Seventh and Eighth Annual Reports

Union County
Mosquito Extermination Commission

Union County, N. J.
1918-1919
Seventh Annual Report

Union County
Mosquito Extermination Commission

Union County, N. J.
1918
The Union County Mosquito Extermination Commission

JOHN M. WHITON, President,
Plainfield, N. J.

DR. R. G. SAVOYE,
Westfield, N. J.

DR. WILLIAM J. LAMSON,
Summit, N. J.

JACOB L. BAUER,
Elizabeth, N. J.

W. C. HOPE, Treasurer,
Roselle, N. J.

L. J. RICHARDS, Secretary,
Elizabeth, N. J.

CHARLES W. LOW,
Roselle, N. J.

STAFF:

CHARLES M. PLATZ, Acting Chief Inspector

L. J. RICHARDS, Consulting Engineer and Secretary.
INSPECTORS:

District No. 1—Theodore F. White

District No. 2—Frank Putnam

District No. 3—J. W. Knox Clark
   Wolcott Calkins

District No. 4—William Mahnken

District No. 5—Charles M. Platz
   Harrison Chase

District No. 6—William Unchester
   Harrison Chase

Mary T. Hangarter, Stenographer and Bookkeeper.
Seventh Annual Report
— of the —

Union County Mosquito Extermination Commission

Elizabeth, N. J., October 31, 1918.

To the Director of the New Jersey State Experiment Station 
and Board of Chosen Freeholders of Union County.

Gentlemen:

Complying with the provisions of Chapter 104, Laws of 
1912, of the State of New Jersey, entitled “An Act for the 
establishment of County Mosquito Extermination Commis­sions and to define their powers and duties”, the Union County 
Mosquito Extermination Commission herewith presents the 
following as its Seventh Annual Report for the period from 
November 1, 1917 to October 31, 1918.

To fill the vacancy caused by the resignation of Dr. James 
S. Green, former president of the Commission, who was com­missioned in the Army, Supreme Court Justice James J. Ber­gen, presiding over the courts of Union County, appointed 
Dr. Richard G. Savoye, of Westfield, and to fill the vacancy 
caused by the resignation of Mr. William C. Hope, former 
treasurer of the Commission, Supreme Court Justice James J. 
Bergen appointed Charles W. Low, of Roselle. Mr. L. J. 
Richards, of Elizabeth, resigned as a member of the Commiss­ion. The following were appointed as members of the Com­mission for three years: Messrs. John M. Whiton and Jacob 
L. Bauer. Dr. F. W. Sell, a former president, also resigned to 
enter the Medical Corps of the Army.

While the inspection force was cut down, yet all the men 
were old and experienced employees so that all the breeding 
places in the county were covered as much and as often as 
possible. The temporary breeding places were also thorough­ly covered.

The successful result of the organized campaign to con­
trol mosquitoes in New Jersey and elsewhere is being followed 
in many sections of the country which have not hitherto taken up this project from the health and economic standpoint. The 
United States Government has done exceptionally noteworthy 
work during the past year. The War Department, in order to 
protect the hundreds of thousands of soldiers in training in the 
Southern camps and cantonments from malaria, which is trans-
mitted only by mosquitoes, has spent several millions of dollars in thorough anti-mosquito and anti-malaria work in the camps. The United States Shipping Board, through its Emergency Fleet Corporation, has also carried on extensive mosquito work in and around all of the shipyards in the country in order not to delay ship building work. The United States Public Health Service has spent $1,300,000 in extra cantonment malarial control work covering an area of more than 1,200 square miles of country. As a result of this work tremendous increases in the comfort of residents affected has occurred, and startling decreases in the amount of malaria throughout these districts have been seen. The States of California, Massachusetts, Pennsylvania, Connecticut, Rhode Island, Delaware and Mississippi and such cities as New York City, Baltimore, Philadelphia, Wilmington, N. C., Jacksonville, Fla., Louisville, Ky., Little Rock, Ark., Nashville, Tenn., and San Antonio, Texas, have made large appropriations for local anti-mosquito work, and corporations such as the New York Shipbuilding Company, at Camden, the DuPont Powder Company at all of its plants, and the Cotton Belt Railroad have spent hundreds of thousands of dollars in effective mosquito and malaria control work. Each year more and more work of this sort is being done, for it is being widely realized that this is necessary for summer comfort and from a sanitary standpoint, and the cost of the work is returned many times over in increased real estate values wherever mosquito control work is being carried on.

Our report for last year called attention to the more widespread distribution of the fresh water swamp mosquito, Aedes Sylvestris and the investigations carried on so far indicate that this variety is breeding in many different kinds of places and far more extensively than before, indicating a change in the breeding habits. As this species is capable of travelling a considerable distance, the problem of freeing a community of it is a difficult one and will require more detailed investigation, particularly as to its control during periods of rainy weather. The Commission has started investigational work in our own county and is working in cooperation with adjoining counties and the New Jersey State Experiment Station in the matter.

The Commission in its latest annual report cited the fact of the need of draining the fresh water marshes along the upper Elizabeth River, in Union Township, which under certain
conditions throw large numbers of mosquitoes into thickly settled communities nearby. The Commission has drained off a large part of these fresh water swamps on the north side of Morris Avenue, but other and more extensive work at the Springfield Pumping Station, Turf Meadow and Stone Swamp just above the Hummocks in Union Township require more attention to check the large number of Aedes Sylvestermosquitoes that escape from here.

The completion of the Rahway Valley Sewer has not materialized up to the present time, and owing to the scarcity of labor and the high cost of material, will probably not be put through for the next two years. In the meantime the Commission has to spend a great deal of time in cleaning up the territory to be drained by the sewer: Springfield, western Union Township, Cranford, Kenilworth, Garwood and Rahway, by cleaning and oiling the large number of open house drains so as to reduce the amount of pollution in the ditches and streams in these areas as much as possible so as to prevent mosquito invasions. The same is applicable to the Linden-Roselle trunk sewer.

The Commission has seldom had sufficient funds to pay for the cost of all the drainage work carried on inland and this year has made strenuous efforts to have the property owners, insofar as possible, pay for the work in full. During the first six months of the year the Commission met with great success along this line, but the constant drain for war has somewhat retarded this progress towards the latter part of the season. However, we expect to take up this work on a much larger scale in the year 1919 and push it more vigorously, and hope for better results. In many instances the Commission has paid from one-third to one-half of the cost of cleaning up some of the larger breeding areas in the county. As the funds were not sufficient to carry this on in all the different townships, the Commission had to resort to oiling, where permanent work could not be done.

To sum up the results of the work for the year, it can be truthfully said that the house mosquito, Culex Pipiens, the kind troublesome indoors, is practically wiped out, as during the entire summer the Commission did not receive one complaint from this species. Of malarial mosquitoes one complaint was received, and after careful investigation it was found that the person afflicted with malaria was a former resident of New
York State and the disease was actually contracted in that State and not in New Jersey. Of salt marsh mosquitoes but two species, Aedes Cantator and Aedes Sollicitans, were somewhat troublesome outdoors in the northerly and southerly parts of Elizabeth, and then only for a few nights during the summer, just at twilight. The fresh water swamp mosquitoes scattered throughout the county were troublesome only on a few nights in the northwesterly section of the county during the first part of the season.

The details of the various branches of the work during the year are taken up in the reports of the acting chief inspector and the consulting engineer, which are included and form a part of this report.

The Commission wishes to thank the officials and the property owners of the various municipalities, the Boards of Health throughout the county, the State Entomologist, the citizens and newspapers whose cooperation throughout the year has been most helpful.

Respectfully submitted,

The Union County Mosquito Extermination Commission.

John M. Whiton, President.
L. J. Richards, Secretary.

Report of the Treasurer
November 1, 1917, to October 31, 1918

RECEIPTS

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<th>Description</th>
<th>Amount</th>
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<td>Interest</td>
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<td>Drainage Receipts</td>
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<td>Miscellaneous Receipts</td>
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<td><strong>Total Receipts for Year</strong></td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<td>Petty Cash Fund Balance</td>
<td>5.00</td>
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<tr>
<td><strong>Total Cash Balance Nov. 1, 1917</strong></td>
<td><strong>1,524.09</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$26,056.91</strong></td>
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DISBURSEMENTS

**ADMINISTRATION:**

Necessary Expenses of Commissioners: $75.00
Administration and Engineering Salaries:
Secretary and Consulting Engineer: $1,293.75
Your Town Can Dispose of Its Ashes and Kill Mosquitoes by Filling Up Places Like This. Is It Doing It?
Stenographer and Bookkeeper .......... $835.00 2,128.75
Administration Personal Expenses ... 12.93
Office Supplies and Printing .......... 321.98 2,537.76

INSPECTION:
Permanent Inspectors' Salaries ...... $2,295.86
Temporary Inspectors' Salaries ...... 1,451.92
Inspectors' Expenses ............... 272.72 4,020.50

PERMANENT ELIMINATION OF BREEDING PLACES:
Salt Marsh Drainage—
Salt Marsh—Old Work
Labor ........................................ $3,212.92

Salt Marsh—New Work
Labor ........................................ 153.97
Material ..................................... 237.89
Dredge Construction .................... 660.38
Dredge Operation ......................... 1,729.68 2,781.92 5,994.84

PERMANENT ELIMINATION OF BREEDING PLACES:
Inland Drainage:
Inland—Old Work .......................... 8,067.13
Inland—New Work:
Labor ....................................... $1,800.98
Material ................................... 110.29 1,911.27 9,978.40

TEMPORARY ELIMINATION OF BREEDING PLACES:
Oiling:
Fuel Oil and Larvicide .................. $388.80
Wagon Hire for Applying Oil ......... 31.89 420.69

EQUIPMENT:
Automobile Purchase ................... $325.00
Automobile Maintenance ............... 1,046.69 1,371.69
Bicycle Maintenance .................... 9.25
Tools ....................................... 240.42
Boots ..................................... 312.42 1,933.78

GENERAL EXPENSES:
Annual Report ............................ $95.50
Auditing ................................... 125.00
Legal Expenses ............................ 164.99 385.49

Total Disbursements .................. 25,271.46

BANK BALANCE Oct. 31, 1918 ............ $780.45
Petty Cash Fund ......................... 5.00 785.45

Total ..................................... $26,056.91

JACOB L. BAUER, Treasurer.
To the Members of the Union County Mosquito Extermination Commission:

Gentlemen:

The following report is made covering the work done under your direction during the past year. As the funds available during the last two months of the year 1917 were such as to prohibit any actual field work being done, this in a large measure retarded the progress as made in former years.

After an extremely cold winter, on March 5th a squad of eight men and a foreman were started cleaning up the dumps in the City of Elizabeth, and soon after some men were started on the salt meadow ditch cleaning. On April 1st a squad of five men were started in Rahway to clean up the pools, drains, swamps, etc. On April 3rd three men were started in District No. 3. On April 15th four men were started in District No. 4. This force was gradually increased until by June 15th the Commission had in its employ thirty-six laborers and eight inspectors.

The Mosquito Season.

The inland woodland swamps and pools were found breeding during the latter part of March and early part of April—in some places light and others very heavy, but the labor force was so distributed as to eliminate this breeding before it could get on the wing. During the latter part of April, May and June in the larger woodland swamps where the breeding became very heavy, the inspectors had to resort to oiling to hold these broods down until the labor force could reach these particular places. On April 11th the tides in the Newark Bay rose to a height of almost seven feet, in fact the highest tide known in this section of the State in forty years. This not only prohibited any work from being done on the meadow, but the debris washed in from along the edges of the shore entirely filled in some of the larger outlet drains, particularly the drain east of the Newark and Elizabeth Railroad from Great Ditch almost to Bound Creek, and from the Newark and Elizabeth Railroad in Great Ditch to the Bay, requiring the force of 20 laborers two weeks to clean this out so as to take the water off the meadow in this section. West of the Newark track in
the diked portion it was impossible for the men to get on the meadow again until May 8th, at which time a very heavy brood of Aedes Cantator larvae was discovered. Laborers were set to work once to oil out this brood, and probably not more than 5 to 10 per cent reached the adult stage. As the water receded the force of men was increased here, and the entire drainage system was gone over as rapidly as possible, so that by June 1st this meadow was again put in first-class condition. The details of this work are mentioned under the heading of "Salt Marsh."

On the South Elizabeth Meadow from time to time small broods of Aedes Cantator and Aedes Sollicitans were picked up along the margins of the northeasterly and northwesterly sections of this meadow. This is caused chiefly by the meadow being used as a pasture by the dairymen in this section and cows constantly tramping down the edges of the drainage ditches and blocking them.

On May 4th a gang of men was placed on this meadow and every ditch was thoroughly cleaned up and left in first-class condition, and an additional 1500 feet of new drainage was found necessary and this was immediately cut. The meadow was oiled as often and as much as possible, to keep down whatever breeding was found.

On the Linden Meadow the inspectors reported from time to time very light scattered breeding. Laborers were placed on this meadow the first part of June and all the drainage was thoroughly gone over. There were two sections of this meadow found breeding, namely, west of the Shortline Trolley Company and south of the Standard Oil Company's property, and around the west works of the Grasselli Chemical Company.

A monthly inspection was made of the Carteret Meadow south of the Rahway River, particularly in the section west of the Mexican Oil Company's plant. Considerable breeding was found here during the entire summer, part of which escaped and reached the lower section of the Linden Township, the City of Rahway and even as far as Plainfield. This matter was taken up with the proper authorities of Middlesex County and we have their assurance that work would be started on this meadow as soon as labor could be procured and this meadow put in first-class condition.

The fresh water swamp mosquitoes, Aedes Sylvestris, which were found to be a troublesome pest in the year 1916
and also very numerous in the year 1917 were almost eliminated during the year 1918. True, we did get a few complaints here and there of people being disturbed on their lawns or porches for about one hour in the evening but this did not occur more than four or five times during the entire summer.

### COMPARATIVE RESULTS FROM NIGHT COLLECTIONS OF MOSQUITOES ON THE WING—
1917 and 1918.

<table>
<thead>
<tr>
<th>Kinds of Mosquitoes</th>
<th>1917 No.</th>
<th>% of Total</th>
<th>Kinds of Mosquitoes</th>
<th>1918 No.</th>
<th>% of Total</th>
</tr>
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<tbody>
<tr>
<td>A. Sollicitans</td>
<td>190</td>
<td>15%</td>
<td>A. Sollicitans</td>
<td>29</td>
<td>9%</td>
</tr>
<tr>
<td>A. Cantator</td>
<td>65</td>
<td>5</td>
<td>A. Cantator</td>
<td>257</td>
<td>76</td>
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<tr>
<td>A. Taeniorynchus</td>
<td>0</td>
<td>0</td>
<td>Total Salt Marsh</td>
<td>286</td>
<td>85</td>
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<tr>
<td>Mosquitoes</td>
<td>255</td>
<td>20</td>
<td>C. Pipiens</td>
<td>45</td>
<td>13</td>
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<td>Total House Mosquitoes</td>
<td>158</td>
<td>12</td>
<td>Total House Mosquitoes</td>
<td>45</td>
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<td>M. Perturbans</td>
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<td>A. Sylvestris</td>
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<tr>
<td>A. Canadensis</td>
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<td>1</td>
<td>A. Sayi</td>
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<tr>
<td>A. Sylvestris</td>
<td>837</td>
<td>64</td>
<td>Total Swamp Mosquitoes</td>
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<tr>
<td>Total Swamp Mosquitoes</td>
<td>854</td>
<td>67</td>
<td>Total Number of Mosquitoes</td>
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<tr>
<td>A. Punctepennis</td>
<td>2</td>
<td>.2</td>
<td>Total Number of Night Collections</td>
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<tr>
<td>A. Quadrimalaculatus</td>
<td>1</td>
<td>.1</td>
<td>Average Catch at Each Station</td>
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<tr>
<td>Total Malaria Mosquitoes</td>
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<td>.3</td>
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<tr>
<td>Other Kinds of Mosquitoes</td>
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<td>Total Number of Mosquitoes</td>
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<tr>
<td>Total Number of Collection Stations</td>
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<tr>
<td>Average Catch at Each Station</td>
<td>3</td>
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THE RESULTS OF THE INSPECTIONS ARE AS Follows.
Inspections made November 1, 1917—October 31, 1918.

<table>
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<tr>
<th>District No.</th>
<th>Vats, Bbls., Etc.</th>
<th>Wells and Cesspools</th>
<th>Cellars</th>
<th>Street Gutters</th>
<th>Sewer Basins</th>
<th>Pool's</th>
<th>Ponds</th>
<th>Swamps</th>
<th>Number of Yard Inspections</th>
<th>Number of Misc. Breeding Places</th>
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<td>65</td>
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<td>1252</td>
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<td>5</td>
<td>8</td>
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<td>75</td>
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<td>11</td>
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<td>25</td>
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<td>Westfield</td>
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<td>28</td>
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<td>District No. 4</td>
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<td>4</td>
<td>45</td>
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<td>Linden Borough and Township</td>
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<td>Union and Hillside Townships</td>
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<td>Lyons Farms</td>
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<tr>
<td>Garwood</td>
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<td>5</td>
<td>7</td>
<td>12</td>
<td>43</td>
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<tr>
<td>Roselle</td>
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<td>43</td>
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<td>1168</td>
<td>1253</td>
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</tbody>
</table>


A Pest Hole Becomes a Beauty Spot.
The Evolution of a Swamp.

(1) Westfield town swamp breeding malarial mosquitoes in 1912. (2) Deepened, edges cleaned, and stocked with fish in 1914 by Town and Union County Mosquito Commission. (3) A beautiful park in 1920. Pictures taken from same spot.
Maple Avenue Dumps drain cleaned.
2 drains in Fay's Woods cleaned, 800 feet.

**UNION TOWNSHIP.**

Several of the largest propositions undertaken by the Commission were successfully carried through here, namely the swamp and lowlands at the Elizabethtown Water Company pumping station, at the Springfield-Union line, where a mile and a half of drains were cleaned and 1500 feet of new ditching installed. In the vicinity of the Wright Chemical Company property, an additional three-quarters of a mile of new ditching had to be cut to relieve this swampy area. The brook on the north side of Morris Avenue from the Elizabethtown Water Company's pumping station to Faitoute's Pond, a distance of three-quarters of a mile, was cut and lowered.

**HILLSIDE TOWNSHIP.**

The north branch of the Elizabeth River from the Lehigh Valley R. R. and Conant Street to Boston Avenue, and thence westerly to the big swamp which lies east of Maple Avenue, a distance of two miles was cleaned.

**ROSELLE BOROUGH.**

Peach Orchard Brook was cleaned from the Pennsylvania Railroad to Fifth Avenue east, Roselle, twice, the distance being one mile. The gutters on Chandler Avenue and 12th Street, were cleaned, and the brook from St. George Avenue to Linden Road, one-half mile, was cleaned.

**LINDEN TOWNSHIP AND RAHWAY.**

The brook at Cedar Street and Wood Avenue, cleaned from Winans Avenue to the P. R. R. The ditches and street gutters on the westerly side of the P. R. R. from Chandler Avenue to the Township line were cleaned. The ditches in the vicinity of Three-In-One Oil Company, Elizabeth Avenue, north of Scott Avenue, were cleaned to the railroad culvert.

**CLARK TOWNSHIP.**

The drains crossing Central Avenue to the Ash Swamp were cleaned, and the drains at Bloodgood's Mills were cleaned.

**SUMMIT.**

All the ditches in Summit were raked out and opened early. Then all standing water and swamps were oiled, after which all ditches were thoroughly cleaned out and deepened or graded as was necessary.
NEW PROVIDENCE.
Sixty feet of tile reopened and relaid.
4500 feet of ditching cleaned and deepened.
Two dams removed.

SPRINGFIELD.
Approximately one and one-half miles of ditches cleaned along Seven Bridges Road.

PLAINFIELD.
4 swamps, E. Front Street, east of West End Avenue, filled.
3 swamps, west of West End Avenue on E. Front Street, filled.
Swamp on West Front Street, north of Everett Place, filled.
Swamp, north of Leland Avenue, east of Henry Place, filled.
Ditch, West Front Street, opposite Everett Place, filled.
2 ditches at Marshall Place, south of Henry Place, cleaned.
4 ditches on Leland Avenue, north of Oxford Street, cleaned.
1 swamp on Fernwood Avenue, south of Denmark Road, filled in and outlet cleaned.
2 ditches on Grandview Avenue, opposite Oakland Place, 1500 feet ditching cleaned.
Brook on Leland Avenue, south of Cambridge Street, cleaned.
15,000 feet of ditching along Green Brook from Gerard Avenue to Jefferson Avenue, cleaned.

WESTFIELD.
Swamp, north of Sherman Avenue, 150 feet outlet cleaned.
Germantown Swamp—700 ft. drain lowered.
1,000 ft. ditch on John Street, opened.
Swamp, northeast of North Avenue, north of Stiles Street, about 300 yards filled in by Town at time of clean-up week.
Gutter in Morris Avenue, between Charles Street and Dudley Avenue, 1,000 feet cleaned.
Outlet to swamp on North Avenue, between Charles Street and Dudley Avenue, in the woods, 200 feet cleaned.
Pools on Alston Road between Dorian Road and Willow Grove Road, 300 feet cleaned.
Cellar on Rahway Avenue, between Willow Grove Road and Grove Street, filled in—3 yards.
Pool, Alston Road between Alston Road and Dorian Road, drains of outlet cleaned, 100 feet.
Pool on Dudley Avenue, north of Charles Street, near the junction of Dudley Avenue and Charles Street in the woods,
filled in with Town ashes, 125 yards.
Swamp on Embree Crescent, south of Brightwood Avenue, drains cleaned 200 feet.
Drain on Greyside Road, west of Embree Crescent and south of Brightwood Avenue, 500 feet cleaned.
2 pools on Cleveland Avenue, between Smith and John Streets, filled in—30 yards.
Ditch on Park Place north of Edgewood Avenue, cleaned, 200 feet.
2 drains on Centre Street, south of Morris Avenue, near the boundary line of Fanwood and Westfield, cleaned.
Brook on Lafayette Avenue, between Morris and Prospect, and north of Brightwood Avenue, cleaned—700 feet.
Swamp on Sinclair Place between Elm and Morris Avenue, filled in—20 yards.
Pool on North Avenue, between Dudley and Charles Street, filled in—20 yards.
Cellar on Holmes Place, between Dudley Avenue and Edgewood Avenue, west of Pleasant Place, filled in by owner—5 yards.
2 ditches on Central Avenue, north of Gold Street, cleaned—300 feet.
Brook on Brook Avenue, east of Boynton Avenue, cleaned 700 feet.
2 drains on Alston Road, south of Rahway Avenue, between Alston Road and Dorian Road, cleaned—200 feet.
1 drain on Alston Road between Alston Road and Dorian Road and south of Rahway Avenue, cleaned, 500 feet.
Drain on Grove Street, North of Rahway Avenue and south of Grove Street, cleaned 200 feet.
Brook on Alston Road, south of Grove Street and east of Radley Road, cleaned 1,000 feet.
150 foot ditch on Prospect Street, near Brightwood Avenue, cleaned.
30 foot ditch between Lawrence Avenue and Brightwood Avenue, cleaned.
150 foot ditch on Grove Street, cleaned.
50 feet of culvert on Rahway Avenue and Dorian Road, cleaned.
Swamp, south of Grove Place near Boynton Avenue, drained permanently.
500 feet of ditching on Lawrence Avenue, near Mountain
REPORT OF UNION COUNTY

Avenue, cleaned.
Swamp on Prospect Street, near Washington, 500 foot outlet cleaned.
Swamp on Fanwood Avenue, near John Street, 200 foot outlet cleaned.
Swamp on Prospect Street near Liberty Street, 200 foot outlet, cleaned.
Swamp on Benson Place, near Fair Acres, 300 foot outlet, cleaned.
Swamp on Lawrence Avenue, near Mountain Avenue, 200 foot outlet, cleaned.
Swamp on East Broad Street, north of Gallows Hill Road, 1,000 foot outlet, cleaned.
Swamp and pond north side of Gallows Hill Road near city line, 750 foot outlet, cleaned.
2 pools on south side of Dudley Avenue, opposite Pleasant Place, drained by owners and filled.

CRANFORD.
Swamp on Centennial Avenue, 500 ft. south of Lehigh Valley R. R., drain, cleaned.
Swamp on Walnut Avenue, just north of Lehigh Valley R. R., drain cleaned, and partly abated.
Brook crossing Walnut Avenue at Cranford School, cleaned to Rahway River.
Gutters of South and Holleywood Avenue, cleaned.

GARWOOD.
Drains at Fourth Avenue and Oak Street, cleaned, 1-2 mile.
2 pools on North Avenue, filled in.

ALDENE.
800 feet drains on Osborne Place, cleaned and brook from Osborne Place to Rahway Valley R. R., culvert cleaned.
Drains along the Rahway Valley R. R., north of North Avenue, cleaned.
Brook from North Avenue to Rahway Valley R. R., cleaned.

FANWOOD.
Ditches on Woodland Road cleaned, 3200 feet.
Ditches between Westfield Road and Midway Avenue, cleaned, 6000 feet.
3 ditches, north of Midway Avenue and east of Woodland Road cleaned, 2000 feet.
2 ditches, east of LeGrand Avenue, north of Park Avenue, cleaned, 2800 feet.
1200 ft. ditching north of Westfield Road and west of Morse Avenue, cleaned.
800 ft. ditching south of Hetfield Road and east of South Avenue, cleaned.
6000 ft. ditching north of Terrill Road, west of Central R. R., cleaned.
700 ft. ditching north of Jerusalem Road, west of Smith Street, cleaned.
7900 ft. ditching in miscellaneous small jobs cleaned.

MOUNTAINSIDE.
4 drains north of Mountain Avenue, west of New Providence Road, cleaned, 700 ft.
4 drains on Mountain Avenue, west of New Providence Road, cleaned, 1,000 feet.
10 drains west of New Providence Road and north of Mountain Avenue, cleaned, 500 feet.
5 pools in same location drained.
4 drains east of New Providence Road and north of Mountain Avenue, cleaned, 1000 feet.
2 drains on Ackerman Avenue, west of New Providence Road, cleaned, 200 feet.

THE FOLLOWING WORK HAS BEEN COMPLETED UNDER CONTRACT.

ELIZABETH—LINDEN.
Land east of C. R. R., above Schiller Street, filled in.
Masury Paint Company swamp, partly in Elizabeth and partly in Linden Township, piped, 850 feet, and pools connected.
Gutters graded and cleaned in St. George Avenue section of Linden Township.
Peach Orchard Brook, Linden, cleaned.

WESTFIELD.
Swamp, Netherwood Avenue, west of Randolph Place, filled in.
2 pools Dudley Avenue, head of Pleasant Place, drained.
Pools on Dudley Avenue, southwest of Pleasant Place, filled in.
Pools, southwest of Grove Place, northeast of Rahway Avenue, filled in.
Pools on North Avenue, northwest of Charles Street, filled in.
Swamp on Netherwood Avenue, north of Randolph Place, filled in.
Union Township Drainage Work. Three Hundred Acres of Land Being Reclaimed Along the Elizabeth River.
Cellar on Rahway Avenue, near Washington Street, drained.
Brook on Radley Road, south of Alston Road, cleaned.
Pool, northeast of Radley Road near Alston Road, drained.
Pool, southwest of Rahway Avenue at Beechwood Place, filled in.
Swamp northeast of Alston Road and east of Radley Road, outlet drained.
Swamp and low ground, Downer Street, near Union Avenue, filled in.
Cellar, Holmes Place, southwest of Edgewood Avenue, filled in.
Pool, Walnut Street, east of High School, abated.
Swamp, Randolph Place and Smith Street, partly filled in.
Low ground, Rahway Avenue, southeast of Beechwood Place, filled in.
Low ground, West Broad Street, west of Osborn Avenue, filled in.
Swamp, Dudley Avenue, west of Clark Street, partly filled in.
Swamp, West Broad Street, west of Osborn Avenue, filled in.

PLAINFIELD.
Swamp, West Front Street, east of Everett Place, filled in.
Pool on Leland Avenue, opposite Berkeley Avenue, filled in

UNION.
Over one mile of ditches cleaned.
Over 1-2 mile of new ditches dug and graded.

It has been the aim of the Commission, insofar as possible, during the year of 1918 to make their work of a permanent character rather than temporary. In this the Commission has received the best of cooperation from the citizens and owners of land, the result being that the inland mosquitoes have been cut down considerably.

In conclusion, the Commission wishes to thank all those who in any way helped to forward the work and lay a successful foundation for better efforts in the year 1919.

Respectfully submitted,
L. J. RICHARDS,
Consulting Engineer.
CHARLES M. PLATZ,
Acting Chief Inspector.
Does Your Town Keep Its Street Gutters Drained? This One Furnishes a Municipal Mosquito Lodging House Rent Free.
Eighth Annual Report
1919

The Union County Mosquito Extermination Commission

MEMBERS:

JOHN M. WHITON, President,
Plainfield, N. J.

EDWIN S. FARRA, Vice President,
Summit, N. J.

JACOB L. BAUER, Treasurer,
Elizabeth, N. J.

DR. R. G. SAVOYE,
Westfield, N. J.

CARL H. FLEMER,
Springfield, N. J.

WILLIAM H. RANDOLPH,
Rahway, N. J.

STAFF:

LOUIS J. RICHARDS, Consulting Engineer and Secretary.

RUSSELL W. GIES, Superintendent.
INSPECTORS:

Meadow Inspector, Charles M. Platz

District No. 1.—Charles H. Brown

District No. 2.—Frank Putnam

District No. 3.—J. W. Knox Clark

District No. 4.—Edwin M. Durand

District No. 5.—Philip M. Brenner

District No. 6.—H. L. Wheeler


Mary T. Hangarter, Stenographer and Bookkeeper
Eighth Annual Report
— of the —

Union County Mosquito Extermination Commission

Elizabeth, N. J., October 31, 1919.

To the Director of the New Jersey State Experiment Station and the Board of Chosen Freeholders of Union County:

Gentlemen:

As required by the provisions of Chapter 104, Laws of 1912 of the State of New Jersey, we are presenting the following to you as the report of the Union County Mosquito Extermination Commission for the period from November 1, 1918 to October 31, 1919.

This report will be made along much the same lines as in previous years, the reason for this being that the Commission has made no radical changes in policy, but is still following closely the plan it had originally laid out when it was organized—that is, a steady attempt to get rid of the permanent breeding areas in the county, by draining or filling, as the funds each season will permit; to maintain the drainage work which has been put in in previous years at a high standard of efficiency; and to control temporary breeding by the use of oil. The word permanent used in this report means places of such size and character as breed practically continuously all season as contrasted with the temporary or emergency places which breed mosquitoes only during the early spring, or following heavy rains.

There have been several changes in the personnel of the Commission during the year—Dr. William J. Lamson, of Summit, resigned on January 29, 1919, and Mr. Edwin S. Farra, of Summit, was appointed to take his place as a member of the Commission. Mr. Charles W. Low, of Roselle, died just after qualifying as a member of the Commission, and Mr. Carl H. Flemer, of Springfield, was appointed and qualified in January, 1919, as a member of the Commission to take Mr. Low's place. Mr. William H. Randolph, of Rahway, was appointed a member to succeed Dr. Frederick W. Sell, a former President of the Commission, who resigned to enter the Medical Corps of the United States Army. Captain Russell W. Gies, Sanitary Corps, United States Army, returned after a year and a half of
service in the army, as Superintendent of the Commission on January 15, 1919. The services of Mr. L. J. Richards, acting executive officer during the war, were also retained as Secretary and Consulting Engineer during the year.

All but one of the inspectors were experienced men, several having been recently discharged from service in the army or navy. It is interesting to note in this connection that the Commission has furnished a large number of trained men for service during the war. There are at least 33 present and past members or employees of the Commission who were in the service, 23 of them as commissioned officers. Three of these men were wounded during the war and one, Mr. Walcott Caulkins of Plainfield, died in the service.

The Commission has been handicapped during the year by its shortage of funds; the budget calling for an expenditure of $26,500.00, or less than the Commission had allotted in 1912, when it was organized. The work has been carried on during the year with a greatly increased labor cost, chiefly for unskilled ditching labor, which has increased two or three times over the wages paid in 1912. Supplies, oil, tools, etc., all cost considerably more than in past years; but in spite of this increase in the cost of carrying on our work, similar to the increased cost of carrying on every other kind of business, the Commission has fulfilled the programme mapped out at the beginning of the year. Extensive improvement has been made to the salt marsh drainage system; the maintenance of 217,289 feet of ditching inland was completed and the upland drainage was further developed as far as funds would permit.

The Commission would call attention to the Treasurer's report, which shows that the aim of the Commission in spending as much money on permanent elimination of the larger breeding areas as possible has been followed out. Seventy-five per cent of our total appropriation has been spent for field work, and sixty-two per cent for permanent drainage of the larger breeding areas and the maintenance work done on such drainage in previous years, and to this must be added the large sums of money which have been spent for drainage and filling by private individuals or corporations throughout the county—perhaps not primarily with mosquito elimination in mind, but with a reduction of stagnant water, and the corresponding reduction of the breeding of mosquitoes as an indirect result of the work. Through this policy of steady and persistent drain-
age of the larger breeding places in the county, as funds would permit, the Commission has now about 60 per cent, or about 2000, of the larger permanent swamps and pools of the county drained or filled. To maintain this drainage work, with its approximately three-quarters of a million feet of ditching inland, and its approximately one million feet of ditching, 17 tide gates and a mile and a half of dike on the salt marsh, so that the ditching will not become clogged and a mosquito breeding condition occur again, becomes an increasingly large problem of the Commission, and as new drainage work is done, the amount which must be set aside for maintenance of ditching must be increased. Wherever possible, our ditches have been made permanent by tile pipe, but as this is expensive work, of necessity the great bulk of the ditching is of the open variety which needs cleaning out every second year. There are also about 250 miles of natural water ways and brooks in the county, which need maintenance by this Commission, as the only agency in the county which is directly interested in seeing that there is a free flowage of water in these streams and brooks, so as to get the best possible drainage conditions throughout the county.

Reviewing the past season, the Commission had to contend with probably the rainiest season since it was organized. The ten-inch rain fall from July 15th to July 24th was only the outstanding storm of a long series of rainy, humid days throughout the summer which kept the low places throughout the county (which in a normal summer are dry) filled with water throughout the breeding season. It was cloudy or rainy for some part of each day for weeks at a time, so that not only the low places remained full of water, but the work of our men was handicapped by the inclement weather.

Our oiling equipment was increased and the two regular oil trucks of the Commission were in constant use throughout the summer; as a result conditions were better than was anticipated on account of the extremely rainy weather. The easterly and northeasterly sections of Elizabeth had the most mosquitoes of any part of the county, due to its close proximity to large marshes inland and to the Great Island section of the North Elizabeth meadow which is as yet incompletely drained. Rahway and Linden were troubled to a much less extent, these mosquitoes being chiefly from the Carteret Meadow, in Middlesex County, which turned out several broods during the sea-
The Outlet of Turf Meadow, Union—One Hundred and Fifty Acres of Swamp Now Dry. Pictures Taken From Same Place.
PERMANENT ELIMINATION OF BREEDING PLACES:

Salt Marsh Drainage—old work
Maintenance, dikes and tide gates, labor and transportation ........ $1,059.25
Material ........................................... 179.41
Maintenance ditching ................................ 3,198.92
Total old work ................................... 4,437.58

Salt Marsh Drainage—new work
Dikes and tide gates
Labor and transportation ......................... 1,388.63
Material ........................................... 298.36
Ditching, labor and transportation ............. 243.30
Material ........................................... 8.59
Total new work ................................... 1,938.88

Total salt marsh work ................................ 6,376.46  23

Inland—old work
Labor and transportation ......................... 6,832.97
Material ........................................... 258.77

Inland—new work
Labor and transportation ......................... 3,513.87
Material ........................................... 144.42
Total inland work .................................. 10,750.03  39

TEMPORARY ELIMINATION OF BREEDING PLACES:

Oiling:
Fuel oil and larvicide ................................ $ 514.38
Labor applying oil ................................... 1,802.84
Transportation for applying oil ............... 863.91

Oiling equipment:
Oil tanks and pumps ................................ 506.57

Total oiling ...................................... 3,687.70  13

EDUCATION:
Pamphlets ........................................... $ 108.40
Lectures ............................................ 9.00
Conventions and conferences .................. 154.17
Newspaper and educational articles ........ 155.00
Annual report .................................... 101.24

Total education .................................. 527.81  2

GENERAL EXPENSES:
Auditing ........................................... 125.00

Total disbursements for year ................... $27,834.77
Balance on hand November 1, 1919 ............... $2,363.39 100

JACOB L. BAUER,
Treasurer.
AUDITOR'S CERTIFICATE.

December 2, 1919.

"In accordance with our contract we have audited the accounts of the Union County Mosquito Extermination Commission for the year ended October 31, 1919 and hereby certify that in our opinion all receipts have been accounted for and that all disbursements were properly authorized and vouched. The cash on deposit at October 31, 1919 was verified by and reconciled with the statement from the Bank as of that date.

Yours truly,

MILLS & COMPANY
Per J. Emory Mills,
Registered Municipal
Accountant No. 46."

Report of the Superintendent

October 31, 1919.

To the Members of the Union County Mosquito Extermination Commission,

Gentlemen:

The following report is made covering the work done under your direction during the year 1919. Much of the details of the work have been given in my monthly reports to you, so that only the summaries will be taken up here.

MOSQUITO SEASON.

On account of the extremely mild weather, outside work could be continued all winter and gangs of men were employed on ditching and drainage work during the entire winter. The chief work taken up was the deepening of the Elizabeth River, through Union Township from the point where the work had been left off in 1918, at Morris Avenue near the pumping station, the channel being cut through as far as Chestnut Street during the winter and spring months a distance of about 4000 feet and tapping a series of swamps along the Elizabeth River between these two points.

In the fall, when laborers were available from other work, this channel was continued westward from Chestnut Street part way through the large swamp known as Turf Meadow, in the direction of Kenilworth, and a great deal of water drawn off from this 150-acre swamp.
On the inland, ditch cleaning was commenced early in February, after thorough inspections had been made to determine what ditches were in need of maintenance. This work was largely completed before the middle of May. The gang of men which had been employed on the new drainage work in Union Township was transferred to the salt marsh in March when their work had reached as far as Chestnut Street, so as to clean up the large amount of salt marsh ditching which needed maintenance before the first brood would mature and thus allow the meadow to dry out quickly, to reduce these broods to a minimum. As a result of this work the first broods on the salt marsh were extremely small.

It was not until after the extremely heavy summer rains commenced that salt-marsh mosquitoes became in evidence in Elizabeth. These rains caused three separate broods during the summer, coming almost entirely from the area immediately south of Great Island, which is the lowest point of our meadows. The dike and sluice gate systems which had been installed in previous years by the Commission, and which had been maintained, were effective in preventing the whole of our meadow from becoming flooded and becoming breeding places. It was only in this section south of Great Island and west of the Central Railroad on the North Elizabeth meadow that water lodged.

This was very largely due to the fact that the sewers draining from the northeasterly section of Elizabeth poured millions of gallons of water on to this meadow during the periods of heavy rains, and once there, it had no opportunity to immediately run off, as the tides remained high during these storm periods outside of our dikes, the water being practically at the level of the meadow, or even above the level of the meadow. East of the Central Railroad the dikes and sluice gates kept out this salt water from flooding the meadow as well as west of the Central Railroad, but the great quantity of fresh flood water coming down from the Elizabeth sewers behind our dikes and mixing with the salt water in the ditches on the meadows caused in July a vast brackish lake to form, practically from Elizabethport to Great Island west of the Central Railroad. Immediately after this July storm, this shallow lake covered an area of 500 acres and heavy breeding was taking place over almost the entire area, but as soon as
county, and all breeding places were visited once in ten days, and oiling or drainage work completed.

For the first time since the organization of the Commission so few rain barrels, tubs, cans and other water-holding receptacles have been found in back yards, that it was thought advisable not to carry on yard inspections, due to the cooperation of the people of the county generally. Where a hundred barrels or other water-holding receptacles breeding mosquitoes had been found when the Commission was first organized, there is hardly one now; so that the money which we have spent in previous years in yard inspections could be saved for permanent drainage work, and the time of the inspector used in more close inspection of the larger breeding areas. It is expected that by means of newspaper articles and other educational measures, the continued cooperation of the people of the county will be secured in keeping their own premises free of artificial containers and other mosquito breeding places, so that it will not be necessary to spend the large amount of money needed if yard inspection work must be continued.

The following table shows the number and kind of mosquito breeding places found in the various municipalities of the county during the present year:

**INSPECTIONS MADE**

**NOVEMBER 1, 1918-NOVEMBER 1, 1919.**

The following list will show in detail the results of inspections made in the county during the year.

<table>
<thead>
<tr>
<th>DISTRICT NO. 1</th>
<th>Vats, bbls., Tubs etc.</th>
<th>Cellars Cesspools Cisterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summit</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>New Providence</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Berkeley Heights</td>
<td></td>
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<table>
<thead>
<tr>
<th>DISTRICT NO. 2</th>
<th>Vats, bbls., Tubs etc.</th>
<th>Cellars Cesspools Cisterns</th>
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</thead>
<tbody>
<tr>
<td>Plainfield</td>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>Fanwood</td>
<td></td>
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<thead>
<tr>
<th>DISTRICT NO. 3</th>
<th>Vats, bbls., Tubs etc.</th>
<th>Cellars Cesspools Cisterns</th>
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<tbody>
<tr>
<td>Westfield</td>
<td></td>
<td>15</td>
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<tr>
<td>Springfield</td>
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<td>Mountainside</td>
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<tr>
<th>DISTRICT NO. 4</th>
<th>Vats, bbls., Tubs etc.</th>
<th>Cellars Cesspools Cisterns</th>
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<tbody>
<tr>
<td>Rahway</td>
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<td>Linden</td>
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<td>Clark Township</td>
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<table>
<thead>
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<th>DISTRICT NO. 5</th>
<th>Vats, bbls., Tubs etc.</th>
<th>Cellars Cesspools Cisterns</th>
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<tbody>
<tr>
<td>Elizabeth</td>
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<td>85</td>
</tr>
<tr>
<td>Union and Hillside</td>
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<tr>
<td>DISTRICT NO. 6.</td>
<td>Vats, bbls., Tubs etc.</td>
<td>Cellars Cesspools Cisterns</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Cranford</td>
<td>8</td>
<td>54</td>
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<tr>
<td>Garwood</td>
<td>5</td>
<td>30</td>
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<tr>
<td>Roselle</td>
<td>19</td>
<td>70</td>
</tr>
<tr>
<td>Roselle Park</td>
<td>12</td>
<td>27</td>
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<tr>
<td>Kenilworth</td>
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<td>3</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>84</strong></td>
<td><strong>303</strong></td>
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<th>DISTRICT NO. 1.</th>
<th>Pools</th>
<th>Brooks</th>
<th>Swamps</th>
<th>Sewer Basins</th>
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<tr>
<td>Summit</td>
<td>105</td>
<td>2</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>New Providence</td>
<td>102</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berkeley Heights</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>141</strong></td>
<td><strong>25</strong></td>
<td><strong>175</strong></td>
<td><strong>125</strong></td>
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<thead>
<tr>
<th>DISTRICT NO. 2.</th>
<th>Plainfield</th>
<th>150</th>
<th>21</th>
<th>576</th>
<th>40</th>
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<tbody>
<tr>
<td>Fanwood</td>
<td>125</td>
<td>30</td>
<td></td>
<td>590</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>175</strong></td>
<td><strong>40</strong></td>
<td></td>
<td><strong>230</strong></td>
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<table>
<thead>
<tr>
<th>DISTRICT NO. 3.</th>
<th>Rahway</th>
<th>141</th>
<th>25</th>
<th>175</th>
<th>125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linden</td>
<td>89</td>
<td>25</td>
<td></td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Clark Township</td>
<td>46</td>
<td>11</td>
<td></td>
<td>92</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>212</strong></td>
<td><strong>95</strong></td>
<td></td>
<td><strong>204</strong></td>
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<table>
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<tr>
<th>DISTRICT NO. 5.</th>
<th>Elizabeth</th>
<th>95</th>
<th>3</th>
<th>28</th>
<th>2000</th>
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<tr>
<td>Union and Hillside</td>
<td>20</td>
<td>10</td>
<td></td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
<td><strong>43</strong></td>
<td></td>
<td><strong>2050</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>DISTRICT NO. 6.</th>
<th>Cranford</th>
<th>100</th>
<th>38</th>
<th>51</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Garwood</td>
<td>42</td>
<td>12</td>
<td></td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Roselle</td>
<td>128</td>
<td>45</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Roselle Park</td>
<td>49</td>
<td>9</td>
<td></td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>Kenilworth</td>
<td>53</td>
<td>12</td>
<td></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1415</strong></td>
<td><strong>251</strong></td>
<td><strong>2013</strong></td>
<td><strong>2240</strong></td>
<td></td>
</tr>
</tbody>
</table>

**SALT MARSH WORK.**

The first work undertaken by the Commission on the salt marsh was the cleaning of the ditching on the three meadows in the county, North Elizabeth, South Elizabeth and Linden Meadow. There is approximately a million feet of ditching on these salt marshes, about one-third of which has to be maintained by thorough cleaning every year. This work was largely finished by the first of May and about 350,000 feet of ditching was cleaned.

Several tide gates of the Commission also needed maintenance on the North Elizabeth meadow. These included the Sloping Creek tide gate put in three years ago, which had been maliciously damaged during the preceding winter. Work was also necessary to repair the gate at the west side of the Central Railroad at Bound Creek, where a new bulkhead was constructed and the dike crossing over the gate strengthened. Several planks had torn loose on Woodruff's Creek tide gate.
The Rebuilt Tide Gates at Oyster Creek, North Elizabeth Meadow.
during the summer, after the heavy storms, and they were repaired in September and the gates changed from the closed box flume type to the open top type of gate, which was considered an improvement on the closed flume type. Obstructions had to be removed at various times throughout the summer from practically all of the gates and two or three gates needed minor adjustments to work at their highest efficiency. In addition, the large double gate at Oyster Creek near Newark Bay, which was maliciously burned out in the winter of 1917-1918, was completely rebuilt, the old abutments in the main stream being utilized with new timber work in the middle to form a dam crossing Oyster Creek and the new gate being placed in a new channel north of the main creek bed. This gives a better foundation for the gate and makes it stronger in every way. The general plan of the gate was similar to the old one which had been destroyed.

Another large new sluice gate which was constructed was the one built at the easterly side of Bound Creek and the Central Railroad to take the water from the main ditch along the Central Railroad. This gate had been destroyed during the terrific storm last year which washed over the entire Central Railroad embankment, the gate being pounded to pieces by telegraph poles and other debris. In reconstructing the gate a double row of sheet piling was used making it much stronger than the old gate. The repairing and construction of these various gates has placed the great majority of the surface of our meadows in excellent condition, so that they are now dry, even during severe storms when the high tides would normally flood the meadows.

The only point of any magnitude on the salt marsh in the county where a large amount of mosquito breeding takes place is the area south of Great Island, which has been mentioned previously. A new thirty-inch drain has been cut east from this area to the Manahan ditch which is the natural outlet for this low-lying section. This ditch is but a temporary expedient but has helped materially in getting the water off this low land in the shortest possible time. However, it is necessary, as soon as funds will permit, to dredge out Manahan ditch and to cut a new drain of larger size from Manahan ditch westward into this bad mosquito breeding area south of Great Island in order to get a better outlet for this last remaining large breeding place on the salt marshes.
The dredging of Great Ditch, which had been done in the last two years on the North Elizabeth Meadow, has drained off the water which formerly would accumulate along the edge of the upland from Elizabethport northward, so that this area did not cause much trouble during the past year. However, the dredging work of the past two years is being fast nullified by deposition of sewage and sludge from the Elizabeth sewers to Great Ditch. Our records show that the ditch which was originally dredged to a depth of five feet has now filled in with more than two feet of sludge and mud. The opening of this ditch at the lower end from the Bay up will help to keep it maintained in a deep condition, and it is hoped that the City of Elizabeth will take more effective measures for the disposal of its sewage, or will at least make some provision for the dredging out of the channel of Great Ditch into which this sewage is deposited, in order that the adjacent meadows may not be covered with this flood water from the sewers.

The South Elizabeth Meadow where the ditches were given a thorough cleaning early in the spring, and where some new spur drains were cut, did not produce mosquitoes except in a few places where the cattle which run at large on this meadow had trampled in the drainage ditches. Only scattered breeding was found over the Linden Meadow during the year, due to the good condition of our ditching there, most of this breeding being in the vicinity of the west works of the Grasselli Chemical Company. However, industrial developments which are taking place very rapidly on this meadow must be closely watched in order that the construction of new fills for factories, warehouses, and oil tanks with the accompanying building of roads, switches, etc. may not block off the drainage systems which the Commission has installed.

INLAND WORK.

There has been a shortage of funds necessary for the most careful maintenance of our inland ditching work, but with what funds were at our disposal, we have maintained the drainage work which has been done in past years in the best manner we could. Approximately 217,000 feet of ditching have been carefully cleaned and graded inland distributed over several hundred jobs as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summit</td>
<td>14875</td>
</tr>
<tr>
<td>New Providence</td>
<td>9700</td>
</tr>
</tbody>
</table>
Springfield .................. 6130
Fanwood .................... 54150
Plainfield ................ 35800
Westfield .................. 48415
Cranford ...................  650
Garwood ...................  2000
Union and Hillside .......  6925
Elizabeth .................. 27050
Rahway ....................  1270
Linden .....................  8334
Roselle ....................  500
Roselle Park ...............  700
Kenilworth ................  700

Total ...................... 217289

In addition several hundred thousand feet of ditches, brooks, and water ways have been inspected regularly, and minor obstructions, rocks, stones, leaves, etc. removed so as to get the best possible flow, and many private owners have cooperated in abating mosquito breeding places on their own properties at their own expense. The bulk of the new work inland has been done in Elizabeth and Union Township, where the greatest concentration of population would be affected. The Union Township work which has been going on for the past two years, the importance of which drainage has been explained in our previous reports, has been continued so that a large part of the 300 acres of land embraced in the marshes along the head waters has been made permanently dry by our work in cleaning out the main channel of the Elizabeth River. It is expected that this work can be completed next year by the carrying of the main channel of the River across Turf Meadow to Kenilworth and that the cooperation of private property owners can be secured in the construction of lateral ditches on these projects.

Several municipalities have utilized their waste ashes and other materials for filling in low places in the municipal limits. The Commission has prepared a list of the actual water-holding mosquito breeding places which are available to be filled in with town ashes, and has in many cases made arrangements with the property owners on behalf of the municipality for using these places for a disposal ground. It is hoped that all of the larger municipalities of the county will take advantage
this winter of this chance to do the double job of getting rid
of their waste materials and wipe out mosquito breeding places
at the same time by utilizing actual stagnant water places for
dumping grounds.

The details of this inland work which has been done this
year are taken up in a summary of the work in each com-

The following work has been done by the Commission
from March 1st, 1919 to November 1, 1919:

DISTRICT NO. 1.

In Summit 296 inspections were made, in which it was
found necessary to oil 27 breeding places from time to time.
During the year 14,875 feet of ditching were cleaned.

In New Providence 154 inspections were made and 27
breeding places were oiled as often as necessary. During the
year 9,790 feet of ditching were cleaned here and in Berkeley
Heights.

Berkeley Heights was inspected 97 times and eighteen
breeding places oiled.

DISTRICT NO. 2.

In Plainfield 1226 inspections were made and 54 breeding
places found, which were oiled from time to time. During the
year 35,800 feet of ditching were cleaned. Much filling was
done along Cedar Brook with City ashes.

In Fanwood 1163 inspections were made and 77 breeding
places found, which were oiled as often as necessary. During
the year 54,150 feet of ditching were cleaned and 900 feet of
new ditching installed.

DISTRICT NO. 3.

In Westfield 594 inspections were made and 28 breeding
places found, which were oiled from time to time. During the
year 48,415 feet of ditching were cleaned, and 2000 feet of new
ditching installed.

In Springfield 175 inspections were made and 9 breeding
places found, which were oiled. During the year 6,130 feet
of ditching were cleaned, the greatest amount on the property
of the Elizabethtown Water Company along Seven Bridges Road, paid for by the Company.

**DISTRICT NO. 4.**

In Rahway 330 inspections were made and 31 breeding places found, which were oiled regularly. During the year 1270 feet of ditching were cleaned and 1020 feet of new drainage installed, including work done to drain seven pools on the Merck Company property at Scott Avenue and Edgar Road.

In Linden 231 inspections were made and forty breeding places found, which were oiled. During the year 6334 feet of ditching were cleaned, including the gutters through part of the Township, Greater Elizabeth brook and Peach Orchard brook.

In Clark Township 58 inspections were made and 7 breeding places found, which were oiled.

**DISTRICT NO. 5.**

In Elizabeth 509 inspections were made and 49 large breeding places found, which were oiled regularly. During the year 27050 feet of ditching were cleaned and 5470 feet of new ditching installed. The largest project undertaken was at Port Avenue Dumps where 4100 feet of new ditching were cut.

In Union and Hillside 48 inspections were made and 27 breeding places found, which were oiled. During the year 6925 feet of ditching were cleaned and 7500 feet of new ditching installed, mostly the deepening of the Elizabeth River.

**DISTRICT NO. 6.**

In Cranford 281 inspections were made and 19 breeding places found, which were oiled from time to time. During the year 650 feet of ditching were cleaned.

In Garwood 99 inspections were made and 10 breeding places found, which were oiled. During the year 2000 feet of ditching were cleaned.

In Roselle 364 inspections were made and 24 breeding places found, which were oiled regularly.

In Roselle Park 171 inspections were made and 15 breeding places found, which were oiled.

In Kenilworth 145 inspections were made and 7 breeding places found and oiled.
OILING.

The exceptionally rainy season has necessitated much more oiling than the preceding year. Two Ford trucks were employed continuously during the summer in the distribution of oil in all municipalities in the county, and at times we have had two additional oil trucks at work in the oiling of the permanent and large number of the temporary breeding places formed after a rain. One hundred and forty-one barrels of oil were distributed during the year.

The Commission has bought and installed two large oil storage tanks or reservoirs at two central points in the county—one at the Westfield Sewer Farm where the Town Council of Westfield kindly allowed us to place a tank, and the other on City of Elizabeth property at South Street, Elizabeth, which was donated through the courtesy of the Elizabeth City authorities. From these two oil stations, our trucks have worked carrying oil to all parts of the county. This arrangement has saved considerable time, and the first cost of the oil tanks and pumps has been nearly saved this year in the saving in the cost of having our oil delivered to our tanks in tank wagons rather than it being delivered in barrels; there being a saving of several cents on each gallon of oil by buying in tank wagon quantities. The storage tanks installed have been of the underground variety, as they are less liable to leakage due to the action of frost or of being tampered with by vandals.

EDUCATIONAL WORK.

The Commission has realized that the success of a mosquito control campaign depends very largely on the fullest cooperation of the people of each community and every effort has been made to get this complete cooperation. Ninety-one newspaper articles have been published in the newspapers of the county during the year, describing the life history of the mosquito, the kinds of breeding places it has and the measures which are being taken by the Commission, and the measures which can be taken by the public generally to reduce the number of mosquitoes to the lowest possible point.

We wish to thank the newspapers for the space they have generously contributed in forwarding this work during the year, which has undoubtedly helped considerably in attaining the end that we are all working for, and that is the fewest possible mosquitoes in Union County.
Meetings of various boards and organizations throughout the county have been attended whenever time permitted. Representatives were sent to the conference of all mosquito extermination commissions in the State, held at Atlantic City in February, to discuss the best methods of carrying on control work, and to the Conference of Sanitary Engineers called by the United States Government at Wilmington, North Carolina, to discuss the latest and most improved methods of carrying on mosquito control work over the whole United States.

It is hoped that during the coming spring “Mosquito Week” may be held again in all of the public schools of the county, as was held several years ago, so that the 50,000 homes in Union County may be reached through the school children by our exhibit of mosquito larvae and educational literature so as to get the best possible cooperation of the people in the county in carrying forward this work.

Respectfully submitted,

RUSSELL W. GIES,
Superintendent

THE FOLLOWING TABLE IS PRESENTED SHOWING THE VALUATION OF EQUIPMENT OWNED BY THE COMMISSION AS OF DATE OF OCTOBER 31, 1919.

<table>
<thead>
<tr>
<th>Item</th>
<th>Original Cost</th>
<th>Present Value</th>
<th>Replacement Value (New)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ford touring car, 1915 model (second hand)</td>
<td>$325.00</td>
<td>$150.00</td>
<td>$600.00</td>
</tr>
<tr>
<td>1 Ford oil truck</td>
<td>400.00</td>
<td>125.00</td>
<td>600.00</td>
</tr>
<tr>
<td>1 Ford oil truck</td>
<td>400.00</td>
<td>125.00</td>
<td>600.00</td>
</tr>
<tr>
<td>5 Bicycles ($23. each)</td>
<td>115.00</td>
<td>50.00</td>
<td>150.00</td>
</tr>
<tr>
<td>Office furniture and fixtures</td>
<td>325.00</td>
<td>300.00</td>
<td>450.00</td>
</tr>
<tr>
<td>Engineering equipment: Files, surveying instruments and drafting instruments</td>
<td>250.00</td>
<td>250.00</td>
<td>350.00</td>
</tr>
<tr>
<td>Maps and engineering records</td>
<td>1,000.00</td>
<td>1,000.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>Miscellaneous scientific and laboratory equipment: 2 microscopes (second hand)</td>
<td>60.00</td>
<td>100.00</td>
<td>150.00</td>
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<tr>
<td>Stereoptican machine</td>
<td>33.00</td>
<td>35.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Lantern slides</td>
<td>125.00</td>
<td>125.00</td>
<td>250.00</td>
</tr>
<tr>
<td>Other miscellaneous equipment including camera</td>
<td>70.00</td>
<td>50.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Tools</td>
<td>100.00</td>
<td>40.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Dredge</td>
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<td>2,800.00</td>
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<td>Scow</td>
<td>1,156.50</td>
<td>1,400.00</td>
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<td>Evinrude motor (second hand)</td>
<td>50.00</td>
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<tr>
<td>2 oil tanks and pumps</td>
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<td>505.57</td>
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<td>Total</td>
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<td>$10,575.00</td>
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