vigorous bees in the spring, there must be three pounds or more of young vigorous bees in the fall instead of a colony of old, worn-out worker bees. Then the thoughtful beekeeper sees that every colony is provided with at least 25 to 30 pounds of good winter stores. These stores may be either full frames of honey saved from the beginning of the clover honey flow or sugar syrup. The sugar syrup should consist of two parts of sugar to one of water, fed to the colony after the fall brood rearing period, but early enough so that the colony will have time to properly ripen and arrange the stores.

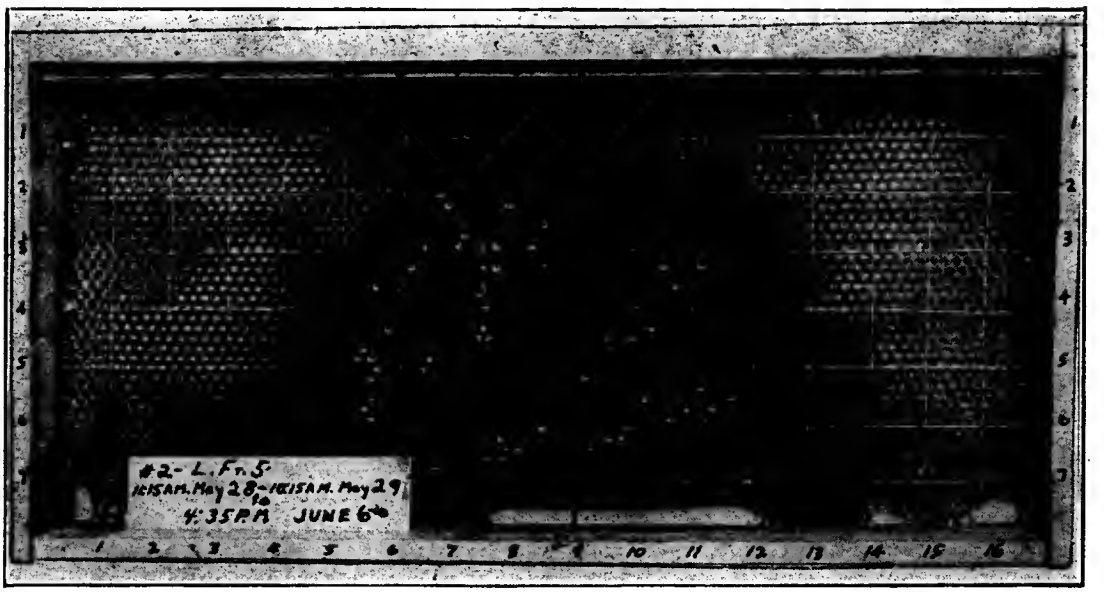
But strong colonies of young bees with a great amount of stores would still be weak in the spring if they were not properly protected from the cold during the winter period. A colony of bees is able to pass through periods of cold weather by the formation of a compact cluster within which heat is created by muscular activity of the individual bees. The stores of honey or sugar syrup provide the source of energy for this activity. A colony of bees may be compared to a storage battery, for every bit of work that the individual bee of the colony or cell of the storage battery must do weakens the strength of the colony or the battery, respectively. If the colony must consume a large amount of stores during the winter period in order to keep up its heat by muscular activity, it will be weak in the spring; it will be a colony of old, worn-out bees. But the beekeeper can avoid this by giving the colony protection from the cold temperatures of the winter period, thereby saving the strength of the colony and at the same time reserving the large amount of stores for the feeding of the young developing bees in the spring. This winter protection may be provided by placing the bees in a dark, dry cellar where the temperature ranges from 45° to 50° F., or the colonies may be packed in packing cases out of doors. Experiments at the Wisconsin Experiment Station seem to show that colonies packed in cases with about six to eight inches of straw, shavings or leaves as packing material give about the same results as cellar wintering, so far as consumption of stores is concerned. However, the packing cases have a further advantage in that they give protection during the first part of the spring brood rearing period when there are fewer bees in the colony.

But why do colonies need protection during the spring period when they are increasing their population? For the development of the bee from the egg through the larval and

pupal stages to an adult, fairly high temperatures are required. The temperatures in the center of a brood nest usually range from 92° to 95°F., but brood can be developed at even lower temperatures, for the edges of the brood-rearing area are often many degrees below these desirable temperatures. Experiments conducted during the spring of 1924 give some interesting information on the relation of the temperature of the brood nest to the rate of development of the honey bee.

Previous investigators have shown that the length of time required for the development of certain insects is inversely proportional to the temperatures to which the developing insects are exposed. With this idea in mind, an experiment was carried on in which five different colonies were placed in hive bodies, each of which contained 44 thermocouples or electrical thermometers, by means of which the temperatures of the brood nests could be determined without disturbing the colonies. The temperatures were recorded at least once each day at various hours of the day, the average of the readings for a particular point being considered as the average temperature of that point, which may not be absolutely correct for that point, but is relatively correct when comparing the temperature of one point with the temperature of other points in the same or other colonies. To procure brood of known age, the queen of each colony was allowed access to an empty brood comb placed between other frames filled with brood for a period of approximately 24 hours, after which the queen was confined above the queen excluder in the second brood chamber. Examinations were made and photographs taken daily while the brood was being capped by the worker bees and again each day while the young bees were emerging from their cells. By comparing one photograph with the previous one, it was possible to count the number of bees that had developed within a certain period of time. The actual length of time for development of any number of bees could not be determined definitely because there was no way of knowing just when the eggs were laid during the 24-hour period of egg laying nor just when the individual bees emerged during the 24-hour period at the end of the developmental cycle.

Enough interesting data was obtained, however, to show that the worker brood was capped by the nurse bees during a period ranging from less than 8 days to more than 12 days after the queens were released upon the frames. It was apparent that the majority of the brood was capped during the ninth day of its development with earlier capping on the frames at the higher temperatures and delayed capping of the brood at the colder temperatures. As regards the total length of the developmental period, it was definitely shown that the length of development of the brood varied indirectly to the temperature of the brood nest. In one colony, with the temperatures averaging from 95.4° to 96° F., of a total of 349 developing bees on one of the experimental frames, 105 bees required not more



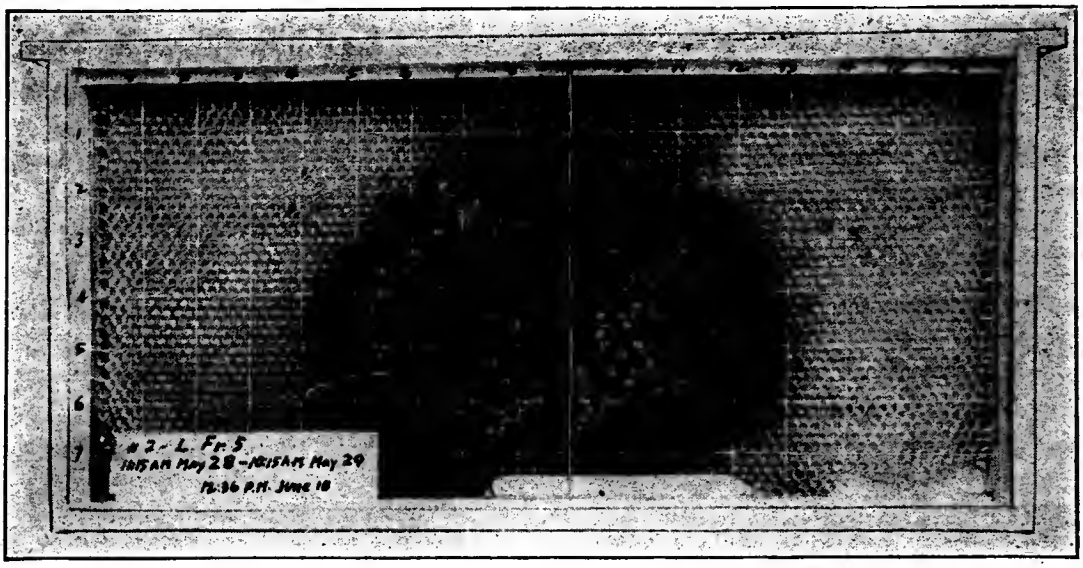
Method of locating and counting the developing brood by using cross wires. No. 1—Taken when brood was first found capped.

than 20 days ¾ hour for complete development, 218 bees not more than 21 days ¾ hour, while the remaining 26 required not more than 22 days ½ hour. These figures include the complete period of time from the moment that the queen was released upon the frame until the time of the daily examination after the emergence of the brood. Hence it is reasonable to assume that in this case a part of the brood emerged in approximately 19 days while none required more than 21 days.

The results obtained in other colonies where the temperatures were comparatively high were similar to the results just mentioned, but where the temperatures were lower the length of the developmental period was increased. In one colony where there was an average temperature near the experimental brood of 88.2° to 88.7° F., no young bees had emerged in 21 days, 23 5/6 hours after the queen was released upon the frames. If the length of the period of egg laying, or 25¼ hours, is subtracted from the total period up to the time of examination, the following results are obtained for the 82 bees on one frame: 36 bees required at least 20 days, 22 7/12 hours for complete development, 32 at least 21 days 22 7/12 hours, 7 at least 22 days 21 2/3 hours, 6 at least 23 days 5 hours, while one bee required at least 24 days 2 hours for complete development. Similar results were obtained on the edges of other frames where the temperatures were low.

In general, the experiment showed that the shorter periods of development are in the center of the frames and on those frames which are nearest to the center of the brood nest of the stronger colonies which have the higher temperatures. This shows one of the reasons why it is that strong colonies with sufficient protection are able to build up relatively faster dur-

ing the spring brood rearing period than the weak colonies and those not properly protected from the cold, since the warmer temperatures permit of the development of a greater number of bees within a given period of time. The manipulations of the previous fall and winter which have been enumerated will help the beekeeper to secure this increase in spring development of his colonies, because strong colonies of young vigorous worker bees are more able to keep up the temperatures of the brood nest during the spring brood rearing period than are weak colonies.



Method of locating and counting the developing brood by using cross wires. No. 2—Taken when the first brood had emerged.

Still further desirable results can be secured by proper spring management. Protection from the cold temperatures of the spring period will aid the colonies in their task of development. The beekeeper who winters his bees in outdoor packing cases has the protection problem solved. He should not make the mistake, however, of leaving the packing on so late in the spring that the bees start to loaf and hang out at the entrance because of a lack of ventilation in the hive. While high temperatures are beneficial for the rapid development of brood, a colony may start to loafing and eventually swarm if the temperatures in the colony are excessive. By careful observation, the beekeeper can tell when his bees need more ventilation at which time it may be given by enlarging the entrance or by removing a part or all of the packing to secure the desired results. But for the beekeeper who winters his bees in the cellar, the problem of spring protection is somewhat different. Some beekeepers provide each colony with some kind of spring protection in the form of light packing cases or by wrapping the individual colonies with tar paper. This form of protection, no doubt, pays for itself in increased results, but a certain

amount of protection can be given without any added expense. Tight-fitting covers and bottom board along with small entrances during the cold spring days give much protection. The bees can be set out in a location where they are sheltered from the strong cold winds from the west and north by some sort of windbreak. This may be either a hedge, a high fence, the farm buildings, a hill or a small wood lot. These forms of protection are inexpensive, but they are very beneficial to the maintaining of high temperatures in the brood nest.

Having performed the above operations, which brings the colonies through to the spring brood rearing period with a large force of young vigorous bees in a hive that is well protected from the cold, certain further requirements are necessary for the developing of a large force of worker bees before the main honey flow. The ideal condition is to have a large force of 75 to 100 thousand worker bees at the beginning of the honey flow. Someone has determined that for the development of a of a single worker bee a cell of honey is required. This means that for each full frame of brood of approximately 7,000 cells, a full frame of honey is used by the bees. As the average full frame of honey contains about 5 pounds of honey, the enormous amount of stores required for a maximum spring development is evident. The successful beekeeper provides for this by saving the first super of stores from each colony that was gathered at the beginning of the main honey flow of the previous year. This has insured him of good honey stores for wintering, as well as a plentiful supply for spring development. In addition to stores of honey, large amounts of pollen are necessary for the development of the young bees. Honey is an energy giving food, while pollen is the source of protein which is a body building material, hence the need of the latter in the growth of the young bee from the tiny larva to the adult. As a rule the strong colonies of bees will have solved the pollen problem by gathering large amounts of pollen the previous fall. Furthermore, during the warm days of the spring the strong colonies of bees are able to gather large amounts of pollen and nectar from the early blooming flowers, from fruit trees and from dandelions. Often the strong colonies may even gather a surplus of honey from one or more of these sources, whereas the weak colonies may not be able to gather enough stores to satisfy their own requirements. The beekeeper should see to it that no colony ever has less than fifteen pounds of honey stores during the spring brood rearing period. These stores should be provided in the form of full frames of honey, or else by the feeding of sugar syrup. Colonies deficient in stores of either honey or pollen reduce the amount of brood rearing and often large numbers of bees are lost when making flights to the field on cold windy days to secure enough stores for feeding the brood. Sufficient stores eliminate these undesirable conditions and bring increased profits to the beekeeper.

But all these requirements might not bring the best results unless the beekeeper has made provision so that there will always be adequate room for the expansion of the brood nest upon good worker comb. Good worker combs are obtained by having them built in frames containing full sheets of wired foundation. Sufficient room for brood rearing and stores is provided by the use of a large hive such as the Modified Dadant, or by the use of two hive bodies for brood rearing when the standard hive is used. In using the latter hive, the second hive body should be added in the spring when the colony needs more stores or when there are 6 or 8 frames containing brood in the first brood chamber. With the strongest colonies even more room for brood rearing may need to be added, no matter which type of hives is used. The choice of one or the other by the beekeeper is often determined by the type of climate and seasons, the nature of the honey flow, the system of management, and other important factors. The advantages and disadvantages of the two types of hives have been fully discussed in the leading bee journals.

At the beginning of this discussion, it was stated that one of the desirable spring conditions was favorable weather for gathering water, fresh pollen, and nectar. The bees need water in the preparation of the larval food, experiments at the Wisconsin Experiment Station showing that some of the colonies use as much as four and one-half gallons during the spring brood rearing period. While it has been shown that bees store water in "reservoir" bees, prolonged periods of cold weather may necessitate flights to secure water when the outside temperatures are so low as to cause many bees to chill and die. Bees may sometimes be seen taking water from the edge of melting snow on the alighting board during a cold period when brood is being reared. The frantic search of bees for water on blades of grass, on the ground, in the eaves of the house or about watering troughs and pumps are familiar sights to all beekeepers. These facts show the necessity of having a source of water supply close at hand. While it may not be advisable to supply the water by a feeder in the hive, the beekeeper can at least provide water in some kind of a container in or near the yard. Since the bees do not often desert their first source of supply, it is best to arrange the watering place before the bees have made their first flights for water in the spring. This will reduce loss of bees in making distant flights during cold periods and will help to eliminate the occasional difficulty of bees about watering places for stock.

It is generally considered that European foulbrood is associated with poor beekeeping and unfavorable spring weather. The precautions and suggestions that have been outlined will eliminate this source of trouble to the beekeeper even if the unfavorable weather conditions do prevail during the spring period.

In closing, allow me to again repeat the conditions which will make beekeeping and spring development more or less independent of the climate of a particular locality. In the first place, it is desirable to have each colony headed by a young prolific Italian queen early in the fall and the hive well supplied with stores in order that a large force of young bees will be produced during the fall brood rearing period. Then the colony must be properly protected during the winter period to preserve the energy of the bees and reduce the consumption of stores. During the spring, each colony should be well supplied with stores of pollen and honey, well protected from cold temperatures, and have sufficient room for expansion of brood rearing for the maximum production of young bees in preparation for the honey flow. With these conditions furnished by the beekeeper, his colonies will do their share in securing greater profits. Give the bees a fair chance to show the possibilities of good beekeeping.

EXTRACTED HONEY PRODUCTION.

(By Morley Pettit.)

In extracted honey production it is necessary to have strong colonies to hold them together without swarming, and to give them plenty of supers to store and time to ripen all they will gather. The honey must be extracted in a cleanly manner, graded properly and marketed in an attractive form. In the various operations which this involves the producer must have an eye to his own welfare by using such tools, machinery and methods as will reduce his cost of production to a minimum in order that he may meet competition and secure a fair profit on his investment, risk and labor. That is a very large order in these difficult times; but I shall endeavor to take you through the leading events of a year's work in the Pettit apiaries and perhaps some of our methods and ideas may be generally helpful.

It is not easy to say just when the year begins in the apiaries. In about one hundred and fifty of our colonies the past season it began when Southern packages of bees were introduced to that many hives very early in May. They were two-pound packages, mostly young bees and young queens and each was given two or more combs of honey saved from the previous season with worker combs for the balance of the brood-chamber. Some of the queens failed and were replaced at small cost by extra queens a little later, just in time for us to use. I do not know whether that is common practice with Southern shippers, but it seems like a good one, from our standpoint. In an average season packages produce as much as averaged wintered colonies and without trying to swarm. If good packages from reliable shippers are hived on combs and honey stores, in winter cases about the first of May, I believe they are quite as profitable as wintered colonies, considering all the saving as balanced against their cost.

In continuous colonies the year may be said to begin when the new queen is introduced and begins to lay. The date of this event is whenever the queen begins to fail or allows swarming preparations under good swarm-prevention methods. We endeavor to see every brood-nest once in eight or ten days during the active season and whenever occupied queen cells are found the queen is at once removed and the cells are either destroyed or used in nuclei. We never leave a cell to requeen a colony. On the next visit the colony is given a laying queen, a young one if such is available, or else the old one back again until a

young one is ready. A general replacement of old and failing queens is made in late July and August. When the colony accepts its young queen its year may be said to begin.

The next event in the cycle of the colony is the rearing of copious young for the winter cluster. Our part of this is to provide stores and brooding space in plenty, as well as a good queen. Each hive has a food chamber in addition to its brood chamber. This has been so placed during the honey season as to be well filled with honey. When the main crop is taken off, August first, the food chamber is left on. A super or more of empty combs is also given for storage in case there may be a fall flow. Perhaps it may not be out of place for me to give some personal experience which led up to the use of food chambers on all our colonies. There are always some of our yards which do not store any honey after the first of August or earlier. We are never sure which ones will have that experience. After finding some our best colonies starved to death when we came to feed them for winter some years ago, we decided that the only safe way was to leave plenty of honey in a super on each hive until we were ready to feed it. Whatever they did not use of this was almost sure to have a little fall honey added to lower its grade. Then it would be extracted and sold for less than the price of sugar for winter stores—at least for less than its original value as clover honey. On the other hand, if we fed sufficient sugar syrup to insure good spring building up, it so restricted the brood-chamber space that very early inspection was required to supply room for breeding and storing. Then the extra brood-chamber would be partly filled with spring honey, which not being ready to extract when clover began yielding, would absorb a great deal of clover honey in the process of ripening. This either went in with the main crop to injure its color and flavor or had to be sorted out at considerable further expense and sold at a lower price. While the food chamber does not entirely remove all these difficulties, it relieves them considerably.

When the supers are finally taken off in September, we note whether much honey has been used out of the food chamber. If so, the lighter combs are replaced with well-filled ones and it is left directly over the brood-chamber without excluder. Again, when the hives are placed in winter cases in October any that seem lighter than others are marked for extra feed. On the same day each colony is fed two ten-pound pails of syrup whether it needs it or not. If light, it receives three or four pails. In other words, we want plenty of sugar syrup where it and not the honey will be used during the coldest weather. We also want to make sure that the food chamber is so well filled that the queen is not likely to go up there to lay in the early spring. We do not want brood in the food chamber. "The brood-chamber for brood and the food chamber for food."

After trying various types of winter cases, I have settled

on two kinds, the single which is not unpacked and the quadruple with collapsible sides for easy unpacking. Our bees are in cases from as early in October as possible until the end of May. We feed in the cases in autumn and super and sometimes clip queens in them in spring. They stand on blocks which just clear them from the dampness of the ground, but the height of stand and bottom packing raise the entrances nearly a foot from the ground. We have three or four inches packing underneath, four to six on sides and about eight inches on top. It is quite possible to have good strong colonies too warmly packed, as I have found to my sorrow.

If I considered only the bees I believe all my colonies would be permanently packed in single cases. Good colonies so packed always do well if the season favors. They are less disturbed by extreme weather changes than unpacked colonies and are not roused by restless neighbors on mild winter days, as in multiple hive cases. They suffer no inconvenience from changed surroundings, as when the whole face of nature, so to speak, is altered by the packing or the unpacking of the apiary. That summer packing helps to control swarming I cannot see, and it does not in our case, for there is just as much swarming impulse in the packed yards as in the unpacked. The big cover shades the supers, it is true, but the packing makes the brood chambers hotter, that is, it keeps them hot all night when a little cooling might be beneficial, so I think the one about balances the other.

From the beekeepers' standpoint, the arguments are these: Single cases cost considerably more than others per colony. They are more bulky and awkward for moving when an apiary has to be moved. They are more expensive to paint and being always exposed to the weather they require painting oftener than collapsible cases which are stacked in the flat and protected from all the hot sun of summer. They save the annual labor of packing and unpacking, and this is quite counterbalanced by the labor of lifting the big covers off and on every time the colonies are examined, to say nothing of the stones which must weight them against the wind. If they do not have to be packed and unpacked they do have to be blocked up annually to prevent the bottoms settling into the ground and rotting away. Still this labor is more or less distributed, and it is some satisfaction when the grind of packing yard after yard brings us to single cases which do not have to be done in the same way. Our cases all have a top space of super depth and over. In some ways, it is more convenient examining brood chambers down in this enclosure, especially if the day is cool or windy.

We have, perhaps, a third of our bees in single cases, the rest in quadruple. Over a series of years and locations I think we secure about the same results from both, and our total of labor on the colonies we unpack annually is somewhat less. If

I were going to keep bees without any help, a condition which comes outside my imagination, I think I would use single cases.

The main business of spring in the apiary is to keep all colonies developing rapidly, to provide room for what they may store, to watch out for disease, and to keep them from contracting the swarming impulse. The foundations for good spring development are laid when bees are being prepared for winter as already described. About the first week in May it often turns warm enough to clip queens and if we have time then we like to clip them in all the stronger colonies, because they are easier to find than later. The clipping record is very brief but sufficient. We never clip a queen until she has gone through one winter, so the record of every queen we clip next spring will be the same, "C-25-1". That means that she has gone through one winter. We never try to take a queen through more than two winters, and package queens that have had an express journey and two summers have done their duty. Exceptions to this are special breeders.

With food chambers on all colonies we do not worry if the first examination is deferred until the middle of May. By the time spring honey storing and heavy brooding begins there is some space in the food chamber to temporarily defer the crowding which would otherwise take place and to check the swarming impulse which we used to find early in May with the single brood-chamber only.

Still we like to get around as early as ever, get the tops unpacked and see what is what. There is not likely to be a shortage of stores, but if there is, we feed some to tide over until they can gather. In hives where a shortage of stores does occur the queen will likely be occupying the shallow as well as the brood-chamber. With light topbars and combs perfect up to them, a good queen in a strong colony passes back and forth fairly well. Where the food chamber is partly empty and the colony is weak, the brood may all be in it. This is not a serious matter, as such a colony is not worth much, anyway. The remedy is to keep the hive warm and sufficiently fed until unpacking time, then if necessary place the shallow underneath the brood-chamber. If worth saving, the queen will go up and occupy her rightful place. To those who have not had success with food chambers, I would suggest giving more attention to their queens, then doubling up weak colonies in the fall, so as to have good strong colonies for winter. If they are then adequately fed and packed, as I have tried to indicate, I think they will secure better results.

When giving the second brood-chamber in May there are three conditions of the hive which require three different sorts of treatment. First, a normal colony has stores and no brood in the food chamber. It is full of bees, showing the need of more space. Such a hive is in ideal condition to show off the food chamber to the best advantage. We lift it, making a divi-

sion between brood and food, where we place a set of dark Langstroth worker combs. The queen occupies these right away, and storing of spring honey takes place in the tops of them and in the food chamber above. The original brood nest is still compact, and the space for storing and brooding is set to the queen's taste. Second, they have eaten through and the queen has brood to the top of the food chamber in the middle, and the colony is strong and will stand more room. In that case the extra set of brood combs is placed on top of the food chamber, and she goes on up into it. Later, when the brood-nest has become established in the upper story, the food chamber is placed above it, probably over an excluder. The third case includes all colonies too weak to require any more space.

This early supering is done inside the packing cases, which are not removed until at least the end of May. It most effectually prevents the early swarming which we might easily have in well wintered colonies. The fresh set of worker combs in which the queen established a new brood nest gives conditions similar to those of a newly hived swarm. Later when the lower story has been practically deserted and clover flow is beginning, we shut the queen down in it again and place empty combs with excluder between it and the upper brood. For a second time she is given conditions approximating those of a swarm. This is toward the end of June and it does not take many visits on the eighth or ninth day for brood chamber inspection and supering to bring us to the last week in July—and bee escapes.

It is outside the scope of this paper to describe our method of rearing queens, but it would hardly be complete without a short account of how we requeen. I have already stated that I aim to requeen a colony whenever the queen fails or swarming impulse develops, yet we cannot very conveniently have queens of our own rearing before July or August. This makes it necessary to buy some Southern queens to tide us over until our own are ready. When these queens arrive in May and early June, they are first introduced to nuclei placed over the colonies with screened feeder-board, I call them nucleus boards, between to allow the nucleus to get some colony heat. It is well recognized that queens are more easily introduced to nuclei than to full colonies, and the loss ensuing from a failure is far less. Again, queens are most easily of all introduced to colonies when they have just been removed from the brood-nest. This is why I seldom try to introduce queens direct from the mail to full colonies, but give them at least a week in nuclei first to recover from the fatigue of travelling. This reduces the introduction loss to a low percentage.

Although it is not quite orthodox, we save a great many ripe cells from brood chambers where we find them, place them in nuclei, and when they come only from good stock they make splendid queens. At the time of putting the queens down, in June, I endeavor to graft cells at most of the yards and ten

days later, when the cells are ready to place in nuclei, the brood which was put up all over the yards is ripe and in the best condition for making nuclei. I am very much of a beginner at queen-rearing, but with the purchased queens, and the queens from natural and from artificial cells, we manage to accumulate a fair stock of queens laying in nuclei in all the yards by the time it is necessary to make a general slaughter of queens of doubtful value for further use. As previously stated, all two-year queens must go, unless there happens to be one of very extra value as a breeder. All two-season package queens must go. The work of one-year queens is scrutinized carefully.

If the colony has done well and the queen is laying nice even sheets of brood, she can stay. If not, she must go. Young queens are also judged by their brood, if possible before they leave their places in the nuclei. If a queen cannot produce even brood, that is, if she does not lay in every cell as she goes along, an egg that will hatch, I do not like her, and will not keep her if I can help myself, even though I have paid good money for her.

Our method of introducing queens is very simple and gives almost one hundred per cent success provided the colony is in the proper condition, that is, queenless and celless. The queen is placed in a flat open screen cage which is plugged with some soft comb which the bees will chew away in a few hours. This is pushed in at the entrance just so it can be pulled out again next day. It takes a little practice to know how hard to pack the soft wax plug. Newly-built comb such as one sometimes finds in odd places in nucleus boxes is the very best to use. It should not be very hard.

Now I have taken up fall preparation, wintering, spring management, and requeening, and have the decks fairly well cleared for Supering, Taking Off, Extracting, and Preparing for Market.

We generally attach considerable importance to the time and manner of giving supers. We cannot afford to put on supers faster than they are needed. We have no more than enough to take care of a good crop and we dole out our supply from time to time where it will do the most good. It may be all right to place the empty on top of the stack as some do, but I have always felt that bees store better when the empty combs are placed directly above the brood, and below what is already stored. I want to see into brood-chambers every eighth or ninth day during the honey season, and when a helper lifts off the supers he notes whether more room is needed, while I am examining the brood-chamber. For the first three supers the next one is added just as soon as work is well started in the previous one. Then if conditions indicate that more space may not be well filled we give a super of foundation if anything. This tends to hasten ripening and usually gets a set of combs built with very little cost. The food chamber is kept low enough in the stack to make sure of its being very well filled and sealed.

It should never be placed next the cover. The top super should have the cover well sealed down and not loosened, when escapes are going on, to make it quite safe from robbers after the bees have left it.

With yards rather widely distributed and farmers liable to put in fields of buckwheat almost anywhere over the territory, our light honey is not safe on the hives after the first of August. In fact, it was still July when our best run of buckwheat came in 1923, and in some yards combs of lower supers had to be sorted carefully, to leave for dark honey more of the last gathering of clover honey than we liked. In putting on the bee-escapes we find it convenient to lift the supers all down, sorting them as we go. Unless the yard may expect to gather a fairly large crop of fall honey the food chamber goes next the excluder and on that a super of empty combs. In many cases the foundation super given last will have only unripe honey and it is left instead of the empties. On this is placed the bee-escape and the supers of honey. The greatest care must be exercised to make the supers above the escape perfectly bee-tight, for they will be unguarded. When we start putting on escapes we do nothing else until the first have been on over two nights. By that time the bees are well out unless brood or queens are up. Records and close observation while handling the supers keep those conditions down to a minimum.

For drawing the honey, two trucks work to the best advantage. If great care has been exercised to prevent getting robbing started, when the escapes go on, two active men with a truck apiece will strip a fifty colony yard before the robbers have much chance. All escape boards come home in trucks to go out in the Dodge to the next yards. As far as supplies hold out, I like to get all supers home and stored before going ahead with the extracting. As all of our storing and extracting is on a concrete floor laid on the ground, my mind is quite at rest as to the support of any load we may be able to pile in. In the event of cool weather the storeroom can be kept warm with the boiler, and the four-horse steam engine has lots of power to throw even thick honey from the combs.

What appeals to me most in a central extracting plant is the opportunity it gives to have a first-class building with the best equipment premanently installed, and to work regular hours under comfortable working conditions. After working for years in little houses at outyards where it was a fight with robbers, and toiling heat and lack of water and conveniences, we concluded it was a poor business that would not afford some comfort to its work. Now we can stock a yard in anywhere there is a suitable place, and when the honey is ready to come off, the escapes and trucks get it off and home where we can extract it in a business-like way. In planning a building, I gave some attention to general factory buildings and noticed first that outer walls are made mostly of glass. ceilings are

high, and ground floors are well-surfaced concrete. I wanted to be able to drive right in with a load of honey and close the doors to keep robbers out. The building has running water and every ground floor has a drain for flushing out. The drains lead to a cesspool which takes care of any diseased honey which might possibly be in the washings from the floor.

The building is lighted by electricity, but the extractors are run by steam power. A six-horsepower boiler fired by coke melts the cappings, heats the knives, runs the engine which extracts and pumps the honey to store tanks, and warms the supers when necessary. In cold weather this accommodating boiler also heats the garage where the cars are kept and the office and work room upstairs, to say nothing of the valuable service it renders in making feed and melting wax. It is an indispensable feature of a central plant, and incidentally, I believe I hold the record for being the first to use steam power to run extractors. When steam is needed to uncap and melt the cappings anyway, it is eminently more satisfactory than a gas engine. Then our rates are such that one must pay for electric power for twelve months to get the use of it for one or two. I find that a pound of coke will uncap, melt the cappings, extract and pump nearly fifty pounds of honey, besides warming the supers and the honey to help clarify.

In 1924 we ran three full days and some parts of days to extract the light honey. It was a very short crop. In the three full days we did everything, including sharpening the knives twice a day, cleaning up, etc., inside the ten hours, making between eight and nine hours of actual running, and extracted ten thousand pounds each day. Two men uncapped and cared for the combs, supplying themselves from the stacks in the next room and putting the combs back into the supers and piling them. My duty was to fire the boiler and operate the machines, handling the combs from the uncappers to the extractors and out again where I stacked them flat. There were just three of us working and the good little steam engine and two eight-frame extractors. The three-quarter inch pump we secured from Roots twelve years ago had no difficulty keeping the honey out of our way.

For rapid work in uncapping it is necessary to have combs even and nicely bulged, to have a good head of live steam in the knife, a good long straight knife well sharpened, an active operator with a strong wrist and bright light and plenty of fresh air to work by. With experience and care of the knife, it is possible to do rapid work on honey warm from the hive with a standard unheated knife; but I can place my knife in the hands of an ambitious greenhorn and after one or two days practice he will keep up with the fastest cold knife operator under the best conditions of honey, and when the honey is inclined to be gummy the latter will not see anything of him after the first

half-hour. This may seem like boasting, but I believe it to be merely a simple statement of fact.

There are three fundamental errors in the standard uncapping knife, the short blade, the crooked handle and the bevelled back. Each one of these is calculated to set a man back on his day's and with all three combined, it is only by great skill and patience that he does a day's work at all. Of course, you can get used to them just like you can get used to walking with peas in your boots; but why accustom yourself to any unnecessary inconvenience? There was no doubt that the short blade was the cause of the crooked handle; and why the short blade or the bevelled back no one has ever satisfactorily explained.

About 1915 Mr. Chrysler of Chatham, Ontario, mentioned to me that he was using a straight flat blade for uncapping. It was not long, but would reach across his shallow frames. He found it more satisfactory than the stock knife. There was nothing new about the use of a straight flat knife. It was the first kind ever used; but it had been entirely discarded. Chrysler revived the straight flat knife and deserves credit for it, as for an invention. It was a revelation to me when I learned, about nine years ago and afterwards proved for myself that a straight knife which would reach across the comb was better for uncapping, even without steam, than the standard knife. In 1917 I had two long straight knives steamjacketed and they proved revolutionary, developing such speed as I have already described.

I immediately described these long straight knives of mine in Short Course and Bee Journal. Others had argued copiously for small extracting frames because a short knife would reach across them; but no one had thought of using a larger knife until I did. To prove that I was the first to think of lengthening the knife, note that fact that the idea was so foreign that no one noticed it when it was presented. Not wishing to even try to commercialize the idea, I gave it out freely, and that seems to be one reason why it was not appreciated. However, there was one enterprising young mechanic who picked up the idea, added some notions of his own, and produced the Hardy knife, which is better than the stock knife because it is long and straight like mine, but it not so fast as the Pettit knife because of the bevelled back. Seven years after my knife was first published, this bright young man sold his knife to a Canadian firm of manufacturers, who paid him for it. Which all goes to show that it takes considerable dropping to wear away a stone. Now when you see the Hardy knife advertised, you will know its story. It is a good knife, the best on the market.

Of the two systems for storing the honey, gravity versus pump, I have no experience with the former, but am so well pleased with the latter that there is no desire to change. Both have their advantages and if I found it necessary to build on a side hill, doubtless the system would be gravity, but it is a great saving to have storing and extracting on the same floor and let

the pump do the work. The only effect of the pump is to hasten granulation or if run when not full to cause some foam. Adjoining the extracting room is the tank room with twelve tanks holding 2,500 pounds each. A galvanized iron pipe conducts the honey from the pump to the ceiling and along over the tanks. There is an outlet over each tank which is left open when that tank is being filled. The rest of the system is closed so that honey can be let into any tank by simply opening the valve over it. The system drains to one point where a valve is opened at the end of the day to leave the pipes empty for the next day's start.

We have not strained honey for quite a number of years now, and at the rate we put it through the extractors it would be rather difficult, although it might be possible. The honey from the capping melter is strained before it joins the honey from the extractors in its way to the tanks. This warms the whole fairly well, and each tank as it is filled is covered to retain the heat and allowed to stand for at least three days before being tinned up. This allows all foreign matter to rise so completely that very little indeed ever appears on the surface after it is tinned up. Just before draining each tank into selling packages, the foam and a good quantity of thin honey, if any, is skimmed off the top so that all is clear and thick.

Our whole crop is sold in the granulated form in ten pound, five pound and two and a half pound lithographed pails. One might say that all Canadian honey is sold in the granulated form. The only complaints we receive with reference to granulation come when we have heated it too much to assist clarifying when extracting not so as to injure the flavor, but so as to retard granulation or prevent a nice, even grain. Whenever a customer receives a shipment which is not hard and firm there is suspicion of adulteration and we have to be pretty careful not to do anything which will interfere with normal granulation.

There is one purely mechanical idea which I have saved from the downfall of the Hedden hive system which came to me from the enthusiasm of men who were trucking home Hedden supers with their closed-end frames held tightly together. The names of Miller, Bainard, Chrysler, all past-presidents of the Ontraio Beekeepers' Association, came to mind in this connection. I said to Chrysler, who is also a maker of supplies, "Why not make us up some frames like yours, only Langstroth depth?" He made one hundred supers for us to experiment with. The next year we got five hundred more, and have since gotten another five hundred, making eleven hundred supers of regular ten-frame capacity, each containing nine frames with the end-bars wide enough, the full depth, to space them evenly, only leaving a space at each side, one for a wooden spacer and the other for a super-spring. They have projecting top-bars from which they hang like Langstroth frames, but they are long enough to fit the ends of the super as a drawer fits a desk, and

are held firmly together by the super-springs. They are never removed from the super except to be uncapped, and are returned to it directly from the extractor. Bee-escapes are used in getting these supers from the hives, and the boys delight in handling them freely and rapidly, because the frames do not fall out or lose their spacing.

CLEANING UP AMERICAN FOULBROOD COUNTY BY COUNTY.

(By S. B. Fracker, State Entomologist, Madison Wisconsin.)

For two generations, nearly three-fourths of a century, the beekeepers of this country have been engaging in a deliberate and determined battle to control American foulbrood in apiaries, The disease has been in the United States somewhat longer, but well-planned combative measures may be dated from the time of Quinby, who in 1853 described what he called "diseased brood". He discovered that honey might be disinfected by boiling and that the only effectual control was "to drive out the bees into an empty hive", or to destroy the infected colonies at the end of the honey flow. He seems to have preferred the latter method.

As commercial beekeepers have moved from one section of the country to another, have discovered new profitable bee pastures, and have bought and sold bees and used supplies, this disease has spread into nearly every section of the country. Its virulence differs in different places, but in many of the best honey-producing sections in the country it is the most serious problem beekeepers have to face.

Eight years ago Wisconsin adopted a policy which has been known as the "area clean-up plan", as it was then out of the question to attempt such a strenuous measure as cleaning up the state all at once. Certain counties were chosen in which the beekeepers were active and showed a cooperative spirit, and in which assistance was needed. These counties have been consistently the most heavily infected in the state. Both state and county funds have been employed in the adoption of control measures.

Seventeen counties are being covered at present under this plan. They are mainly in one group along the east border of the state, although in addition, one isolated county (Richland) in the western half of the state, has been covered.

At first progress was slow, as funds were scarce, and the inspection was not particularly efficient. During the first two or three summers, in spite of definite instructions from the chief inspector, the deputies would look over a yard and only examine the weak colonies or perhaps a frame or two in some of the strong ones. Since that time the work has become more efficient and it is a positive rule that every inspector must look over every colony in the yard and every frame in every colony before he makes a report as to the condition of the apiary.

The available appropriation was insignificant until July 1, 1919, when it was made $5,000.00 a year. Two years later this was increased to $10,500.00, which is the amount still used.

The best way of determining whether the work has been worth while is go over the list of area clean-up counties and report the records of each one.

Calumet and Jefferson counties were begun in 1918. In the former, thirty-five apiaries were found diseased, while in 1924 this had been reduced to seven. The reduction in the number of infected apiaries was therefore from fifteen to three per cent. In the latter county, 111 out of 465 apiaries were found diseased on first inspection, while in 1924 this had been reduced to twelve. The reduction is therefore from 24% to 3%.

Manitowoc was begun about the same time, but has never been completely covered. There are 252 beekeepers in the county, of which forty-four apiaries have at different times been found diseased. By 1924 only six remained infected in the part of the county inspected in 1917-18.

A small part of Richland county was undertaken in 1917 and the county as a whole covered for the first time in 1920. Out of 312 apiaries, forty-eight have been infected. This had been reduced by 1924 to six infected apiaries, a reduction in the proportion diseased from fifteen per cent to two per cent.

Winnebago county was begun in 1919. There are about three hundred apiaries in this county, of which about forty-seven were found infected when first examined. Only one is now known to be infected and the reduction has therefore been from 16 to .3 of one per cent.

Milwaukee county was also begun in 1919 and during that and the following year was found to contain 236 apiaries, of which sixty-two were infected. This was reduced to three in 1924, the reduction is therefore from twenty-three per cent to one per cent.

In Fond du Lac county, begun in 1921, one of the most successful campaigns has been carried on. The inspectors have been particularly efficient, and energetic in hunting up all the apiaries in the county. 475 were located, of which 108 were found diseased when first examined. This number by 1924 had been reduced to 11, an improvement of from 23% infected to 2% infected.

Shawano and Sheboygan counties were also undertaken the same year and the reduction in infected apiaries has been from 8% to five-tenths of one per cent in the case of Shawano and from 8% to 2% in the case of Sheboygan.

Outagamie and Dodge counties were begun in 1922. The former has 316 apiaries, of which twenty-four were infected at first and two still remain so, so far as known. In Dodge county the infection was very heavy, 108 out of 540 apiaries showing disease. In the two seasons in which work has been carried

on this number has been reduced to 78, but is expected to decrease rapidly in the future.

Three additional counties were added in 1923, Washington, Ozaukee and Green. As the reports in 1924 show the effect of only the first season's work, the improvement is not so marked but the number of diseased apiaries was reduced in each case to two-thirds of the amount in 1923. The percentage figures are: Washington, from thirty-six to twenty-four per cent; Ozaukee, from twenty-six to seventeen per cent; and Green from fourteen to ten per cent.

Rock and Marathon Counties were started in 1924 and it is therefore too early to determine the results of the work.

One of the most important, if not the most important, feature of Wisconsin apiary inspection is the legal provision which prohibits anyone from moving bees without a permit from the state apiary inspector. This has prevented the reintroduction of disease into clean-up areas and is doing a great deal to protect the northern counties where infection is more rare. However, Wisconsin has a great deal of American foulbrood and the disease is believed to be absent in only fourteen counties out of seventy-one.

In order to issue permits intelligently it is necessary to make special inspections in many cases where it is desired to sell or move bees or used equipment. Owing to the number of these applications, inspections have been made in nearly all the counties of the state. For example, during the two seasons of 1923 and 1924 inspections were made and American foulbrood discovered in fifty-four counties. Inspections were made but no American foulbrood found in twelve counties, and there were only five counties in the state in which no apiary inspection of any kind was carried on.

The benefits from area clean-up work and apiary inspection are not only in reduction of disease, but in preventing it from increasing. From experience in the past we can be certain that in a county, for example, in which the disease has been reduced from, say, fifteen per cent to three per cent of the number of apiaries, it would have increased to twenty-five or thirty per cent if bee disease eradication methods had not been employed. It is clear, therefore, that the adoption of the area clean-up plan in Wisconsin was sound judgment and that the expenditures for this purpose have proven a wise investment.

FORMATION OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

SPRINGFIELD, ILL., *February 26, 1891.*

The Capitol Beekeepers' Association was called to order by President P. J. England.

Previous notice having been given that an effort would be made to form a State Association, and there being present beekeepers from different parts of the State, by motion, a recess was taken in order to form such an association.

P. J. England was chosen temporary chairman and C. E. Yocum temporary secretary. On motion, the Chair appointed Thos. G. Newman, C. P. Dadant and Hon. J. M. Hambaugh a Committee on Constitution.

Col. Chas. F. Mills addressed the meeting on the needs of a State association and stated that it was his opinion that the beekeepers should have a liberal appropriation for a State Apiarian Exhibit at the World's Columbian Exposition.

A motion to adjourn 'till 1:30 p. m. prevailed.

AFTERNOON SESSION.

The Committee on Constitution reported a form for same which, on motion, was read by the Secretary, by sections serially.

Geo. F. Robbins moved to substitute the word "shall" for "may" in the last clause of Section 1, Article III. This led to a very animated discussion, and the motion was lost.

J. A. Stone moved to amend the above-named section by striking out the word "ladies" and all that followed of the same section, which motion led to further discussion, and motion finally prevailed.

Section 2, Article II, relating to a quorum, was, on motion, entirely stricken out.

Mr. Robbins moved to amend Article V by adding the words "Thirty days' notice having been given to each member." Prevailed.

Thos. G. Newman moved to adopt the Constitution, so amended, as a whole. Which motion prevailed.

(See Constitution).

J. A. Stone moved that the Chair appoint a Nominating Committee of three on permanent organization. Prevailed.

Chair appointed as such committee, Col. Chas. F. Mills, Hon. J. M. Hambaugh, and C. P. Dadant.

Committee retired and in a few minutes returned, submitting the following named persons as candidates for their respective offices:

For President—P. J. England, Fancy Prairie.

For Vice Presidents—Mrs. L. Harrison, Peoria; C. P. Dadant, Hamilton; W. T. F. Petty, Pittsfield; Hon. J. M. Hambaugh, Spring; Dr. C. C. Miller, Marengo.

Secretary—Jas. A. Stone, Bradfordton.

Treasurer—A. N. Draper, Upper Alton.

Mr. Black moved the adoption of the report of the Committee on Nominations. The motion prevailed, and the officers as named by the committee were declared elected for the ensuing year.

Hon. J. M. Hambaugh moved that Mr. Thos. G. Newman, Editor Ameri-

can Bee Journal, of Chicago, be made the first honorary member of the association. Prevailed.

At this point, Col. Chas. F. Mills said:

"Mr. Chairman, I want to be the first one to pay my dollar for membership," at the same time suiting his action to his words, and others followed his example, as follows:

CHARTER MEMBERS.

Col. Chas. F. Mills, Springfield.
Hon. J. M. Hambaugh, Spring.
Hon. J. S. Lyman, Farmingdale.
C. P. Dadant, Hamilton.
Chas. Dadant, Hamilton.
A. N. Draper, Upper Alton.
S. N. Black, Clayton.
Aaron Coppin, Wenona.
Geo. F. Robbins, Mechanicsburg.
J. W. Yocum, Williamsville.
Thos. S. Wallace, Clayton.
A. J. England, Fancy Prairie.
P. J. England, Fancy Prairie.
C. E. Yocum, Sherman.
Jas. A. Stone, Bradfordton.

FIRST HONORARY MEMBER.

Thos. G. Newman, Editor American Bee Journal, Chicago.

STATE OF ILLINOIS—DEPARTMENT OF STATE.

ISAAC N. PEARSON, *Secretary of State.*

To all to whom these Presents shall come—GREETING:

Whereas, A certificate duly signed and acknowledged having been filed in the office of the Secretary of State on the 27th day of February, A. D. 1891, for the organization of the Illinois State Beekeepers' Association, under and in accordance with the provisions of "An Act Concerning Corporations," approved April 18, 1872, and in force July 1, 1872, and all acts amendatory thereof, a copy of which certificate is hereunto attached.

Now, Therefore, I, Isaac N. Pearson, Secretary of State of the State of Illinois, by virtue of the powers and duties vested in me by law, do hereby certify that the said, The Illinois State Beekeepers' Association, is a legally organized corporation under the laws of the State.

In Testimony Whereof, I hereunto set my hand and cause to be affixed the great seal of State.

Done at the city of Springfield, this 27th day of February, in the year of our Lord one thousand eight hundred and ninety-one, and the Independence of the United States the one hundred and fifteenth.

[SEAL] I. N. PEARSON, *Secretary of State.*

STATE OF ILLINOIS, } ss.
County of Sangamon }

To Isaac N. Pearson, Secretary of State:

We, the undersigned, Perry J. England, Jas. A. Stone and Albert N. Draper, citizens of the United States, propose to form a corporation under an act of the General Assembly of the State of Illinois, entitled, "An Act Concerning Corporations," approved April 18, 1872, and all acts amendatory thereof; and for the purposes of such organizations, we hereby state as follows, to-wit:

1. The name of such corporation is, The Illinois State Beekeepers' Association.

2. The object for which it is formed is to promote the general interests of the pursuit of bee-culture.

3. The management of the aforesaid Association shall be vested in a board of three Directors, who are to be elected annually.

4. The following persons are hereby selected as the Directors, to control and manage said corporation for the first year of its corporate existence, viz: Perry J. England, Jas. A. Stone, and Albert N. Draper.

5. The location is in Springfield, in the county of Sangamon, State of Illinois.

(Signed) PERRY J. ENGLAND,
JAS. A. STONE,
ALBERT N. DRAPER.

STATE OF ILLINOIS, } ss.
Sangamon County, }

I, S. Mendenhall, a notary public in and for the county and State aforesaid, do hereby certify that on this 26th day of February, A. D. 1891, personally appeared before me, Perry J. England, James A. Stone, and

Albert N. Draper, to me personally known to be the same persons who executed the foregoing certificate, and severally acknowledged that they had executed the same for the purpose therein set forth.

In witness whereof, I have hereunto set my hand and seal the day and year above written.

[Seal] S. MENDENHALL, *Notary Public.*

CONSTITUTION AND BY-LAWS OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

Constitution.

Adopted Feb. 26, 1891.

ARTICLE I.

This organization shall be known as The Illinois State Beekeepers' Association, and its principal place of business shall be at Springfield, Ill.

ARTICLE II.—OBJECT.

Its object shall be to promote the general interests of the pursuit of bee-culture.

ARTICLE III.—MEMBERSHIP.

Section 1. Any person interested in apiculture may become a member upon the payment to the Secretary of an annual fee of one dollar and fifty cents ($1.50). (Amendment adopted at annual meeting, December, 1919): And any affiliating association, as a body, may become members on the payment of an aggregate fee of fifty cents (50c) per member, as amended November, 1910.

Sec. 2. Any person may become honorary member by receiving a majority vote at any regular meeting.

ARTICLE IV.—OFFICERS.

Section 1. The officers of this association shall be, President, Vice President, Secretary and Treasurer. Their terms of office shall be for one year, or until their successors are elected and qualified.

Sec. 2. The President, Secretary and Treasurer shall constitute the Executive Committee.

Sec. 3. Vacancies in office—by death, resignation and otherwise—shall be filled by the Executive Committee until the next annual meeting.

ARTICLE V.—AMENDMENTS.

This Constitution shall be amended at any annual meeting by a two-thirds vote of all the members present—thirty days' notice having been given to each member of the association.

By-Laws.

ARTICLE I.

The officers of the association shall be elected by ballot and by a majority vote.

ARTICLE II.

It shall be the duty of the President to call and preserve order at all meetings of this association; to call for all reports of officers and committees; to put to vote all motions regularly seconded; to count the vote at all elections, and declare the results; to decide upon all questions of order, and to deliver an address at each annual meeting.

ARTICLE III.

The Vice Presidents shall be numbered, respectively, First, Second, Third, Fourth and Fifth, and it shall be the duty of one of them, in his respective order, to preside in the absence of the President.

ARTICLE IV.

Section 1. It shall be the duty of the Secretary to report all proceedings of the association, and to record the same, when approved, in the Secretary's book; to conduct all correspondence of the association, and to file and preserve all papers belonging to the same; to receive the annual dues and pay them over to the Treasurer, taking his receipt for the same; to take and record the name and address of every member of the association; to cause the Constitution and By-Laws to be printed in appropriate form and in such quantities as may be directed by the Executive Committee from time to time, and see that each member is provided with a copy thereof; to make out and publish annually, as far as practicable, statistical table showing the number of colonies owned in the spring and fall, and the amount of honey and wax produced by each member, together with such other information as may be deemed important, or be directed by the Executive Committee; and to give notice of all meetings of the association in the leading papers of the State, and in the bee journals at least four weeks prior to the time of such meeting.

Sec. 2. The Secretary shall be allowed a reasonable compensation for his services, and to appoint an assistant Secretary if deemed necessary.

ARTICLE V.

It shall be the duty of the Treasurer to take charge of all funds of the association, and to pay them out upon the order of the Executive Committee, taking a receipt for the same; and to render a report of all receipts and expenditures at each annual meeting.

ARTICLE VI.

It shall be the duty of the Executive Committee to select subjects for discussion and appoint members to deliver addresses or read essays, and to transact all interim business.

ARTICLE VII.

The meeting of the association shall be, as far as practicable, governed by the following order of business:

Call to order.
Reading minutes of last meeting.
President's address.
Secretary's report.
Treasurer's report.
Reports of committees.
Unfinished business.
Reception of members and collection.
Miscellaneous business.
Election and installation of officers.
Discussion.
Adjournment.

ARTICLE VIII.

These By-Laws may be amended by a two-thirds vote of all the members present at any annual meeting.

C. E. YOCUM.
AARON COPPIN.
GEO. F. ROBBINS.

Following is a copy of the law passed by the Illinois Legislature May 19, and signed by the Governor June 7, 1911, to take effect July 1, 1911:

STATE FOULBROOD LAW.

State Inspector of Apiaries.

House Bill No. 670.

(Approved June 7, 1911.)

AN ACT *to prevent the introduction and spread in Illinois of foul brood among bees, providing for the appointment of a State Inspector of Apiaries and prescribing his powers and duties.*

Whereas, the disease known as foulbrood exists to a very considerable extent in various portions of this State, which, if left to itself, will soon exterminate the honey bees; and

Whereas, the work done by an individual beekeeper or by a State Inspector is useless so long as the official is not given authority to inspect and, if need be, to destroy the disease when found; and

Whereas, there is a great loss to the beekeepers and fruit growers of the State each year by the devasting ravages of foulbrood.

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That the Governor shall appoint a State Inspector of Apiaries, who shall hold his office for the term of two years, and until his successor is appointed and qualified, and who may appoint one or more assistants, as needed, to carry on the inspection under his supervision. The Inspector of Apiaries shall receive for each day actually and necessarily spent in the performance of his duties the sum of four dollars to be paid upon bills of particulars certified to as correct by the said State Inspector of Apiaries, and approved by the Governor.

Sec. 2. It shall be the duty of every person maintaining or keeping any colony or colonies of bees to keep the same free from the disease known as foulbrood and from every contagious and infectious disease among bees. All beehives, beefixtures or appurtenances where foulbrood or other contagious or infectious diseases among bees exists, are hereby declared to be nuisances to be abated as hereinafter prescribed. If the Inspector of Apiaries shall have reason to believe that any apiary is infected by foulbrood or other contagious disease, he shall have power to inspect, or cause to be inspected, from time to time, such apiary, and for the purpose of such inspection he, or his assistants, are authorized during reasonable business hours to enter into or upon any farm or premises, or other building or place used for the purpose of propagating or nuturing bees. If said Inspector of Apiaries, or his assistants, shall find

by inspection that any person, firm or corporation is maintaining a nuisance as described in this section, he shall notify in writing the owner or occupant of the premises containing the nuisance so disclosed of the fact that such nuisance exists. He shall include in such notice a statement of the condition constituting such nuisance, and order that the same be abated within a specified time and a direction, written or printed, pointing out the methods which shall be taken to abate the same. Such notice and order may be served personally or by depositing the same in the post-office properly stamped, addressed to the owner or occupant of the land or premises upon which such nuisance exists, and the direction for treatment may consist of a printed circular, bulletin or report of the Inspector of Apiaries, or an extract from same.

If the person so notified shall refuse or fail to abate said nuisance in the manner and in the time prescribed in said notice, the Inspector of Apiaries may cause such nuisance to be abated, and he shall certify to the owner or person in charge of the premises the cost of the abatement and if not paid to him within sixty days thereafter the same may be recovered, together with the costs of action, before any court in the State having competent jurisdiction.

In case notice and order served as aforesaid shall direct that any bees, hives, beefixtures or appurtenances shall be destroyed and the owner of such bees, hives, beefixtures or appurtenances shall consider himself aggrieved by said order, he shall have the privilege of appealing within three days of the receipt of the notice to the County Court of the county in which such property is situated. The appeal shall be made in like manner as appeals are taken to the County Court from judgments of justices of the peace. Written notice of said appeal served by mail upon the Inspector of Apiaries shall operate to stay all proceedings until the decision of the County Court, which may, after investigating the matter, reverse, modify or affirm the order of the Inspector of Apiaries. Such decision shall then become the order of the Inspector of Apiaries, who shall serve the same as hereinbefore set forth and shall fix a time within which such decision must be carried out.

Sec. 3. The Inspector of Apiaries shall, on or before the second Monday in December of each calendar year, make a report to the Governor and also to the Illinois State Beekeepers' Association, stating the number of apiaries visited, the number of those diseased and treated, the number of colonies of bees destroyed and the expense incurred in the performance of his duties.

Sec. 4. Any owner of a diseased apiary or appliances taken therefrom, who shall sell, barter or give away any such apiary, appliance, queens or bees from such apiary, expose other bees to the danger of contracting such disease, or refuse to allow the Inspector of Apiaries to inspect such apiary, or appliances, shall be fined not less than $50 nor more than $100.

Approved June 7, 1911.

(Bill passed in the 50th General Assembly.)

BEEKEEPERS' ASSOCIATION.

THE ORIGINAL BILL.

§ 1. Appropriates $1,000 per annum— proviso.

§ 2. How drawn.

§ 3. Annual Report.

AN ACT *making an appropriation for the Illinois State Beekeepers' Association.*

Whereas, The members of the Illinois State Beekeepers' Association have for years given much time and labor without compensation in the endeavor to promote the interests of the beekeepers of the State; and,

Whereas, The importance of the industry to the farmers and fruit-growers of the State warrants the expenditure of a reasonable sum for the holding of annual meetings, the publication of reports and papers containing practical information concerning beekeeping, therefore, to sustain the same and enable this organization to defray the expenses of annual meetings, publishing reports, suppressing foulbrood among bees in the State, and promote the industry in Illinois;

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That there be and is hereby appropriated for the use of the Illinois State Beekeepers' Association the sum of one thousand dollars ($1,000) per annum for the year 1917-1918, for the purpose of advancing the growth and developing the interests of the beekeepers of Illinois, said sum to be expended under the direction of the Illinois State Beekeepers' Association for the purpose of paying the expenses of holding annual meetings, publishing the proceedings of said meetings suppressing foulbrood among bees in Illinois, etc.

Provided, however, That no officer or officers of the Illinois State Beekeepers' Association shall be entitled to receive any money compensation whatever for any services rendered for the same, out of this fund.

Sec. 2. That on the order of the President, countersigned by the Secretary of the Illinois State Beekeepers' Association, and approved by the Governor, the Auditor of Public Accounts shall draw his warrant on the Treasurer of the State of Illinois in favor of the treasury of the Illinois State Beekeepers' Association for the sum herein appropriated.

Sec. 3. It shall be the duty of the Treasurer of the Illinois State Beekeepers' Association to pay out of said appropriation, on itemized and receipted vouchers, such sums as may be authorized by vote of said organization on the order of the President countersigned by the Secretary, and make annual report to the Governor of all such expenditures, as provided by law.

Itemized in the Omnibus Bill as follows:

For shorthand reporting	$ 200.00
For postage and stationery	50.00
For printing	550.00
Expense of meetings	200.00
Total amount of the appropriation	$1,000.00

The Assembly ruled that this is not to be paid in *lump*, but drawn on itemized accounts.

CODE OF RULES AND STANDARDS FOR GRADING APIARIAN EXHIBITS AT FAIRS AS ADOPTED BY ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

COMB HONEY.

Rule 1. Comb honey shall be marked on a scale of 100, as follows:

Quantity	40	Style of display	20
Quality	40		

Rule 2. Points of quality should be:

Variety	5	Straightness of comb	5
Clearness of capping	10	Uniformity	5
Completeness of capping	5	Style of section	5
Completeness of filling	5		

Remarks: 1. By variety is meant different kinds, with regard to the sources from which the honey is gathered, which adds much interest to an exhibit.

2. By clearness of capping is meant freedom from travel stain and a water soaked appearance. This point is marked a little high, because it is a most important one. There is no better test of the quality of comb honey than the appearance of the cappings. If honey is taken off at the proper time, and cared for as it should be, so as to preserve its original clear color, body and flavor will take care of themselves, for excellence in the last two points always accompanies excellence in the first. Clover and basswood honey should be white; heartsease, a dull white tinged with yellow; and Spanish needle, a bright yellow.

3. By uniformity is meant closeness of resemblance in the sections composing the exhibit.

4. By style is meant neatness of the sections, freedom from propolis, etc.

5. Honey so arranged as to show every section should score the highest in style of display, and everything that may add to the tastiness and attractiveness of an exhibit should be considered.

EXTRACTED HONEY.

Rule 1. Extracted honey should be marked on a scale of 100, as follows:

Quantity	40	Style and display	15
Quality	45		

Rule 2. Points of quality should be:

Variety	10	Style of package	10
Clearness of color	5	Variety of package	5
Body	5	Finish	5
Flavor	5		

Remarks: 1. Light clover honey pouring out of a vessel is a very light straw color; Spanish needle, a golden hue, and dark clover honey, a dull amber.

2. Style of package is rated a little high, not only because in that consists the principal beauty of an exhibit of extracted honey, but also because it involves the best package for marketing. We want to show honey in the best shape for the retail trade, and that, in this case, means

the most attractive style for exhibition. Glass packages should be given the preference over tin; flint glass over green, and smaller vessels over larger, provided the latter run over one or two pounds.

3. By variety of package is meant chiefly different sizes; but small pails for retailing, and, in addition, cans or kegs (not too large) for wholesaling, may be considered. In the former case, pails painted in assorted colors, and lettered "Pure Honey", should be given the preference.

4. By finish is meant capping, labeling, etc.

5. Less depends upon the manner of arranging an exhibit of extracted than of comb honey, and for that reason, as well as to give a higher number of points to style of package, a smaller scale is allowed for style of display.

SAMPLES OF COMB AND EXTRACTED HONEY.

Rule 1. Single cases of comb honey, entered as such for separate premiums, should be judged by substantially the same rules as those given for a display of comb honey, and samples of extracted, by those governing displays of extracted honey.

Rule 2. Samples of comb or extracted honey, as above, may be considered as part of the general display in their respective departments.

GRANULATED HONEY.

Rule 1. Candied or granulated honey should be judged by the rules for extracted honey, except as below.

Rule 2. Points of quality should be:

Variety	10	Style of package	10
Fineness of grain	5	Variety of package	5
Color	5	Finish	5
Flavor	5		

Rule 3. An exhibit of granulated honey may be entered or considered as part of a display of extracted honey.

NUCLEI OF BEES.

Rule. Bees in observation hives should be marked on a scale of 100. as follows:

Color and markings	30	Quietness	5
Size of bees	30	Style of comb	5
Brood	10	Style of hive	10
Queen	10		

Remarks: 1. Bees should be exhibited only in the form of single frame nuclei, in hives or cages with glass sides.

2. Italian bees should show three or more bands, ranging from leather color to golden or light yellow.

3. The markings of other races should be those claimed for those races in their purity.

4. A nucleus from which the queen is omitted should score zero on that point.

5. The largest quantity of brood in all stages or nearest to that should score the highest in that respect.

6. The straightest, smoothest and most complete comb, with the most honey consistent with the most brood, should score the highest in that respect.

7. That hive which is neatest and best made and shows the bees, etc., to the best advantage should score the highest.

QUEEN BEES.

Rule. Queen bees in cages should be marked on a scale of 100, as follows:

Quantity	40	Quality and variety	40
Style of caging and display	20		

Remarks: 1. The best in quality consistent with variety should score the highest. A preponderance of Italian queens should overweigh a preponderance of black ones, or, perhaps, of any other race or strain; but sample queens of any or all varieties should be duly considered. Under the head of quality should also be considered the attendant bees. There should be about a dozen with each queen.

2. Neatness and finish of cages should receive due consideration, but the principal points in style are to make and arrange the cages so as to show the inmates to the best advantage.

BEESWAX.

Rule. Beeswax should be marked on a scale of 100, as follows:

Quantity	40	Quality	40
Style of display	20		

Remarks: 1. Pale, clear, yellow specimens should score the highest, and the darker grades should come next in order.

2. By style is meant chiefly the forms in which the wax is molded and put up for exhibition. Thin cakes or small pieces are more desirable in the retail trade than larger ones. Some attention may be given to novelty and variety.

FOULBROOD IN BEES.

So important it is to be well posted on the two most important, and likewise most destructive, diseases of bees, that a full description of the diseases and their treatment is herewith given. These are taken verbatim from Bulletins Nos. 2 and 5 of the Michigan Apiary Inspection Division and were written by Michigan's present State Bee Inspector, Mr. B. F. Kindig.

AMERICAN FOULBROOD

American foulbrood is an infectious disease of the larvae of the honey bee.

CAUSE.

The disease is caused by a microscopic organism similar in appearance and habits to some of the germs which cause disease in the human body. The organism is known as *Bacillus larvae.*

SYMPTOMS.

To the beekeeper who is unfamiliar with this disease, usually the first symptoms apparent are a gradual weakening of the colony and the presence of a very unpleasant odor in the hive. In the very early stages of the disease it is recognized by an occasional brood cell capping being sunken and darker in appearance than the cappings of the adjacent cells. A part of these cappings may also have small holes in them, often ragged in appearance. Upon further examination it may be found that in a few uncapped cells the larvae have died and are decaying on the lower cell walls. Upon careful examination, the dead larval remains in all of the cells just mentioned will be found to be similar in shape and position, although they may vary somewhat in color. Soon after the death of the larvae it begins to take on a brownish appearance and the longer the larvae has been dead and the more it becomes dried down the darker is the color. When the remains have dried down to a thin scale on the lower cell wall the color becomes almost black. When larvae die from this disease the decayed remains tend to become quite gluey in their consistency. If a match or tooth-pick be inserted into the cell and a part of the remains drawn out it will be found to stretch out somewhat like glue. This quality is commonly spoken of as ropiness and is often considered the diagnostic symptom of this disease. However, in making a diagnosis these four factors should be present:

(1) The larval should lie on the lower cell wall.
(2) The color should be brown or black.
(3) The consistency of the larvae should be ropy unless dried down into a black hard scale.
(4) The odor should be repulsive, inasmuch as it is commonly described as smelling like a glue pot.

Even in a very mild case of disease the first three symptoms should be apparent while the fourth (the odor) may not be so noticeable if only a few cells are affected. Whenever there is the slightest doubt as to the diagnosis of disease a sample of the comb containing the diseased larvae

should be sent to the U. S. Department of Agriculture, Bee Culture Laboratory, Washington, D. C., where a microscopic examination will be made. Upon application, the department will gladly furnish a mailing case for sending in samples of comb for disease identification.

TREATMENT.

The only successful treatment for American foulbrood consists in removing the bees from the combs and hives and placing them in a clean hive without combs but in which the frames are fitted with full sheets of foundation. There are slight variations in the method of treatment according to the season of the year. These slight differences will be fully discussed under the method of treatment for the particular season. If it is at all possible to avoid it, a diseased colony should never be treated in the same yard with colonies that are not diseased. Wherever possible, the diseased colonies should be removed a mile or more from the yard, given the proper treatment and then returned to the yard. Whenever treating for disease one should give due consideration to the location of other beekeepers in order that disease may not be spread by robbing during the process of treatment.

SPRINGTIME TREATMENT.

When it is desired to treat the bees in the spring as early as possible and when more than one colony is diseased, it is possible to save the brood of each colony excepting the last one treated by the following plan:

Pick out from among the diseased colonies the ones which are deemed strong enough to stand the shock of treatment during the month of May. Each of these colonies should be transferred into clean hives with full sheets of foundation and the brood which they had should be placed on one or more of the weaker diseased colonies. In the process of transferring, the diseased colony is placed two feet or so to the back side of where it formerly stood. The hive into which it is desired to transfer the bees is placed on the old stand. After placing a newspaper in front of the hives to catch any honey that may drip, then taking one frame at a time the bees should be brushed upon the paper in front of the new hive. Care should be used to see that the queen enters the new hive. After she is in, a queen-guard or queen and drone trap should be placed on the entrance to prevent the swarm from absconding. After all the bees have been removed, the combs may be placed on another diseased colony, as said bfore. If only one colony is affected then the combs should be buried deeply or burned. In all of the manipulations concerned with the handling of disease every precaution must be used in order that no robbing may take place. If any robbing occurs it is quite certain that each colony concerned in the robbing will later become diseased. For this reason it is customary to treat diseased bees late in the evening after the bees quit flying. If it is necessary to treat them in a yard where there are healthy colonies, then the entrances to all the adjacent healthy colonies should be closed with a screen so that in the excitement and confusion incident to transferring if any of the bees from the diseased hive attempt to enter they will be unable to do so. If it is impracticable to remove the bees from the yard for treatment, then the hives should be moved a foot or more each day until the diseased hives are as far as they can be placed in the yard from other colonies. Many beekeepers who have treated disease from year to year find it advisable to use a screened cage about six feet square and six feet high. They perform all of the work of transferring within this cage. In this way it is impossible for robbers to enter or for any of the bees of the colony to enter another hive. Whenever bees are disturbed as in transferring they fill their honey sacs with honey. In case it is a diseased colony the honey which they carry may transmit disease to any colony which such bees may enter. It is, therefore, very essential that all of the bees of a diseased colony be

kept together. Colonies which are strong enough to admit of treatment in the month of May should build up and store a satisfactory amount of honey during the following honeyflow.

SUMMER TREATMENT.

Weak colonies on which the brood was stacked from the colonies treated in May, or other colonies which were too weak for treatment at that time, should be treated during the first few days of the main summer honeyflow, which in this State is either the basswood or clover flow. The same method of treatment should be followed as described previously, excepting that in case some colonies are not strong enough at that time to produce surplus honey, then, two or more colonies should be united at the time of treatment. It is not advisable to handle colonies in such a way that the surplus honey crop is entirely sacrificed. If an increase in the number of colonies is desired, it can be made in the latter part of the clover flow with but very slight sacrifice in the honey crop. The brood from five or six treated colonies can be piled upon one diseased colony and after three weeks when all of the brood is hatched, then the remaining colony should be treated. Whether or not all of the colonies are to be treated at the beginning of the main honey flow is optional with the beekeeper. If they are all treated at that time all frames containing brood must be burned or buried at once. If some of the diseased colonies are still weak it is probably best to pile the brood from those that are strong enough on them and arrange to treat three weeks later. However, when treatment is delayed until three weeks after the beginning of the honey flow in some instances not sufficient time is left for them to store honey enough for their needs. In this case they will have to be fed later.

FALL TREATMENT.

It occasionally happens that a colony which becomes infected in the spring may not be discovered until after the clover honey crop has been gathered. In general, it is not advisable to treat bees when there is no honey flow. The danger of robbing under such conditions is very much greater and feeding must be resorted to in order to keep the colony alive. Late cases of infection may be treated during the month of October after brood rearing has practically ceased. The method of treatment is the same as described before, excepting that the bees are transferred into a hive without frames. They should be left in this hive for at least 48 hours. At that time the beekeeper should carefully remove the hive body from the bottom board. A hive body full of combs of honey taken from a healthy colony should be set in its place. Then the empty hive body with the bees should be set on top and jarred slightly. The bees will then take possession of the combs and honey and the empty hive body may be removed.

FEEDING IN CONNECTION WITH TREATMENT.

When it is desirable to treat very early in the season it is occasionally necessary to resort to feeding in order to get the foundation drawn out and to get brood rearing under way as quickly as possible. Realizing that the bees carry with them a supply of honey which is sufficient for their food for several days, it is not necessary to do any feeding until two to three days after treatment. It is very fortunate that in the digesting of the disease-carrying honey which the bees have in their honey sacs at the time of treatment, all danger of disease is eliminated. When bees are placed on foundation they very rapidly use up the honey which they have with them in the secretion of wax for comb building. For this reason it is not advisable in treating disease to give the colony a set of drawn combs. When this is done they deposit the honey which they carry with them in the cells and part of it is fed to the young larvae which they proceed to rear. Thus the disease

which was present in the old hive is continued in the new one. When it is necessary to feed, the use of a Boardman entrance feeder or an Alexander bottom board is very convenient. If these are not at hand a very efficient feeder can be made by punching a number of fine holes in the lid of a friction top pail. This should be filled with syrup and inverted directly over the frames. The bees will then suck out the syrup.

DISPOSAL OF WAX AND HONEY.

Where only a small number of colonies are treated the best means of disposal of the frames and honey is to burn or bury them. In cases where a large yard is quite generally diseased it then becomes advisable to save as much of the equipment as possible. After the brood has been allowed to emerge as previously mentioned, then the hive bodies of combs should be removed to a bee-tight building. There the honey should be extracted at once. The honey may be used for making honey vinegar. It is not desirable to sell this honey as it may be exposed by the purchasers in such a way that bees may secure some of it and thus carry the disease to their own hives.

After extracting, unless a very cold cellar is available for storing the combs, it is necessary to cut the combs out and melt them at once because of the danger of wax moths at that season. No one should ever attempt to ship diseased combs to a foundation factory for rendering, excepting during the months of December, January and February. When combs are packed in a barrel and shipped, very often honey leaks out upon the floors of the cars or in the freight house and becomes accessible to the bees of the vicinity. This practice is forbidden by law in most states including Michigan.

After disposing of the combs and honey the frames should be boiled for not less than five minutes in a solution made from one can of concentrated lye to six gallons of water. Before placing the frames in this solution the wax and propolis should be carefully removed. After boiling, the frames should be thoroughly rinsed in a tub of clear, warm water. The hive bodies, super covers and bottom boards, should be thoroughly scraped to remove all particles of wax, honey and propolis. Then they should be gone over with a flame of a blow torch and the surface scorched until no germs can remain alive. Ordinarily supers and hive bodies are more easily sterilized by piling them up-side-down as high as one can conveniently reach and burning a small handful of straw or paper on the inside. Care must be exercised else the whole pile of supers will be burned up. A hive cover should be convenient for putting over the top to stop the blaze.

It must be realized that there is grave danger in the handling of diseased material unless every precaution is taken to prevent robbing. The extractor should be thoroughly scalded out after extracting diseased honey. If possible the extractor should be taken to where it may be turned up-side-down and a steam hose turned into it with considerable pressure for at least 15 minutes. If the wax is rendered, the slumgum and the water used in wax rendering should be buried after the bees have quit flying in the evening. All vessels or tools which come in contact with the disease must be thoroughly disinfected. If the above directions are followed carefully much valuable material may be saved. If not, foulbrood will be scattered far and wide over the adjacent territory.

METHODS OF SPREAD.

American foulbrood is commonly spread through carelessness on the part of someone. If carelessness on the part of beekeepers could be eliminated the problem of controlling foulbrood would be very much simplified. Weak diseased colonies may be robbed out because the entrances have not been contracted to a point where they can defend themselves. Dead

diseased colonies are robbed out because the beekeeper carelessly leaves such colonies exposed in the bee-yard. It is a beekeeper's business to know whether any colonies are dead or weak, and it is his business to take care of them so that they may not be a menace to the neighboring beekeepers. The careless exposure of disease-carrying honey and the like is criminal and the offender should be punished by nothing less than confinement in the county jail. Often honey houses and other places where diseased honey and combs are stored have cracks in the doors or windows or the siding does not fit properly and whatever is contained therein is exposed to all of the bees in the territory. Often hives in which the colonies have died from disease are sold either through ignorance of the seller, or as has been amply demonstrated, because his sense of right and justice has never been properly developed. A careful survey of conditions in Wisconsin showed that a large part of the spread of foulbrood was directly traceable to the selling or moving of diseased hives or equipment. The feeding of honey, a part of which was extracted from a diseased colony, causes an outbreak of disease wherever such honey is fed. It is not always possible to know whether or not some of it may have come from a diseased hive even though no disease is known to be present in the bee-yard. Some of the honey in the yard may have been stored from honey robbed from a diseased colony in the neighborhood.

BEE-YARD SANITATION.

The bee-yard practice must be such as to prevent robbing.

Frames of honey should not be taken from one colony and given as food to another colony.

A diseased colony should never be opened when there is the slightest danger of robbing.

Diseased colonies should be removed from the yard as soon as discovered and treated before returning them.

Carelessness, ignorance and malice are at the bottom of most of the spread of disease.

Do not use equipment from an unknown source without seeing to it that it cannot carry disease.

When a colony shows disease every frame connected with that colony must be destroyed. Some have erroneously judged that those frames which do not have dead larvae in them are suitable for further use.

In purchasing bees buy them in combless packages, not on drawn combs, unless there has been no disease among the bees for at least one year. The selling of diseased bees contributed largely to the spread of disease in Michigan.

Every super and every frame should be numbered to correspond with the hive on which it belongs and should be used there and nowhere else. If this suggestion is followed, extracted honey producers will find that foulbrood is just as easy to control in their yards as in the yards of comb honey producers.

EUROPEAN FOULBROOD.

European foulbrood is a bacterial disease which causes the death of the larvae of workers, queens, and drones. It attacks them normally when they are about three days old and usually kills them before the cells are capped. The disease is quite variable in its severity; in some cases most of the uncapped larvae are affected, while in other colonies or under different conditions of season or honeyflow, but very few larval may be attacked.

DISTRIBUTION.

European foulbrood is found in nearly all sections of the country, and in Illinois is prevalent in Central and Northern Illinois. Several years ago Dr. E. F. Phillips of the Bureau of Entomology, United States Department of Agriculture, called the attention of the writer to what seemed to be

a striking coincidence, in that European foulbrood seemed to be particularly virulent on the poorer types of soil. The truth of this statement seems to be well borne out in the distribution of the disease in the various counties. While the disease is frequently met with on the heavier types of soil, yet it appears as a serious menace largely on the lighter soils where there is but little incoming nectar during the spring and early summer months. There are many counties in the State from which the disease has not been reported. This should not be construed to mean that such territories are immune from the malady. On the contrary, it seems to be purely an accident that this trouble has not appeared in many of these counties.

PREDISPOSING CONDITIONS.

As noted above, areas in which there are but few nectar-secreting flowers during the early part of the season seemed to be favorable for the development of the disease. As Italian bees are essential for the control of this disease, it therefore follows that in those communities where the black bees predominate European foulbrood is particularly serious. It has also been noted that the poor wintering of bees is exceedingly favorable to rapid progress of the disease. Those colonies are particularly susceptible which are weak in numbers and slow to build up either because of insufficient strength or because of the presence of a failing queen.

STRENGTH OF COLONY IN RELATION TO DISEASE.

Strong colonies of bees attempt to eradicate the disease from the hive by carrying out the dead larvae. This reminds one of the reaction of a strong colony to the presence of wax moths. Weak colonies seem to make but little effort to clean out the diseased larvae as they appear. The carrying out of the dead larvae seems to be an important factor in retarding the spread of the disease within the colony. Nurse bees have often been observed sucking the juices from the bodies of the dead larvae. Doubtless the nurse bees, because of their contamination with the bacteria, form the principal agency in the dissemination of the hive.

Very little is definitely known regarding the spread of the disease from hive to hive or from one apiary to another. It has been definitely shown, however, that the disease can be transferred by the agency of the honey taken from the diseased colonies.

DIAGNOSIS.

The larvae are first affected by European foulbrood while they are curled up in the backs of the cells adjacent to the midrib of the comb. Frequently the larvae seem to move slightly before death and dead larvae change in color from pearly white to gray or yellow, and if permitted to remain in the cells they may become a yellowish brown or brown in color. The larvae do not adhere tightly to the cell walls. In serious cases there is usually a decided odor. There is but slight ropiness, if any at all. Queen, worker, and drone larvae seem to be equally susceptible to the disease.

In case of any doubt in diagnosis of disease, write to the Bee Culture Laboratory, Department of Agriculture, Washington, D. C., asking for a box in which to mail a sample of the diseased comb. The comb should not be wrapped in waxed paper nor mailed in tin containers.

TREATMENT.

During the past ten years the methods of treatment for European foulbrood have been changed quite radically. The transferring of the bees from the diseased hive is no longer advocated.

E. W. Alexander of New York and Dr. C. C. Miller of Illinois, demonstrated conclusively that the destruction of combs and the loss of brood were

unnecessary in treating this disease. Dr. E. F. Phillips has summed up the whole matter of preventive measures: "The practices of good beekeeping are those which result in the eradication of European foulbrood."*

Every beekeeper should look forward to the possibility of European foulbrood becoming epidemic in his apiary. Preventive measures are therefore indicated rather than awaiting the coming of the disease and then attempting to remedy the situation. The following points are particularly important in this connection: Young queens, an abundance of food, suitable winter protection, Italian blood, and strong colonies.

In combating the disease after it has appeared, the queens of the diseased colonies should be killed and Italian queens of known resistance should be introduced as soon as the bees have had an opportunity to free the combs from all dead larvae. The length of time required for removing the dead larvae depends upon the race of bees and strength of the colonies as well as the amount of infection present. If colonies are weak, it is frequently desirable to unite two or more colonies. The uniting of two weak discouraged diseased colonies frequently results in a complete change of morale and a quick cleaning up of the diseased material.

In those apiaries where most colonies are headed with resistant stock, it is unnecessary to send away for queens. Ripe queen cells from the best queens may be introduced into the colonies at the time the old queens are killed or a few days later, depending upon the severity of the disease. If the cells are introduced some time after the removal of the queens, then a careful examination of the combs must be made and all queen cells removed before introducing the ripe cells. Negligence in this matter may result in a hopelessly queenless colony due to the destruction by the bees of the cell introduced and by the blasting of the cells reared by the colony because of the disease present.

In connection with the treatment for disease, beekeepers frequently find it advantageous to feed a thin syrup at frequent intervals. After requeening all diseased colonies the beekeeper should keep very close watch of the performance of the various queens. He should begin rearing young queens from those queens which seem to produce colonies most resistant to the disease. The beekeeper should not depend entirely upon purchasing queens from regular queen breeders. He should learn to rear his own queens from those which he knows are fully capable of carrying their colonies through the season without a severe outbreak of disease. The vigor of a queen seems to be impaired by shipping through the mail. Vigor is of exceeding importance in queens in apiaries where disease is present.

*Farmers' Bulletin 975, "The Control of European Foul Brood," by Dr. E. F. Phillips.

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INDEX.