A public health survey of Topeka.

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A PUBLIC HEALTH SURVEY OF TOPEKA

Part I

THE TOPEKA IMPROVEMENT SURVEY

A report by

FRANZ SCHNEIDER, JR.
Sanitarian

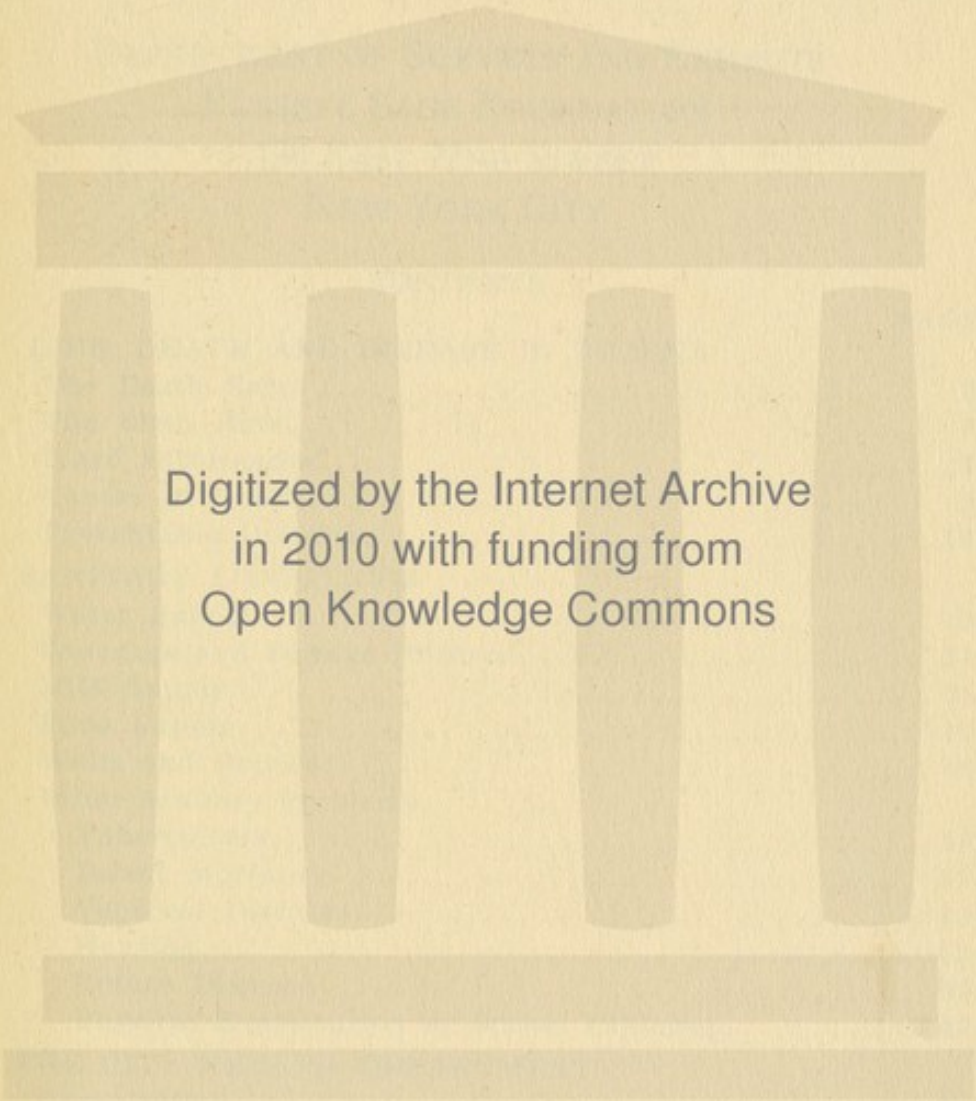
DEPARTMENT OF SURVEYS AND EXHIBITS
RUSSELL SAGE FOUNDATION
NEW YORK CITY

To the

TOPEKA IMPROVEMENT SURVEY COMMITTEE

TOPEKA - KANSAS

May 1914



A PUBLIC HEALTH SURVEY OF TOPEKA

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FOREWORD

This Public Health Survey of Topeka is not the product of investigation by one individual or by an organized staff working under the direction of one individual, but is a product of co-operation by the public health forces of the City of Topeka and the State of Kansas. A mere recital of the resources drawn on is impressive, the list including the State Board of Health, the city Sanitary Department, the State University, the State Agricultural College, Washburn College, and the offices of the State Hotel and Dairy Commissioners. To the State Department of Health the Survey owes the investigations covering vital statistics and the food supply, as well as generous and valuable co-operation in securing milk and water analysis and the investigation of the sewer system. To the State University the Survey is indebted for the investigation of the sewerage, and for the remarkable feat of analyzing some seventeen hundred samples of water. The contribution of the city Sanitary Department is likewise a substantial one, covering the enumeration of all wells and privies in the city and the preparation of the maps representing this material. The State Agricultural College lent its energies to the chemical and bacteriological examination of milk; Washburn College to the bacteriological examination of samples of ice cream, and the inspection of the places in which ice cream was handled; the State Hotel Commissioner inspected a number of lodging houses and restaurants; while the State Dairy Commissioner visited Topeka and went over the dairy and milk depot situation.

Thanks are especially due Dr. S. J. Crumbine, secretary of the State Board of Health, for his constant interest, encouragement, and assistance; to W. J. V. Deacon for his painstaking analysis of vital statistics; to City Commissioner W. L Porter for his ready and cordial co-operation; and to J. A. Ramsey, sanitary sergeant. Others in this list are Prof. Granville R. Jones of the State University; Prof. C. C. Young, director of the State Water Survey; Prof. L. D. Bushnell of the State Agricultural College; Prof. Edith M. Twiss of Washburn College; State Dairy Commissioner George S. Hine; State Hotel Commissioner Miles Mulroy; Mrs. Charles B. Thomas and Miss Mary R. Vose. What a large part of the work was carried out by these co-operators readily can be seen, and to them thanks are due for the breadth of scope which it has been possible to give this survey.

A PUBLIC HEALTH SURVEY OF TOPEKA

I. LIFE, DEATH AND DISEASE.

Eight hundred and thirty-five persons died in Topeka in 1912, giving the city a death rate of 17.9 per 1,000 of the population as against 10.2 for the State of Kansas as a whole. The question naturally arises why 18 persons out of each thousand should die in Topeka while only ten die in the whole state. Is there an unusual and unnecessary amount of sickness and death in the city; or is there an unusual number of infants and old persons, whose death rates are always high; or is it a fact that the city's hospitals attract an unusual number of non-residents whose deaths go to swell the city's total? Such explanations will occur readily to natives of the city. Still Topeka is a young, normally-growing western city, such as usually has a low death rate, and we must inquire into the facts and see whether these or other special factors account for the excesslve mortality, or whether real evils exist.

The Death Rate.

The first and most obvious correction of the death rate is that which eliminates deaths of non-residents. In 1912 Topeka's complete death registration of 835 included 171 such persons. Making the corresponding correction, the rate falls to 14.2 per 1,000—a figure still 40 per cent higher than that of the state as a whole.

Taking now the resident deaths in Topeka (and in all calculations which follow only resident deaths will be considered) and comparing the city's mortality at different age groups

with that of the state, it is apparent that the city is always in excess. The figures are shown below:

TABLE 1. DEATH RATES BY AGE GROUPS, TOPEKA VS. STATE OF KANSAS, 1912.

Age	Topeka	State of Kan.	Topeka excess
Under 5 years.....	33.6	20.5	13.1
5-14 years.....	3.4	1.7	1.7
15-24 years.....	5.1	3.2	1.9
25-44 years.....	7.0	5.2	1.8
45-64 years.....	17.6	13.8	3.8
65 and over.....	72.1	63.8	8.3
All.	14.2	10.2	4.0

At the same time there is a slightly more favorable age distribution of population in the state; but when proper correction is applied[1] the reduction in the city's general death rate is small—from 14.2 to 13.2. This small reduction on account of age distribution will be surprising to many who have considered Topeka's "retired farmer" population as having an important influence on her death rate.

One more correction may be applied—that for color. Topeka has a negro element in her population of 10.4 per cent—as against 3.2 per cent for the entire state; and the crude death rate of these negroes was, in 1912, 22.9 as against 13.2 for the whites. This marked advantage of the whites will be considered again; for the present it is sufficient to note that a liberal correction of the city's death rate on this score drops it from 13.2 to 12.3, leaving it—after all corrections—still 20 per cent in excess of the state rate.

Compared with the United States Registration Area (about two-thirds of the country) Topeka appears somewhat more favorably; the relative figures being, after correction for non-residents, age, and sex[1], 18.1 for the Area as against 16.3 for the city. It must be remembered, however, that the Registration Area includes the principal large cities of the country, and that it would be expected to have a death rate considerably in excess of a city of Topeka's character.

To sum up the matter, Topeka has a high crude death rate, due in considerable degree to the deaths of non-residents. Eliminating these her rate compares favorably with that of

[1] For details see Appendix "A".

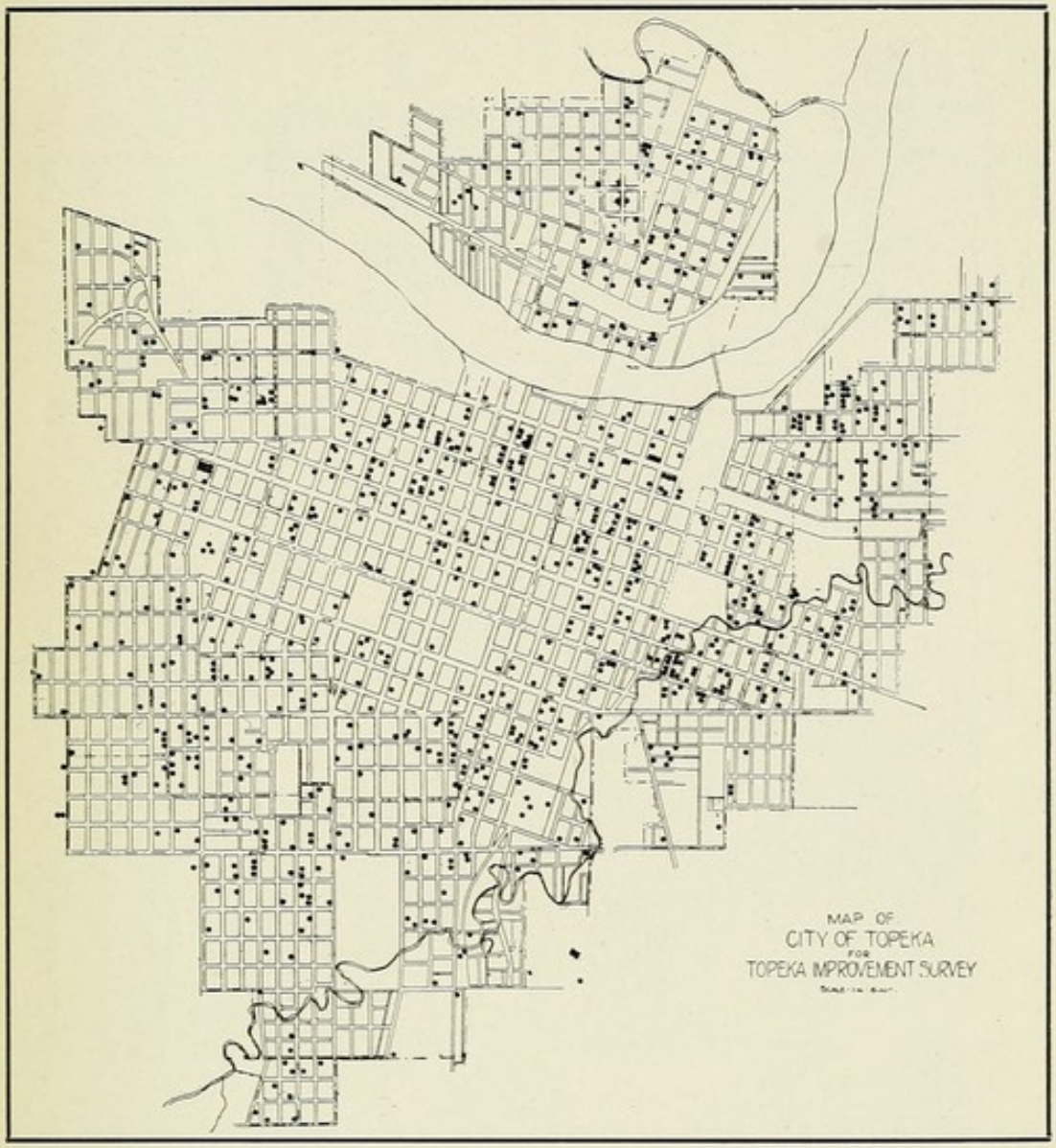
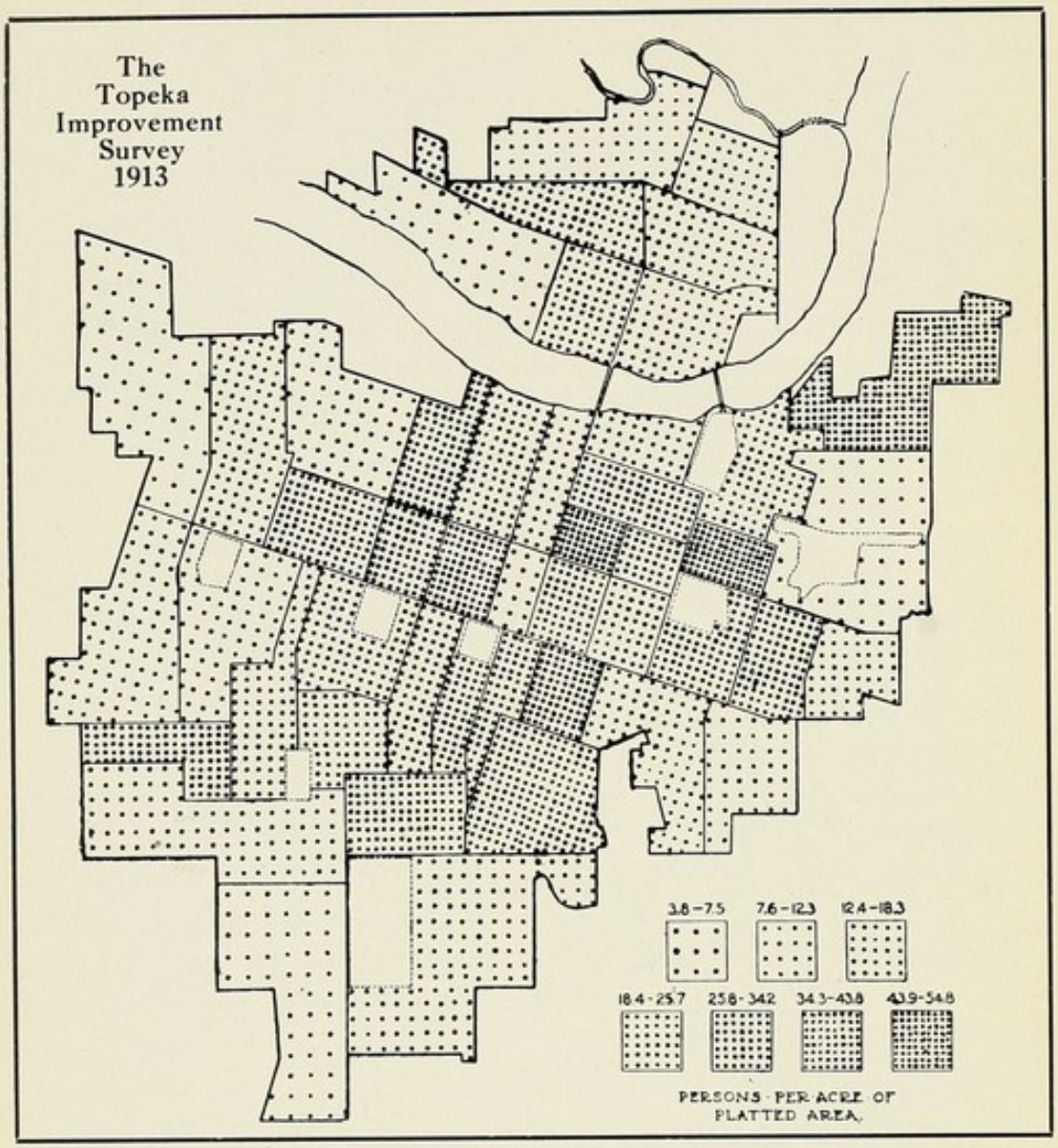


FIG. 1. REGISTERED BIRTHS, TOPEKA, 1913.

the country as a whole, but unfavorably with that of the State of Kansas. It would appear that Topeka suffers from some of the health handicaps incidental to city life; and that while the amount of her disadvantage is not alarming, it is of sufficient magnitude to demand a careful scrutiny of existing sanitary conditions.

The Birth Rate.

Over against her 664 resident deaths occurring in 1912 Topeka can set 923 births: giving a birth rate (or ratio of re-



MAP SHOWING DENSITY OF POPULATION, TOPEKA, 1910.

ported births per thousand population) of 19.8, and a natural rate of increase (excess of births over deaths) of 5.6 per 1,000. This birth rate is not large, and the rate of increase is but a small part of that (30 per 1,000) actually maintained throughout the decade 1900-1910. By far the most important source of the city's growth is evidently immigration from outside.

The number of births registered in 1913 showed a falling off, the rate dropping to 17.4 per 1,000, and the comparison of these figures with those for the State of Kansas, given in Table 2, shows the city at a disadvantage. Topeka's death

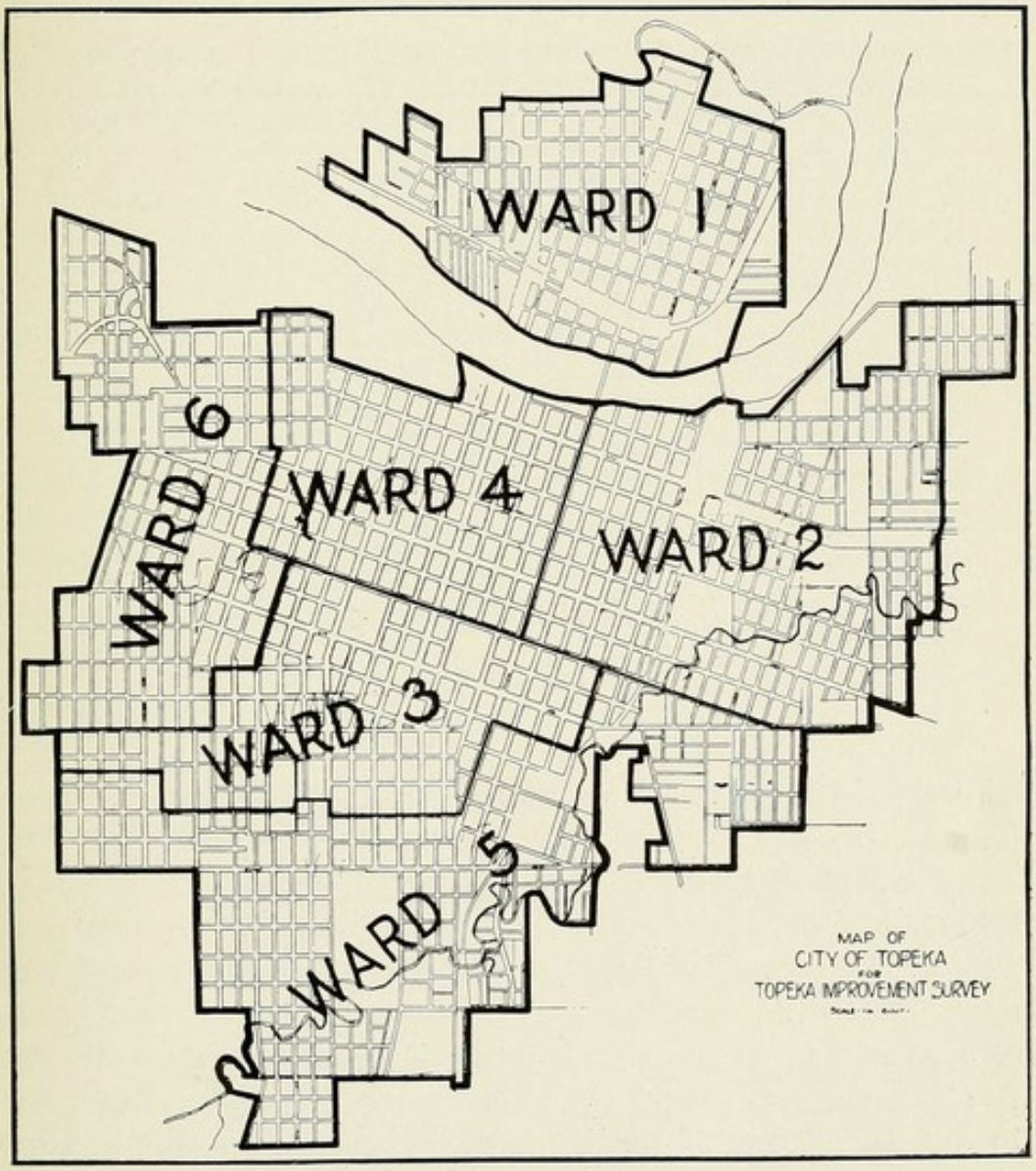
rate is higher, and her birth rate lower, than that of the whole state.

TABLE 2. BIRTH RATE, TOPEKA VS. STATE OF KANSAS.

	Topeka	State of Kan.	Topeka's Deficiency
1912.....	19.8	22.5	2.7
1913.....	17.4	21.0	3.6

WARD DIFFERENCES.

The distribution of births throughout the city is indicated in Figure 1; that of births and deaths, as expressed in



WARD MAP OF TOPEKA.

rates, is shown in Table 3. The marked variations exhibited between the wards, from 7.6 to 19.1 in the death rate and from 10.7 to 26.4 in the birth rate are doubtless a result, to a large degree, of differences in the character of the population. Ward 3, for example, including some of the best parts of town, has at once the highest death rate and the lowest birth rate, being the center, no doubt, of the "retired farmer" population. Ward 5, which embraces the southern edge of the city, has, on the other hand, the combination of highest birth and lowest death rate—and so may lay claim to considerable hygienic credit. Its rate of natural increase for the year was over twice that of any other ward.

Table 3. Ward Birth and Death Rates, Topeka, 1912.

Ward	Population	Death Rate	Birth Rate	Natural Rate of Increase
1.....	6,388	16.2	18.8	2.6
2.....	12,378	16.1	21.0	4.9
3.....	8,522	19.1	10.7	—8.4
4.....	7,312	12.0	17.8	5.8
5.....	7,611	7.6	26.4	18.8
6.....	4,376	11.6	18.5	6.9
City...	46,578	14.2	19.8	5.6

These differences, while not accurate indications of actual degrees of healthfulness, are large enough to be of some real significance; and reinforce the suggestion of our analysis of the general death rate, i. e.—the necessity for careful scrutiny of existing sanitary conditions.

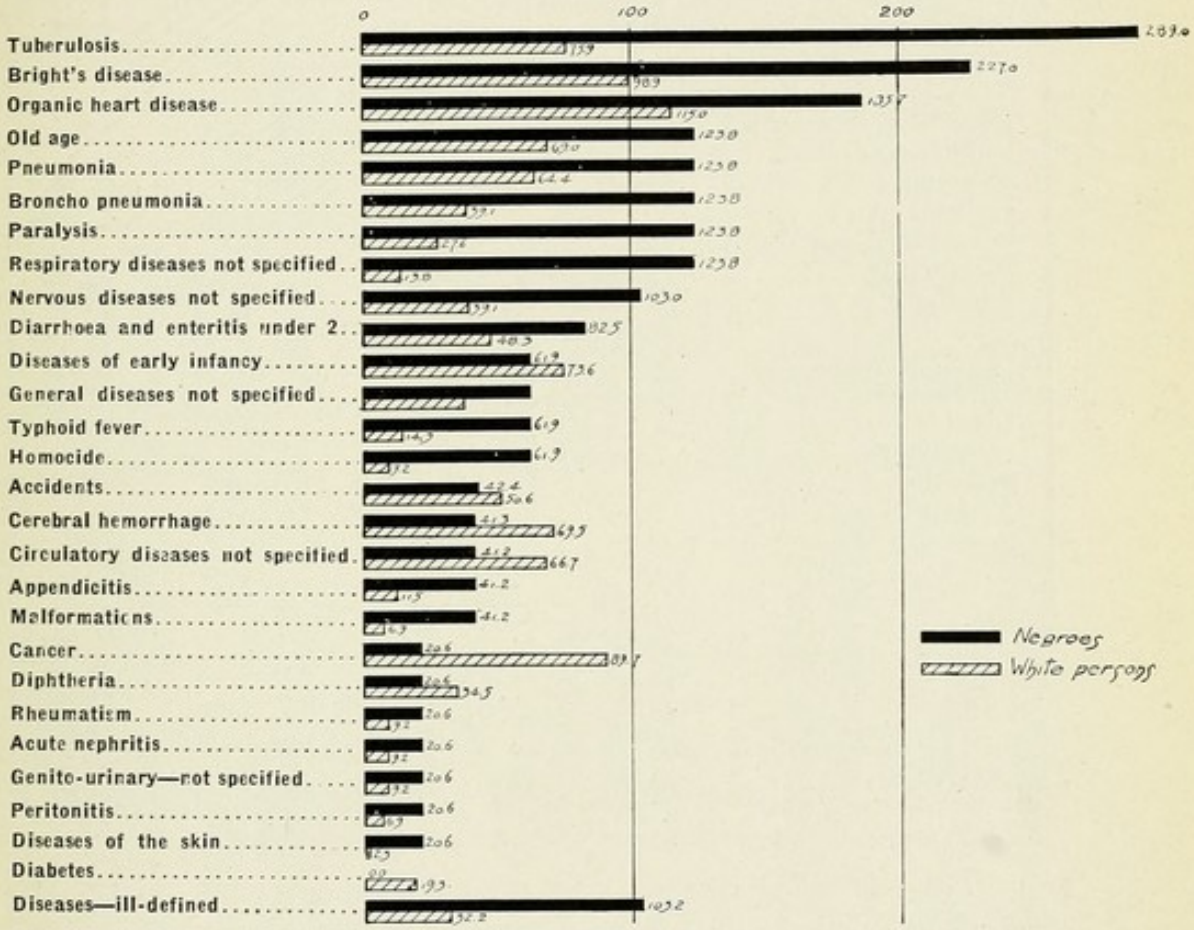
Causes of Death.

The next test that may be applied to Topeka's mortality statistics is the most illuminating of all: it is the examination of the causes of death. Modern science recognizes two great groups of diseases: constitutional —as a naturally weak heart, or a congenial deformity; and infectious—those produced by external influences, and of which typhoid fever is a type. With the constitutional diseases little can be done, except as it may be possible to prevent the breeding of the unfit; but great advances have been made in the last few years in our knowledge of the infectious diseases and here a great field for the protection of health and happiness has been

opened up. Prominent among the infections are the germ diseases—sometimes referred to as the communicable diseases, and including the so-called contagious diseases; but poisonings by industrial processes, or by ptomaines, and the like, are included under any liberal interpretation of the term. It is with this great group of environmentally produced, preventable deaths that we are primarily concerned; and it is with this point of view that we direct our attention to the causes of Topeka's mortality.

LEADING CAUSES OF DEATH, TOPEKA, 1912.

(Rates per 100,000 Population.)



The most striking feature of the above chart is, of course, the almost invariable excess of mortality among the negroes, and the particular disproportion with respect to tuberculosis. The negro's experience in Topeka is but an illustration of a general principle—his relative inability to cope with the health hazards of our city life. His physical inheritance is

such as offers the least resistance to the white man's city-life diseases, and his social and economic position is such that he lacks most of the white man's artificial defenses. With their general death rate nearly twice that of the white inhabitants, it is evident that Topeka needs make special provision for public health work among her 5,000 negroes.

Notable among the causes of death among Topeka's white citizens are certain constitutional diseases — such as of the heart and kidneys, regarding which little of a directly preventive nature can be done; and several infectious diseases,

Table 4. Preventable Deaths, Topeka, 1912.

Diseases commonly regarded preventable.	Deaths		Rate per 100,000.	
Tuberculosis (all forms)	47		102.2	
Diarrhoea and enteritis under 2	25		54.4	
Diphtheria	16		34.8	
Typhoid fever	9		19.3	
Dysentery	3		6.5	
Whooping cough	2		4.3	
Scarlet fever	1		2.2	
Smallpox	1	104	2.2	225.9
Diseases in which factor of preventability enters.				
Diseases of early infancy	35		76.2	
Pneumonia	34		73.8	
Broncho pneumonia	23		50.0	
Accidents	26		56.5	
Puerperal state	10		21.7	
Meningitis	5	133	10.8	289.0
Totals		237		514.9

by far the most prominent of which is tuberculosis. Deaths from the constitutional diseases are, on the whole, the more numerous; but, brought together, as in Table 4, the principal infections (and accidents) present no mean array.

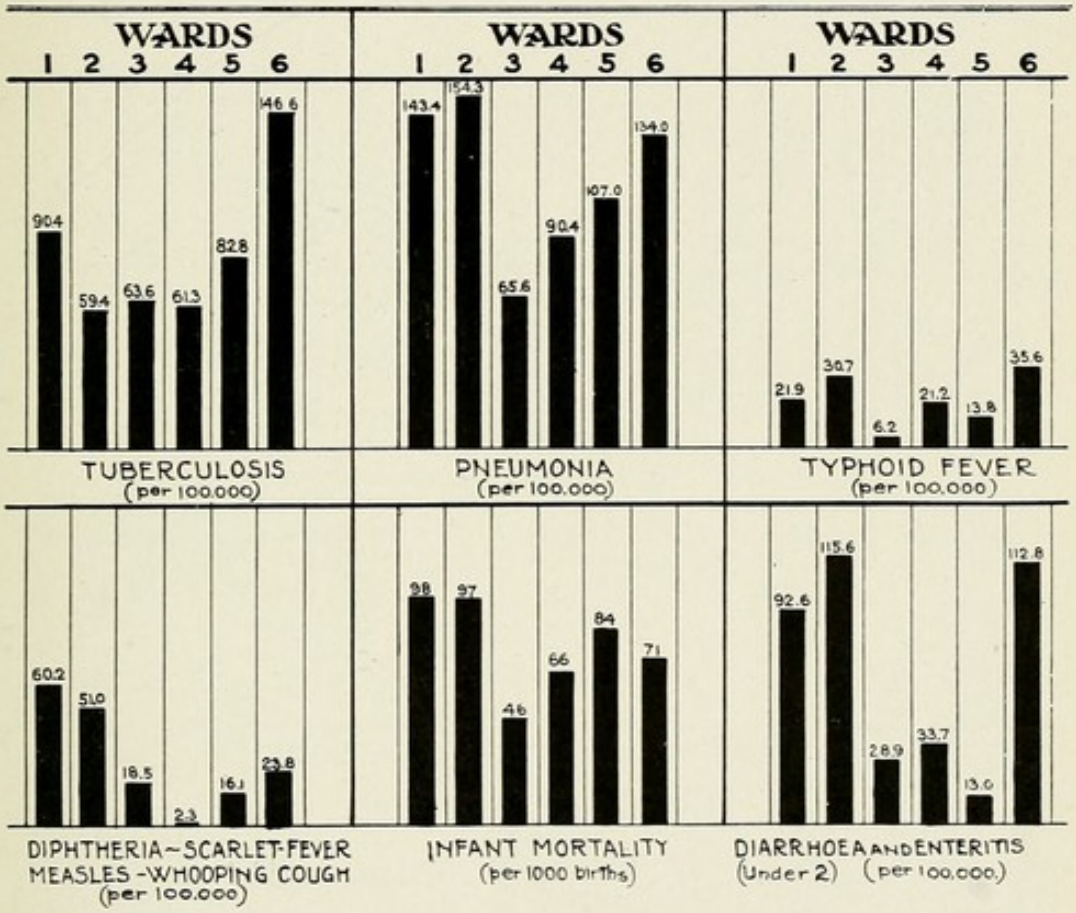
Thus from diseases of unquestionable preventability Topeka has suffered, in a single year, 104 deaths; and from certain other diseases 133 deaths—a goodly number of which are probably preventable. Avoidable, therefore, were 15.7 per cent of the year's deaths; with another 20 per cent as a potential premium. And these figures take no account of the incidental cases of non-fatal illness — probably ten-fold in number. No extended discussion is needed to emphasize the

importance of the situation: it will probably be some time before Topeka gets to prevent all this mortality, but she can hasten toward the goal if she will, and much of the way is easily to be traveled if she cares to adopt the accepted features of a modern public health program.

Distribution of Preventable Diseases.

Study of the distribution of preventable diseases throughout a city is not only interesting in itself, but is profitable from the standpoint of diagnosing the situation and laying

WARD DEATH RATES FROM PREVENTABLE CAUSES, TOPEKA.[1]



out a program. Such a study is, in Topeka, unusually difficult, owing to the fact that prior to 1912 only about half the deaths were registered, while prior to the fall of 1913 no records at all were made of cases of contagious diseases. These unfortunate and uncivilized conditions are now being remedied—in the first instance thanks to the state vital statistics

[1] For further details see Appendix "B".

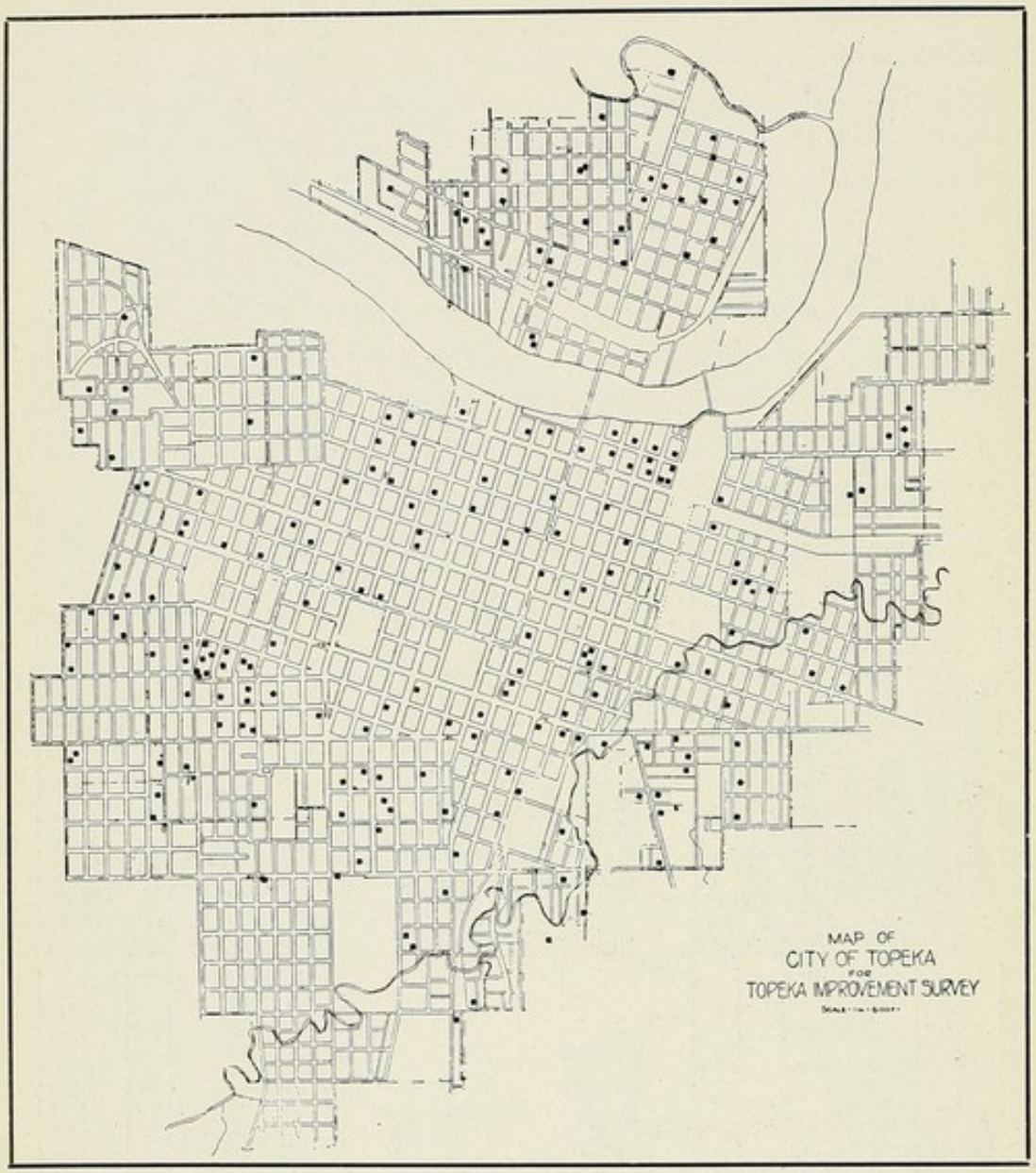


FIG. 2. DEATHS FROM TUBERCULOSIS, TOPEKA, 1908-1913.
(Registration incomplete)

law, in the second to the initiative of the present sanitary sergeant; but the information on file is lamentably meagre, is in some cases incomplete, and has to be interpreted with care. Death records must be relied on solely, and comparable periods cannot be taken in every case.

The facts, as far as they may be obtained for the different wards, are displayed in the chart on page 11; the more precise location of individual deaths being indicated in Figures 2 to 8, inclusive. Ward 3, for example, which we have seen to

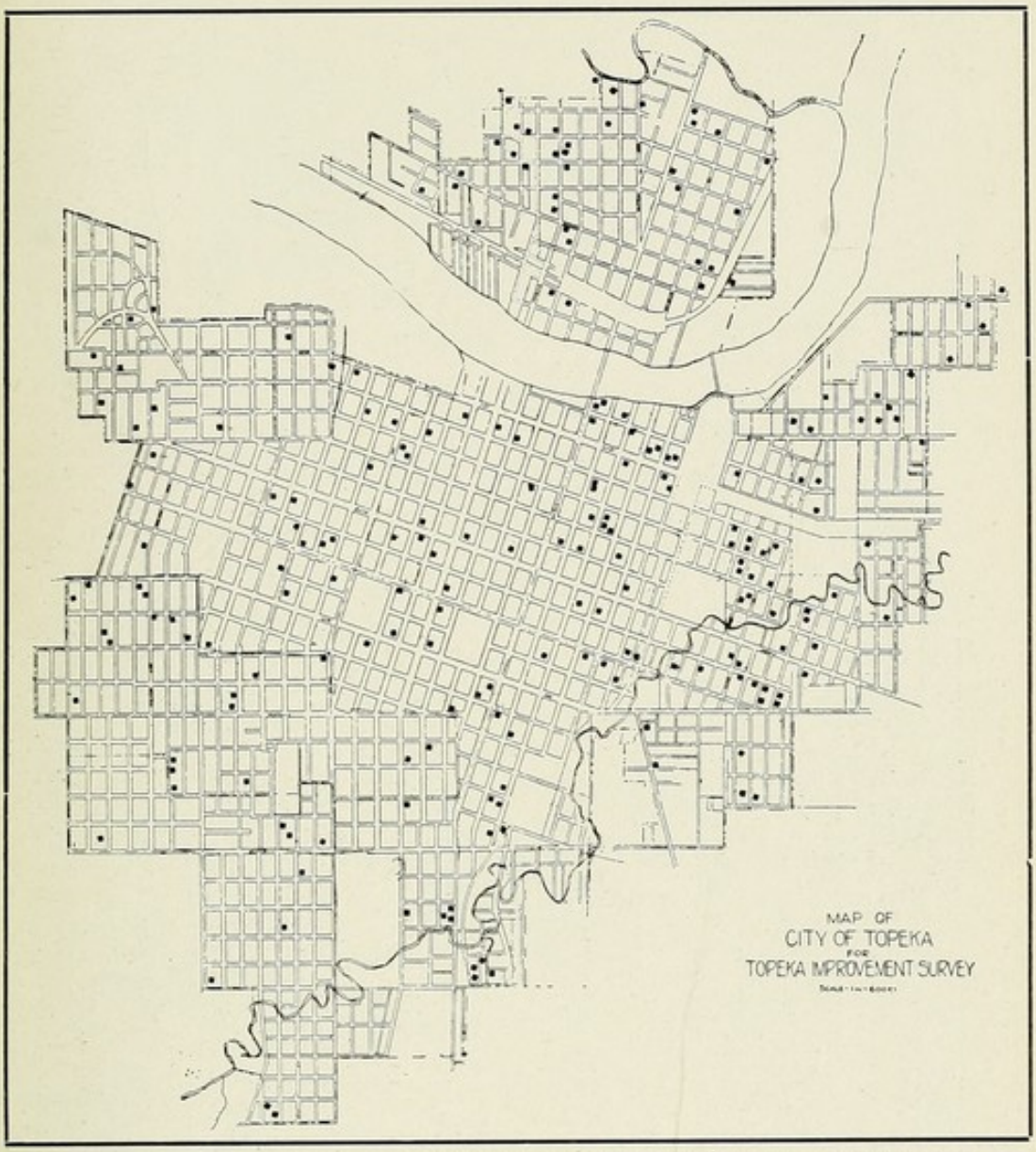


FIG. 3. DEATHS FROM PNEUMONIA, TOPEKA, 1910-1913.
(Registration incomplete)

have the highest general death rate, makes, with respect to these preventable diseases, a uniformly excellent showing: Wards 2 to 6, on the other hand, come off relatively badly. The figures for typhoid fever for another thing, while based on a somewhat small number of instances, are of real significance, especially when taken in connection with the facts regarding wells and privies, which are to be found later in this report. Again, the relative mortality from the common contagious diseases of children—diphtheria, scarlet fever, measles, and whooping cough, is entirely out of proportion to any pos-

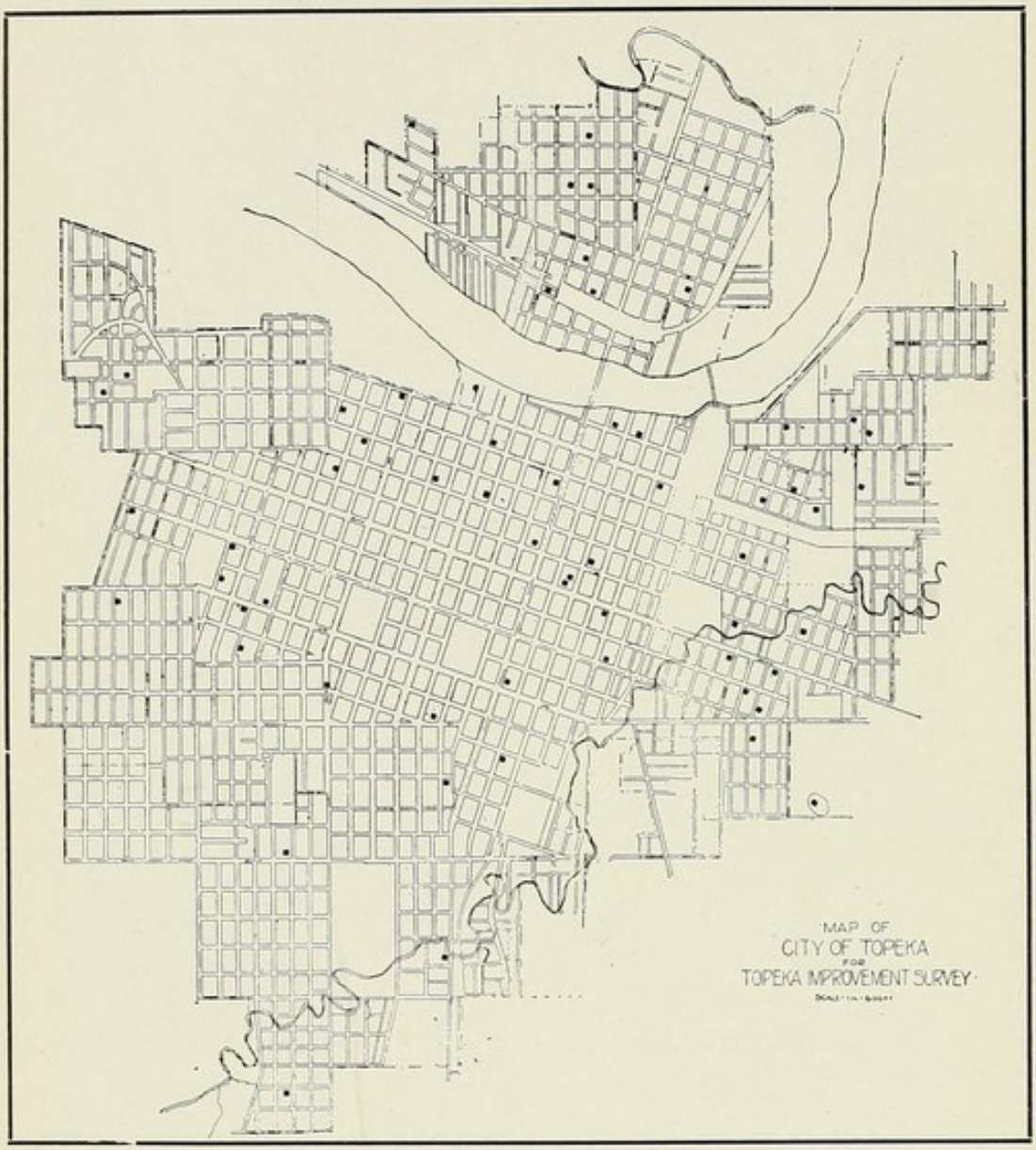


FIG. 4. DEATHS FROM TYPHOID, TOPEKA, 1908-1913.

(Registration incomplete)

Each death represents about 10 non-fatal cases.

sible differences in the number of children in the wards; and makes a stirring appeal for better administrative control. Diphtheria has been the most deadly of these diseases, and, as is clear from an examination of Figure 5, has centered in North Topeka and the east side. With each death representing another ten or twenty non-fatal cases, the size of the burden is more apparent; it is, in fact, entirely too great, and the same procedures that restrict it in Ward 3—prompt adminis-

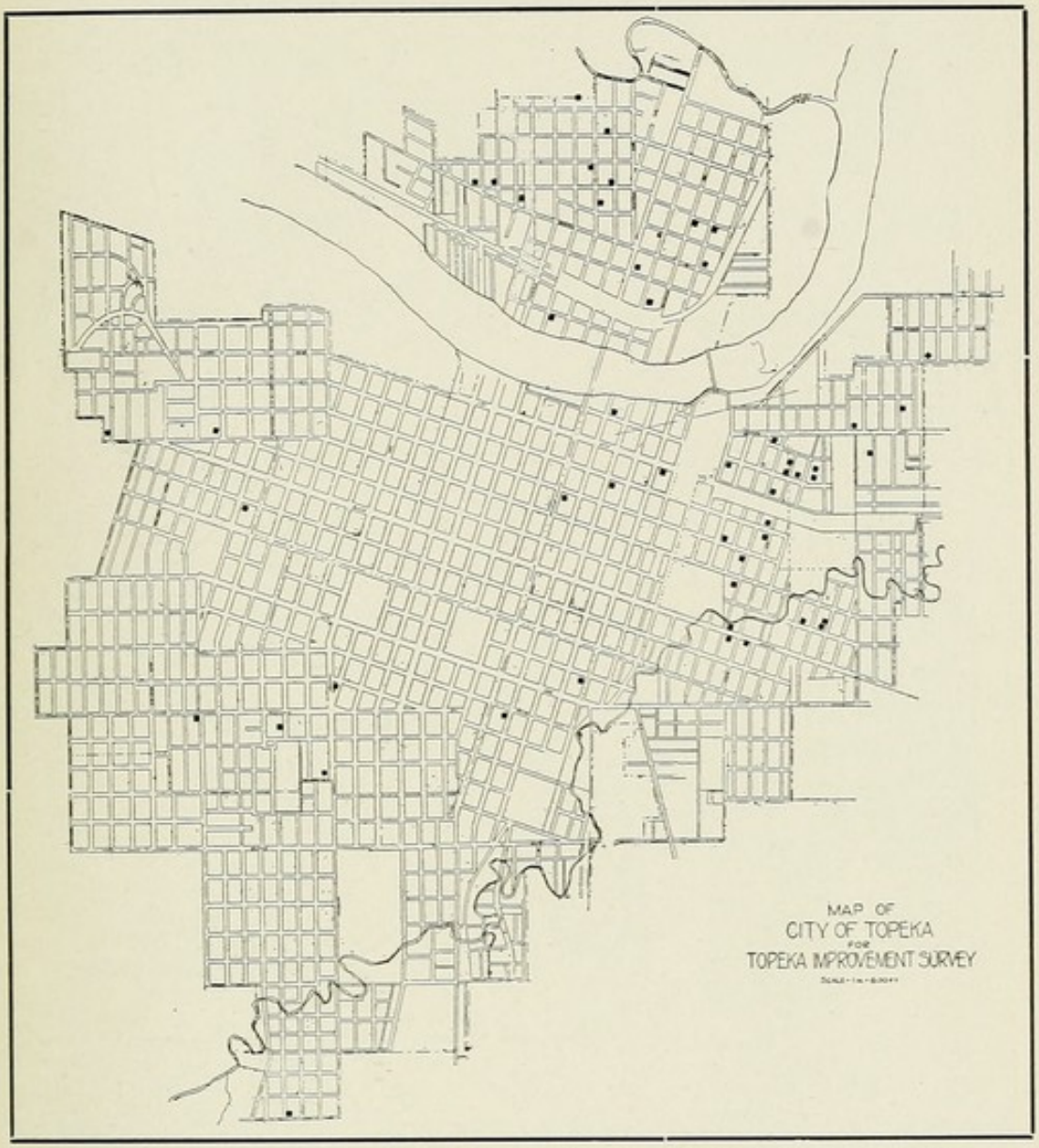


FIG. 5. DEATHS FROM DIPHTHERIA, TOPEKA, 1908-1913.

(Registration incomplete)

Note the marked localization in East and North Topeka. Each death represents another ten or twenty non-fatal cases.

tration of anti-toxin and proper isolation—will control it in Wards 1 and 2.

Similar arguments apply to infant mortality—especially that part represented by diarrhoea and enteritis. Relatively small expenditures for public health nurses have, in other cities, affected remarkable results in baby saving: there is every reason to believe that similar results would be obtainable in Topeka. This question, as well as those particularly

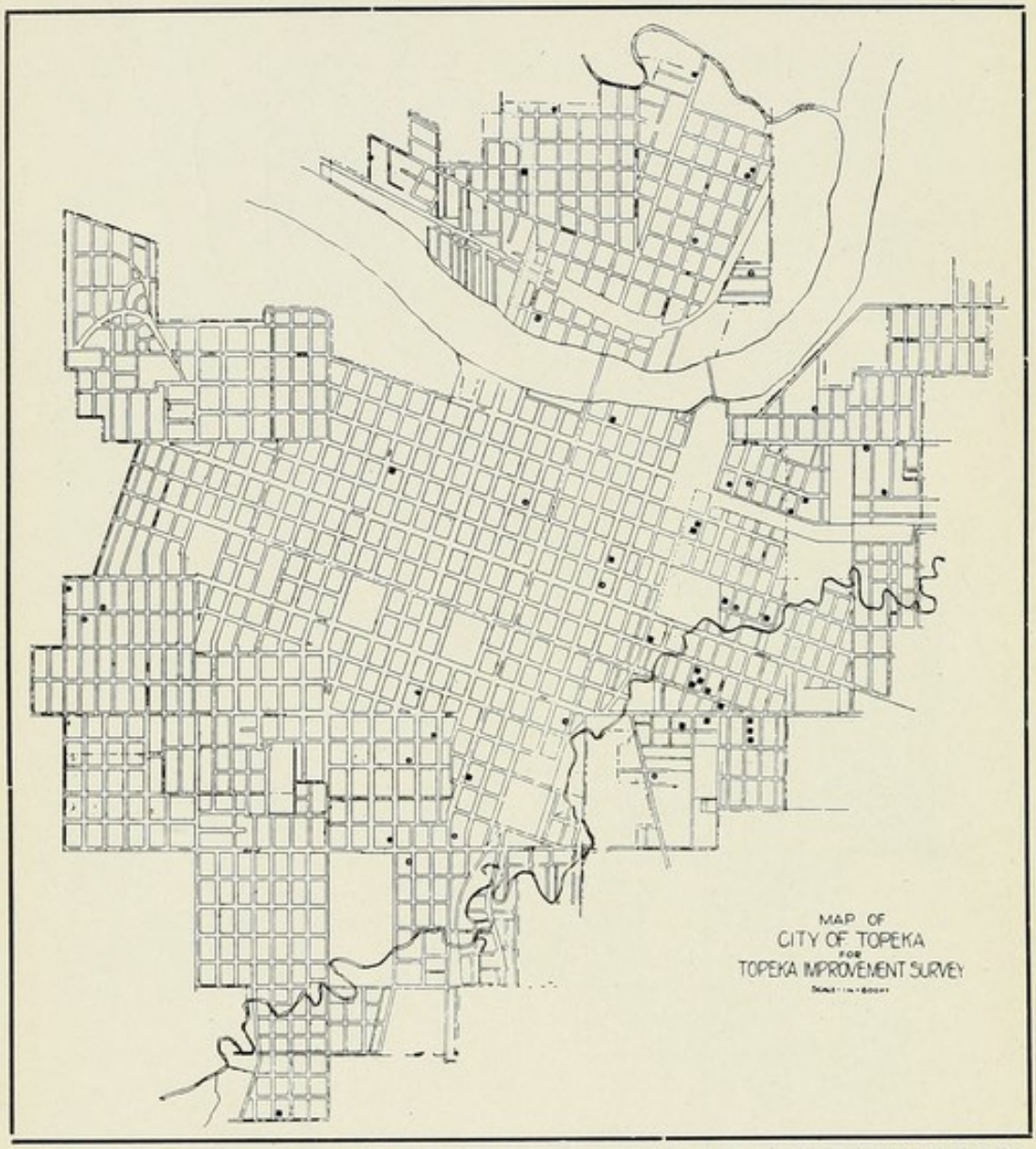


FIG. 6. DEATHS FROM SMALLPOX, MEASLES, SCARLET FEVER AND WHOOPING COUGH, TOPEKA, 1908-1913.

(Registration incomplete)

Squares indicate smallpox
Solid circles indicate measles
Stars indicate scarlet fever
Open circles indicate whooping cough
Note localization in eastern part of the city

affecting tuberculosis, will be discussed later in the present report.

Summary and Conclusions.

In our study of Topeka's vital statistics we have seen that her death rate, while comparing favorably with that of the

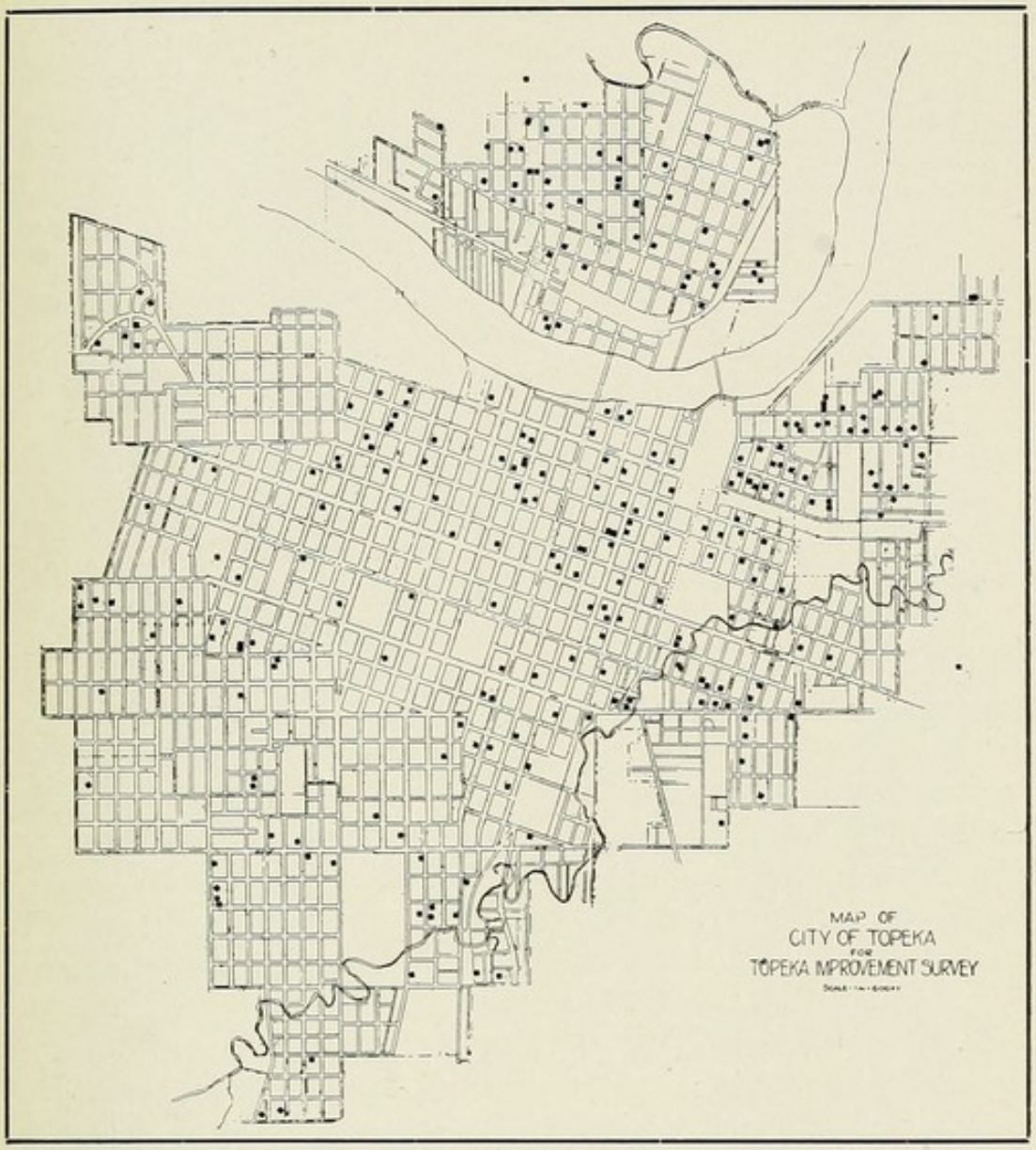


FIG. 7. INFANT DEATHS (UNDER 1), TOPEKA, 1910-1913

(Registration incomplete)

Compare with distribution of births as indicated in Fig. 1.

country at large, is, after applying the proper corrections, still 20 per cent in excess of that of the state of Kansas; that her birth rate is in general somewhat low, and over a tenth lower than the state's; that her people suffer real losses from preventable disease and death; and that these diseases are especially prevalent in certain parts of the city. The suggestion is clear that there is need for a careful scrutiny of existing sanitary conditions, and of the administrative measures of control. Topeka, in short, has, like other cities, a public health

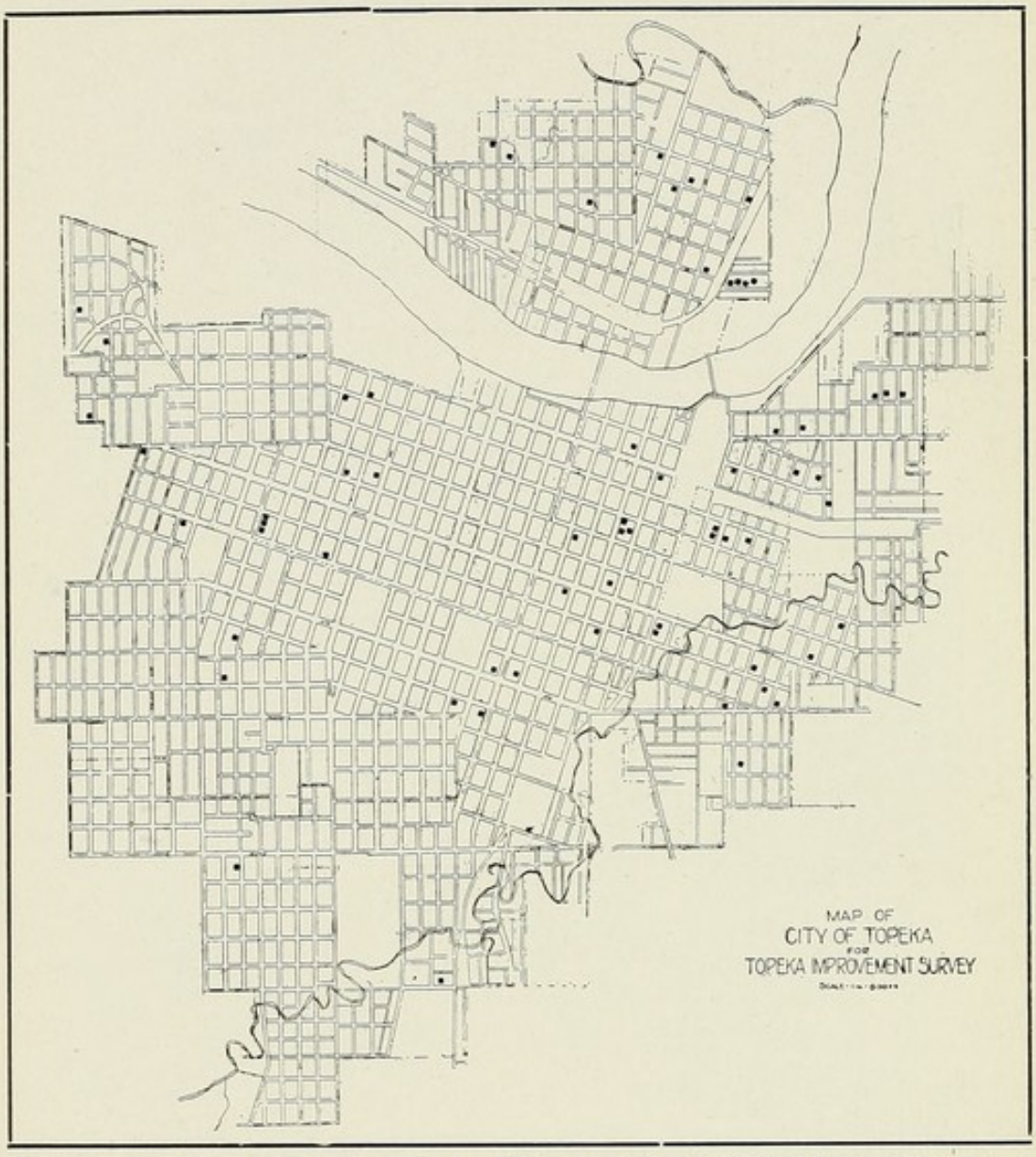


FIG 8. DEATHS FROM DIARRHOEA AND ENTERITIS, UNDER 2, TOPEKA, 1912-1913.

Compare with distribution of births as indicated in Fig. 1.

problem; while not alarmingly large, it is entirely definite and real. That it is of goodly proportions, witness the fact that 15 and possibly 30 per cent of the deaths in the city are from preventable diseases.

II. SANITARY CONDITIONS IN TOPEKA

CITY WATER SUPPLY.

Two principal water supply developments exist in Topeka —that of the Santa Fe Railroad and that of the municipality. Both supplies are taken from dug and driven wells located on the south bank of the Kansas river, and the two systems have a connection which permits pumping from one to the other at times of emergency. Because of this connection, and the corresponding possibility of the distribution of Santa Fe water in the city mains, both systems were inspected during the Survey and both waters were examined.

The municipal supply is obtained from 48 small driven wells and three large dug wells, all located on the edge of the river, a short distance above the city. The small wells, which ordinarily contribute about 40 per cent of the supply, were located when driven in the low land on the bank; they are now, owing to a change in the river bed, entirely under water at all times. These wells are from 28 to 36 feet in depth, are six to eight inches in diameter, and are connected by a suction line to the pumps and so directly with the mains to the city.

The dug wells, contributing about 60 per cent of the supply, are three in number, two 60 feet in diameter and one of 48 feet. These wells penetrate successive layers of sand, loam, blue clay, and quicksand, and finally take their water from a stratum of coarse sand and gravel. The walls are of brick to the level of the ground, are continued then in concrete to above flood level, finally supporting suitable wooden roofs. Entering one of the wells for inspection, the water was seen to be making its way in under the wall on the uphill side (that farthest from the river); it is pumped, as the case may be, into one of the other wells or directly into the mains to the city.

Both city well systems seem to tap the same water-bearing stratum, and to secure water which appears to be of excellent sanitary quality, analyses[1] made during the Survey

[1] A typical analysis may be found in Appendix "C".

failing to disclose any trace whatever of pollution. Accordingly there is reason to believe that the city has secured water from the underflow water, which probably comes a very considerable distance, and so is safe from contamination. The city is indeed fortunate to secure such an abundant and satisfactory supply at so little effort.

Some criticism may properly be made of the older (driven) wells. Covered with river water at all times, they afford an opportunity for contamination from breaks in the suction line. Such breaks are bound to occur, the supply from these wells being shut off at the time of the Survey for this very reason. The properly protected dug wells now in use are the more commendable type, and future developments of the supply should undoubtedly take this form.

The Santa Fe supply is secured from one dug well some 30 feet in diameter and 12 drilled wells. From data available it would appear that the railroad wells, though driven somewhat deeper from the surface than the city wells, penetrate material of very similar nature, and obtain their water from a closely analogous stratum at a depth which, when referred to the high water mark of the 1903 flood, is very close to that of the city wells. Analysis of samples of the Santa Fe water taken from the dug well, the drilled wells, and a tap in the shops, all showed the water to be, at the time, of excellent sanitary quality.

The connection between the Santa Fe and city systems is maintained for mutual convenience, water being pumped occasionally from one system to the other in times of fire or other emergency. While both waters seem excellent at present, it is to the advantage of both parties that careful and regular analytical supervision be kept of both waters; and that the division valve be carefully protected, and that a record be kept of any interchanges of water.

In general, the city will be wise to adopt a liberal policy regarding the development of its present satisfactory water supply. Pumping from the river, such as was resorted to in 1910, should never be found necessary—a fact which cannot be stated too emphatically. The city mains extend well over that part of the city south of the river and west of Shunganunga

creek. Map opposite page 45 shows parts of the city now served. Some 4,738 service connections were in use in 1907, a figure which, according to water office estimates, accounted for about 24,000 persons—or some 55 per cent of the population. Realizing the great importance of pure water in the prevention of a number of important infectious diseases, we may recommend liberal extension of the city mains. This phase of the question will be discussed further in connection with that of wells and privies; for the present it is sufficient to note that the quality of the city water justifies the policy of its liberal extension.

SEWERAGE AND SEWAGE DISPOSAL

The sewerage of Topeka consists of eight systems; one in North Topeka, the other seven south of the river and west of Shunganunga creek. A few short storm-water drains have been laid on the east side, but sanitary sewers (for house sewage) are entirely lacking in that part of the city. Each of the eight systems has its own outfall into the river, as is shown in Figure 9, and all are "combined" sewers, i. e., designed to carry both house sewage and storm-water. The location and relative size of these systems is indicated below:

TOPEKA SEWER SYSTEMS, 1913.

Order in ascending river	Outfall at	Size at outfall, inches	Tributary area, acres	Population served
1	Fairchild St.	34x54	261	4,000
2	Jefferson St.	54x58	1067	12,000
3	Near Madison St.	24 round	28	450
4	Near Monroe St.	24 round	36	550
5	Near Quincy St.	15 round	52	900
6	City Park.	60x72	645	8,800
7	Quinton Blvd.	27 round	95	750
8	Hawthorne St.	15 round	483	3,600

It is evident that two of the systems—Jefferson street and City Park—are relatively large; two—North Topeka and Potwin—are of medium size; while the remaining four are of relative insignificance.

A comprehensive and valuable survey of these sewers was made possible by the co-operation of the State Board of Health as represented by Dr. S. J. Crumbine, and the University as

represented by Professor G. R. Jones, who is also Engineer of the State Board. The work was carried on under the personal direction of Professor Jones by Messrs. E. C. Richardson, H. D. King and W. A. Davenport, senior students at the Univer-

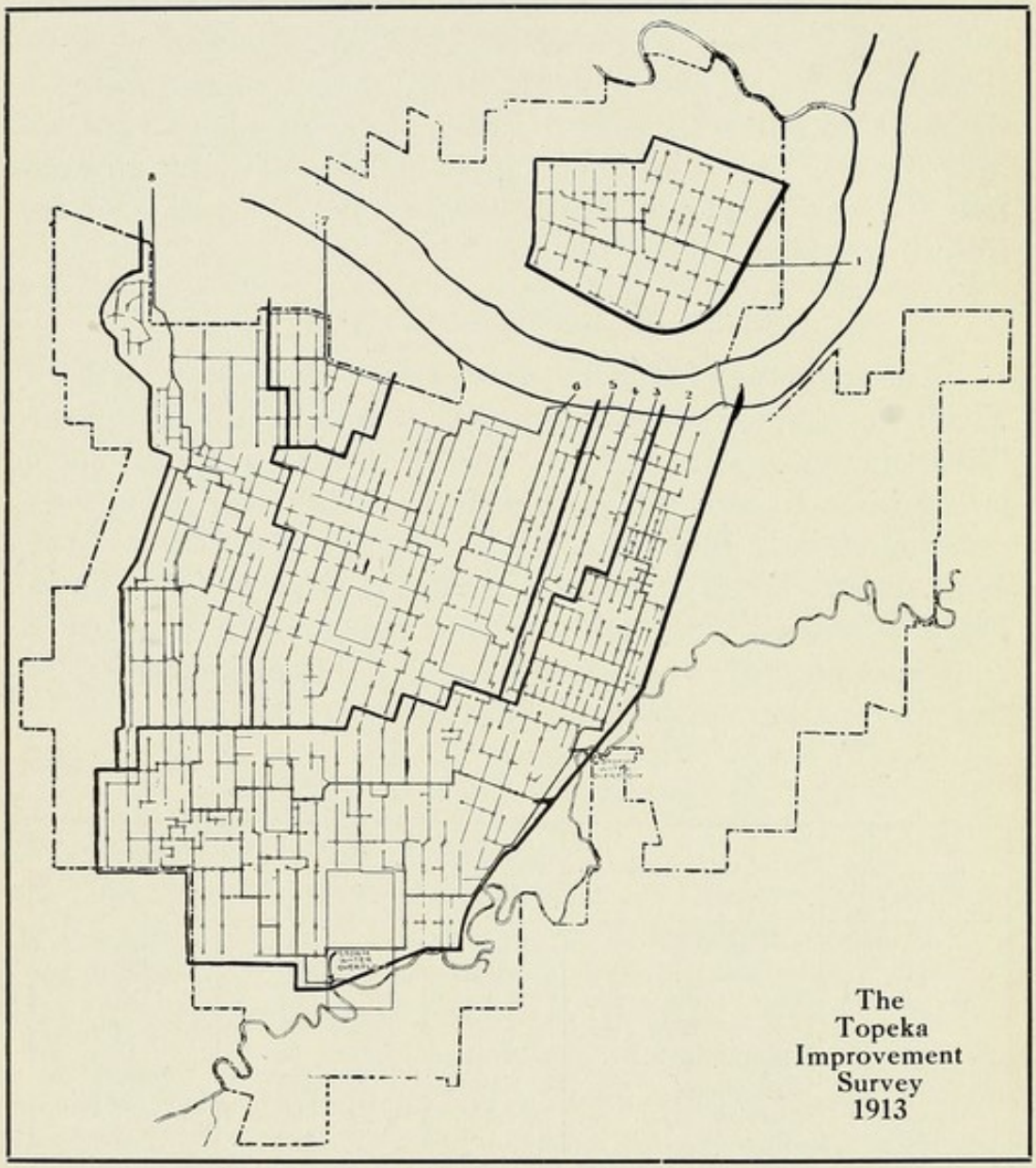
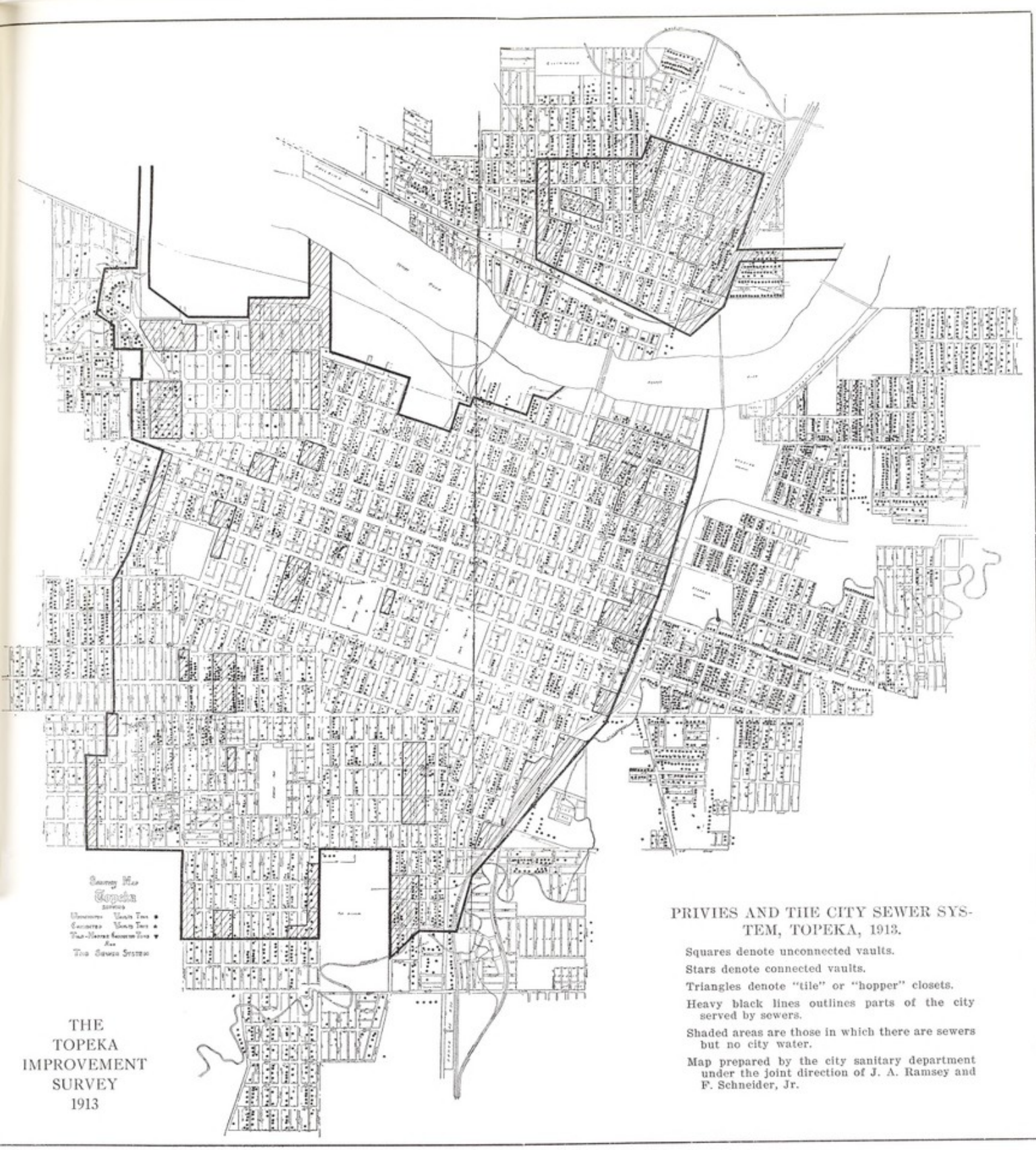


FIG. 9. TOPEKA SEWER SYSTEMS, 1913.

Heavy lines outline sewer districts.
Dot and dash line city limits.
Fine lines indicate sewers; the circles manholes.

sity, the inspection counting as thesis work towards their degrees in sanitary engineering.

The plan throughout was to do whatever work undertaken as thoroughly as possible, rather than to try to cover the en-



THE TOPEKA IMPROVEMENT SURVEY 1913

PRIVIES AND THE CITY SEWER SYSTEM, TOPEKA, 1913.

Squares denote unconnected vaults.

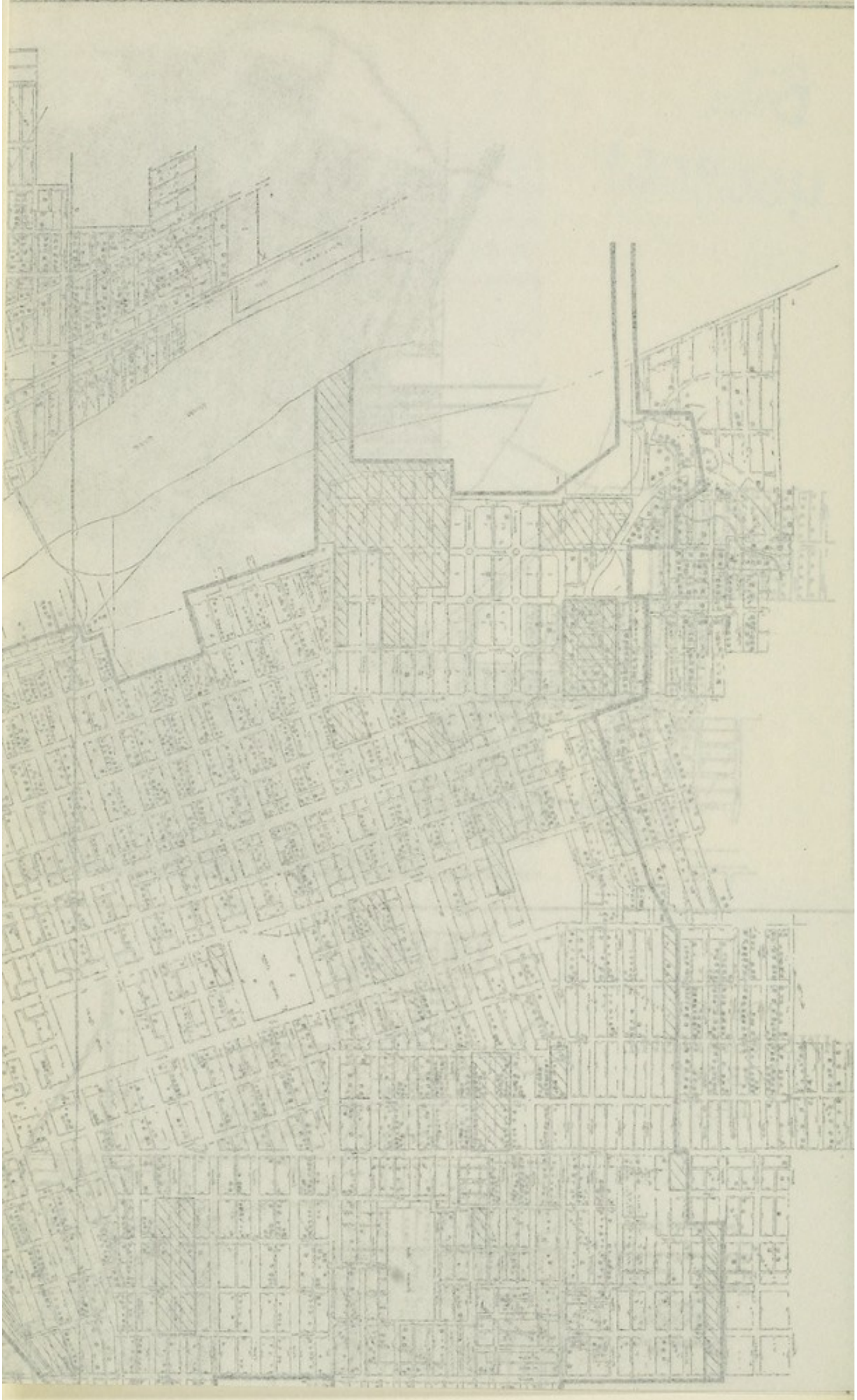
Stars denote connected vaults.

Triangles denote "tile" or "hopper" closets.

Heavy black lines outlines parts of the city served by sewers.

Shaded areas are those in which there are sewers but no city water.

Map prepared by the city sanitary department under the joint direction of J. A. Ramsey and F. Schneider, Jr.



tire territory in a superficial manner. All of the large sewers were entered and explored, a large number of man-holes, flush tanks, and the like were inspected, and a number of places specially complained of were thoroughly investigated. The principal points covered were the dimensions, type of material and construction, and the general condition of the various parts of the systems. Leakage of ground water, unevenness of grades, formation of deposits, the condition of joints and examples of improper design were also noted. The total mileage of Topeka sewers is approximately 73; of these 23 miles were inspected; as well as 306 manholes and flush tanks out of a total of 950.

Many objectionable conditions were found; as, for instance, in the big City Park sewer where, a short distance from the outfall, the bottom is badly worn and an inch and a half crack extends in the top for about 200 feet. In addition, the properly-constructed house connections, originally built into the sewer at each 25 feet, have, in the majority of instances, been disregarded. The sewer has been broken into in the most convenient manner, little attention being given to making the connection tight or to protecting the brick work. Similarly, out of six flush tanks inspected, three were found in good condition, another was found standing full with no flow in or out, while the water was flowing from the other two in a steady stream—all flushing action being thereby lost. The detailed field notes of the inspection may be found in Appendix "D"; the following discussion being quoted directly from Professor Jones' report:

Discussion of the Topeka Sewer Systems

By Prof. Granville R. Jones

Combined Versus Separate Sewers.

"The first criticism that should be made against the Topeka sewers is that they carry both sewage and storm water. The chief argument in favor of 'combined' sewers is their low first cost. As a rule, this is much lower than for separate sewers, but it is very doubtful whether it should be given much consideration in the building of a public utility of such vital importance to the convenience and welfare of the community. At present fewer combined systems and more separate systems are being built, and in some states, of which Kansas is one, the

combined systems are prohibited by law or by regulations of the State Board of Health.

"The arguments against combined sewers as applied to Topeka conditions are many. For example, they were built to carry surface drainage as well as house sewage. The amount of surface drainage during heavy storms, therefore, has controlled their design; as a consequence, during dry weather, when only house sewage is flowing, the depth of the flow is in many places far less than the allowable minimum. In some places there is barely a trickle; in others no flow at all. These low velocities and shallow depths have resulted in heavy deposits of sand, mud, and house sewage sludge. The result is foul and ill-smelling sewers, which are an inexcusable nuisance.[1]

Ventilation.

"The ventilation of the Topeka sewers is bad. This is in part a penalty exacted by the combined system, as the change of air can be accomplished much more rapidly in small than in large sewers. The fault, however, does not lie entirely with the system. In Topeka, manholes are largely used for ventilation, very few manholes with tight covers being found. It would be much more convenient, and much more pleasant for the community immediately adjacent to the ill-smelling sewer line, to close the manholes tight and have the sewer air discharged through house stacks above the roofs. This is the more modern and approved method of sewer ventilation.

Design.

"It is not practicable with the data at hand to go very deeply into the question of the adequacy of the existing Topeka sewers. It may be said, however, that with some exceptions, the sewers are of sufficient size. The one very great exception is in the Potwin sewer. At the corner of Sixth and Morris avenues, two 30-inch brick sewers join and discharge into one 15-inch pipe. The grades of these sewers were not

[1]As examples of such conditions see paragraphs in the field notes (Appendix "D") referring to some of the places where either deposits or bad odors were found, as follows: City Park district—paragraphs 14, 16, 33, 34, 35, 36, 37, 39, 41, 42, 43, 45, 47 and 69; North Topeka district—paragraphs 1, 3, 5, 7, 8, 10, 11 and 12. Places especially complained of—paragraphs 2, 4, 5, 9, 17, 19, 20; Jefferson street district—paragraphs 2, 4, 7, 8, 9, 11, 12, 15, 16, 17, 18, 23, 24, 26, 27, 28, 30, 31, 34, 38, 39, 41, 42, 43, 44, 46, 47, 49, 50, 51, 52, 54; all paragraphs under flush-tanks.

available from the office records and were not determined, but the discharge of two 30-inch sewers flowing full with a velocity of flow equal to the minimum, could not possibly be carried by one 15-inch sewer laid on a reasonable grade, or with an allowable velocity. The arrangement found here was constructed before the present Kansas Water and Sewage law was passed, or would never have been allowed: it represents a foolish and shameful waste of funds. The results justify the characterization of this work even as criminal. Sewage stands in the manholes in this neighborhood far above the crown of the sewers; foul odors are present continually; and with every rain, even with moderate rains, sewage overflows into the streets. These conditions are disgraceful.

"An opportunity to remedy this condition is now presented. A new sewer district immediately to the west of that above mentioned is now being advocated, and the plans which have been drawn call for an outfall line to follow closely the much overloaded 15-inch line. The project has even progressed so far that the City Commissioners have allowed the petition for its construction; but the matter has not yet come before the State Board of Health, and there is a probability that some relief on the Potwin situation will be required before approval of the new work is given. Certainly the city should at this time take advantage of its opportunity and either replace the present 15-inch line with one capable of carrying all the sewage from the combined district, or construct a relief sewer beside the present one.

"Another matter requiring attention relates to the grades or slopes of the sewers. In several places the grades are so low that the velocities are much less than is allowable. In other places, the depth of flow is much below the minimum, due to grades which are too flat. These places are referred to in the discussion of Combined vs. Separate Sewers (page 23).

"Inlet manholes are quite generally used in Topeka, such being very poor practice. All inlets should be equipped with catch basins, which, if properly designed and maintained, would keep out a great deal of the sand and mud found in the sewers during the inspection. Most of the catch basins in use are very well designed; some, however, are not, and should be reconstructed. These are the ones into which it is difficult to enter, and which it is almost impossible to clean.

"Drop manholes are a thing unknown in Topeka. When two sewers join at different levels, the practice has been simply to allow the upper one to project through the wall of the manhole. This has caused wear on the sides, deposits on the benches, churning in the invert, and obstructed flow. Exam-

ples of poorly designed manholes, inlets, catch-basins, etc., may be found in Appendix "D," City Park District, paragraphs 23, 39 and 64; Places particularly complained of, paragraph 2; and Jefferson Street district, paragraph 34.

Records.

"The records of existing construction in the City Engineer's Office are very meager and unreliable. Plans for all work seem to exist, but there is no assurance that they correspond to the work as constructed. In practically half the cases grades are not available, and those that can be had, are entirely untrustworthy. The practical value of complete and reliable records, and the evil results of their absence, is illustrated very aptly by the condition found in the City Park outfall sewer. In making house connections to this sewer, the properly designed and placed inlets have been entirely disregarded, the wall of the sewer, as has been mentioned already, having been broken through and the house drains allowed to project into the sewer without any attempt to make the connections tight. The lack of records of house connection inlets on this sewer has very probably been the cause of the condition described.

"In the matter of engineering service Topeka has been sadly swindled in the past, as the records of the office and the work in the field will testify. At present, affairs are conducted quite differently, and all the work now being done is carefully recorded.

Maintenance.

"The maintenance of Topeka's sewers has been in the past, and is at present, extremely poor. It might be said that there is no maintenance. The many, many places where the sewers are nearly filled with deposits, the absence of even one clean catch basin, the flush-tanks out of order, or using ten times the amount of water necessary, all prove this statement. The department having charge of this work should certainly, at least in this regard, be entirely reorganized; or preferably, the work should be placed in the hands of the City Engineer and an efficient corps organized to carry it on. The sewers should be kept clean. Catch basins should be cleaned after every storm, whereas at present all of them, or most of them, are so filled up that they act merely as inlets of poor design. The flush-tanks should be cared for and operated economically.

Future Extensions.

"There is a most imperative need of sewer extensions in one

portion of the city—the section east of Shunganunga creek. Here, within the limits of the third city in Kansas, is the largest community in the state that remains unsewered. Its population is in the neighborhood of 7,000—to be compared with the fact that there are in the state but two towns with a population of over 3,000 without sewers, and with this exception in Topeka, none larger than 5,000.

"It is stated that the residents of this district do not want sewers. Present conditions are, nevertheless, a menace, not only to residents of the district, but to other citizens of Topeka as well. The city commissioners are empowered to frame, pass and enforce such ordinances, governing the construction and maintenance of privies, cesspools and other 'sanitary makeshifts,' as will eliminate all danger. These regulations, if they are as they should be, will become burdensome enough to make sewers a necessity.

Flood Protection.

"Topeka has recently spent many thousands of dollars for flood protection. Some discussion has arisen as to whether the works constructed are adequate, and varying opinions have been expressed. For the purposes of this discussion it will be assumed that the desired result other than that in which the sewer outlets are a factor, has been accomplished and that the works will perform their function. As long, however, as the existing outlets pass through the dike without means for closing them during floods, and without means of disposing of the city's sewage when they are closed, they annul, in a very large measure, the advantage of flood protection and the money spent for the work is wasted. Nothing whatever will, under the present conditions, prevent the river from rising through the sewers and flooding the lower district of the city to the same heights as formerly. Every outfall should be equipped with a flap-valve or other means of preventing back flow from the river at high stages, and also with means for lifting the sewage over the dike and into the risen stream. The sewage might be more economically collected at one place and pumped entirely through one station, or it might possibly be carried down the river by a long outfall sewer and discharged without pumping. These, however, are details which would be worked out in designing of the project. That some decided improvements along this line are imperative is very evident.

"It may sometime become necessary for Topeka to purify its sewage before discharging it into the river. The disadvantage of a combined system will then become even more evident. Treatment works for combined sewage are necessarily much larger and more expensive than for house sewage alone.

Summary and Recommendations.

"As a whole, Topeka has a poorly designed, a poorly constructed, and a poorly maintained sewer system. Many of the things that have been done can not be changed, but there are a large number of betterments that should be undertaken at once. These will be enumerated, but not in the exact order of their importance, because some are equally necessary; but the first ones should be started at once.

1. A complete survey of the sewers—to supply missing records, and verify the available records of the City Engineer's Office. This probably can not be done by any force in the present city department; but a special corps of men should be employed at once.

2. All the sewers and appurtenances should be thoroughly cleaned. They should be kept in this condition by a properly organized department of maintenance.

3. All needed repairs [1] to manholes, flush tanks, sewer inverts, etc., should be attended to at once.

4. The relief of the Potwin sewer district should not longer be neglected.

5. A sewer system for East Topeka should be started without unnecessary delay.

6. All outfalls should be equipped with the means for their closing during flood periods of the Kansas river, and should be equipped with pumping stations. Or the alternative plan of collecting all of the sewage at one point and installing one pumping station should be adopted."

MILK SUPPLY.

Topeka's milk supply is produced entirely by farmers living within a radius of a few miles, or at least within such distance that the milk is brought in by wagons. Some milk enters the city by railroad from Meriden and Nortonville, but according to the statement of the purchasing company, it is all skimmed and used for the manufacture of butter. Production rests, according to figures furnished by the city milk inspector, in the hands of some 177 farmers, who may be conveniently classified with reference to the manner in which they dispose of their milk—whether wholesale or retail—in bulk or in bottles. The detailed information is as on the following page.

[1] Places needing repairs are described in Appendix "D" as follows: City Park District, paragraphs 1, 2, 4, 28, 53 and 59; places particularly complained of, paragraphs 6, 7, 24, 27, 41, 42 and 55.

MILK PRODUCTION, TOPEKA, 1913.[1]
(Figures furnished by City Milk Inspector)

Producers selling—	Number	Number of cows	Average daily quarts produced
Wholesale and retail in bottles	25	342	2,173
Wholesale in bottles	17	218	1,615
Wholesale in bulk	135	962*	5,310
Totals	177	1,522	9,098

*Number of cows not stated for 31 producers.

Most of the milk (58.4 per cent) is sold in bulk to middlemen, something less than a fourth being sold directly by the producer to the consumer. The actual retailing is carried out about as follows, the amount handled by depots and companies being greater than would appear, as they furnish a good proportion of the store milk:

RETAILING OF MILK, TOPEKA, 1913.
(Figures furnished by City Milk Inspector)

By producers	2,371	quarts per day
By depots and companies	3,406	quarts per day
By stores	2,055	quarts per day
Total	7,832	quarts per day

While a marked discrepancy, 1,266 quarts per day, exists in the milk inspector's estimates of production and sales, the figures give, no doubt, a fair approximation of the situation. They are sufficient to indicate that Topeka's milk problem centers in the inspection of some 177 dairy farms, some seven depots (which handle about two-thirds of the supply), and a large number of grocery stores. The railroad shipment problem is absent; and, with a proper inspection service, there is no reason why Topeka should not have its milk supply in excellent condition.

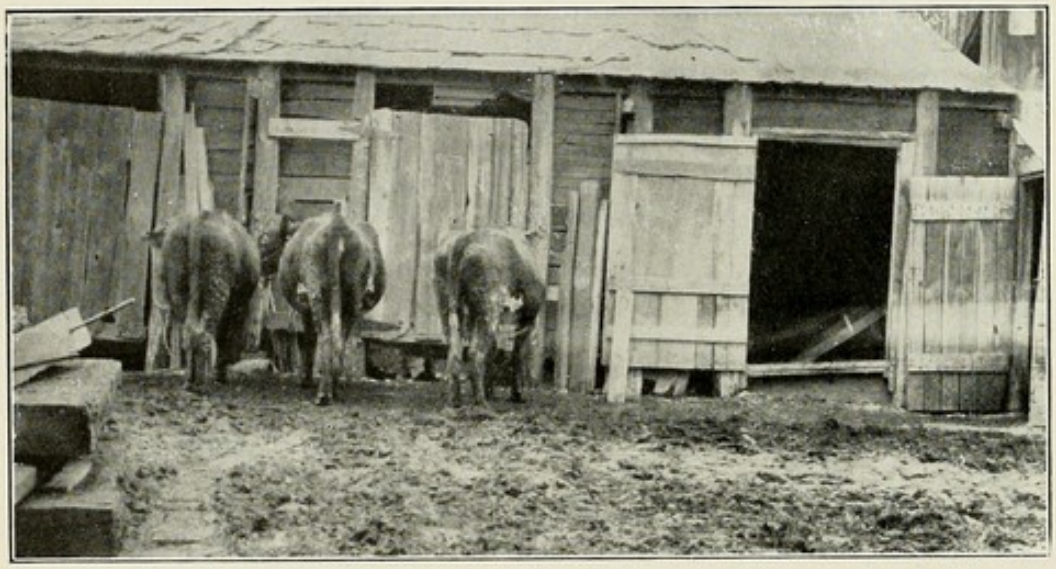
EXISTING CITY MILK INSPECTION.

To protect the supply the city has passed a milk ordinance (1910) and provided a milk inspector. The requirements are, in brief, to the effect that all dairymen must be registered

[1] For further details see Appendix "E".

with the city milk inspector and pay a license fee varying with the size of their business; they are forbidden to produce milk in unsanitary places or from unclean cows; the milk shall be, one hour after drawn and at all times thereafter, at temperatures below 60 degrees Fahrenheit; all milk must be retailed in closed containers—thus practically requiring bottles; and all cows must be healthy and shall have passed the tuberculin test. Chemical standards are also set up, preservatives are forbidden, and it is specified that the city milk inspector shall score dairies and take and analyze samples of milk.

The provisions of this ordinance, which was passed in October, 1910, have not been observed in any adequate way. Reg-

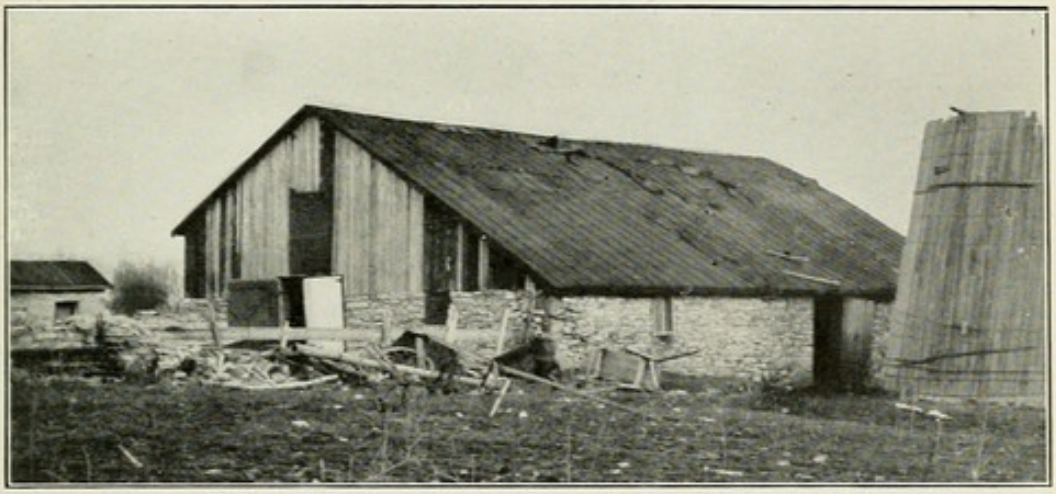


A TOPEKA DAIRY.

Within the city limits, but unregistered and unknown to the milk inspector. Cows kept in small coal shed (door open); milk sold to nearby store.

istration of producers and dealers has not been carried out, nor has the requirement of tuberculin testing of cows been enforced. No dairy score cards are on file as is required by ordinance, the inspector stating that he has made inspections, but has thrown the cards away; nor have the required annual reports been filed.

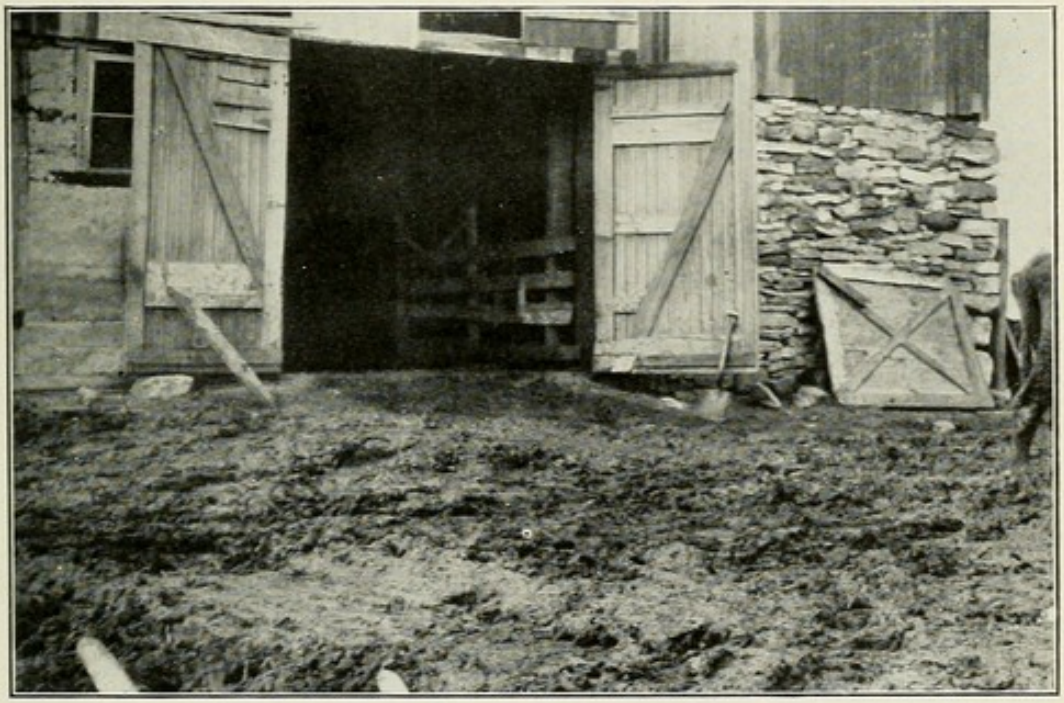
The actual milk tests employed are, furthermore, not such as to adequately determine the sanitary character of the city's milk, having been limited to fat determinations to detect watering, and simple straining through cotton filters to detect visible dirt. Such tests are quite inadequate from a sanitary



ANOTHER TOPEKA DAIRY.

Thirty-two cows kept in this barn, which is of wretched construction, allowing practically no light or ventilation. Milk from this dairy goes to some of the best parts of the city.

standpoint. Producers quickly realize that it is necessary merely to use cotton filters themselves, whereupon their milk, which originally may have been very dirty, is quite safe from detection. The best indication of the sanitary character of milk can be obtained only by utilizing the bacteriological examination, an operation calling for some laboratory equipment



BARNYARD OF DAIRY ABOVE.

Cows and barn in filthy condition.

and some skill on the part of the inspector. It is the test employed, however, by all up-to-date milk inspection systems, and its use in Topeka is strongly advocated.

The Survey Milk Inspections.

A survey of the Topeka milk situation, including an inspection of a fair number of dairy farms and the examination of a considerable number of samples of milk, was made possible through the co-operation of the State Dairy Commissioner, George S. Hine, and the State Board of Health, as represented by Dr. Crumbine. Eighteen farms, selected to represent good and bad conditions, were visited in company with Dr. Babb, city milk inspector, and were scored by Mr. Hine. In interpreting the following results it should be borne in mind that a perfect score for equipment is 40, and for methods 60—making a possible perfect total of 100.

Dairy Scores, Topeka Improvement Survey, December, 1913.
(Scores by G. S. Hine, State Dairy Commissioner)

Producer	No. cows	Score for equipment	Score for methods	Total score
"A"	23	27.00	54.00	81.00
"B"	27	31.00	45.00	76.00
"C"	25	31.25	42.50	73.75
"D"	42	25.75	45.50	71.25
"E"	42	22.75	48.00	70.75
"F"	10	19.00	41.75	60.75
"G"	16	17.25	37.50	54.75
"H"	9	16.50	37.75	54.25
"I"	7	17.75	36.00	53.75
"J"	32	10.75	34.00	44.75
"K"	23	14.00	24.00	38.00
"L"	4	9.50	26.00	35.50
"M"	6	9.25	25.50	34.75
"N"	2	11.50	21.75	33.25
"O"	5	6.50	24.00	30.50
"P"	20	6.50	23.50	30.00
"Q"	4	9.25	19.00	28.25
"R"	14	8.50	18.00	26.50
Totals...	311	294.00	603.75	897.75
Average..	17	16.32	33.54	49.88

Even allowing for the fact that the United States Department of Agriculture score card (used in these inspections and required by the Topeka ordinance) is rather hard on the small producer, these scores are hardly flattering to the city. The

INCIDENTALLY A MILK DEPOT

The occupant of this house kept five cows himself and bought milk from ten other dairymen. Bottling and all other milk-handling operations carried out on back porch. Surroundings, equipment and methods objectionable.

showing for methods is somewhat better than that for equipment; but it is unnecessary to point out that very poor places were found, such as the Topeka ordinance — and decency, forbids.

Samples of milk were taken from stores and delivery wagons by state food inspectors, and were subjected to chemical and bacteriological analysis. Most of the bacteriological samples were analyzed in Topeka by Prof. L. D. Bushnell of the State Agricultural College, although some were taken in sterile tubes, properly iced, and sent to him at Manhattan. The chemical samples, 27 in number, were all analyzed at the Agricultural College, and, with the exception of one sample that indicated added water, proved satisfactory.[1] The bacteriological results are indicated on the next page.

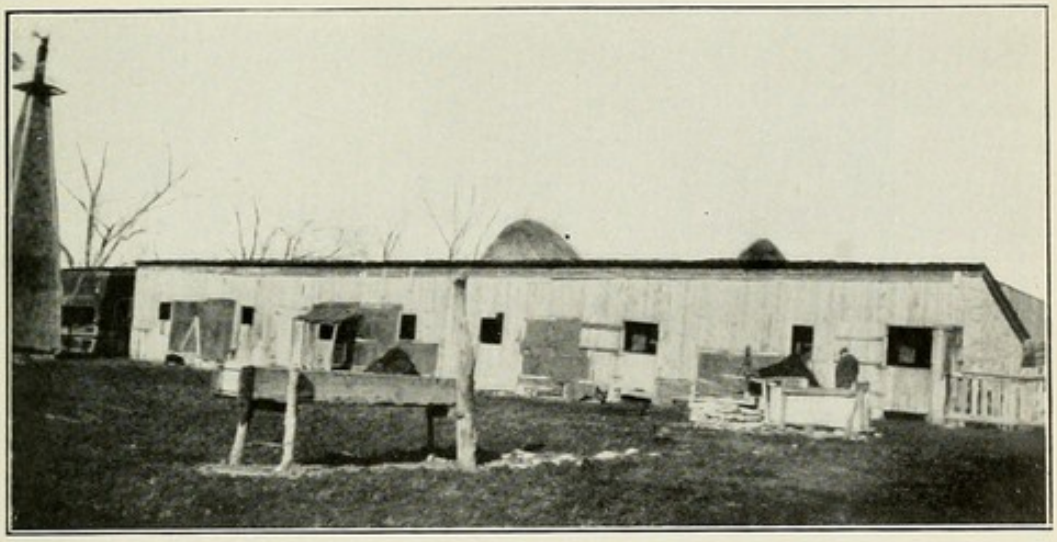
These figures represent a shocking situation—15 per cent of the samples containing over 10,000,000 bacteria to the cubic centimeter, with nearly half over 1,000,000; and this in the cool

[1] For details see Appendix "E".

Bacteriological Counts of Topeka Milk, November and December, 1913.

(Samples taken by State Food Inspectors and examined by Prof. L. D. Bushnell.)

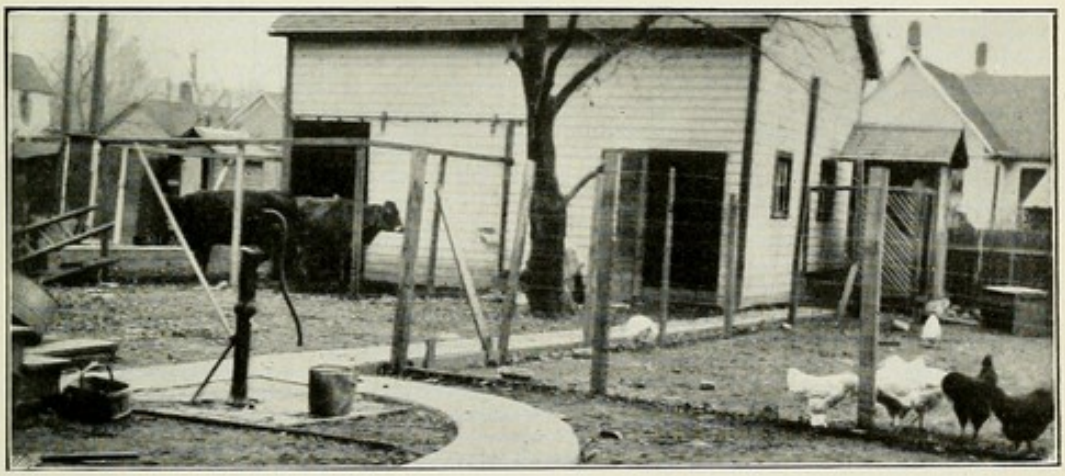
Bacteria per c. c. (37° C.—24 hours.)	WAGON SAMPLES			STORE SAMPLES			TOTAL		
	No. of Samples	Per cent	Average count	No. of Samples	Per cent	Average count	No. of Samples	Per cent	Average count
10,000,000 and over..	2	9.5	14,500,000	9	17.0	37,500,000	11	14.9	33,000,000
1,000,000 to 10,000,000	5	23.8	3,340,000	19	35.8	3,770,000	24	32.4	3,680,000
500,000 to 1,000,000.	5	23.8	598,000	7	13.2	857,000	12	16.2	750,000
100,000 to 500,000...	9	42.9	253,000	10	18.9	374,000	19	25.7	316,000
Less than 100,000...	0	00.0	0	8	15.1	51,000	8	10.8	51,000
Totals.....	21	100.00	2,430,000	53	100.0	7,910,000	74	100.0	6,352,000



DAIRY SCORING 26½ PER CENT.
Unregistered and uninspected.

months of November and December. In Boston nearly two-thirds of all these samples would have been illegal, and Boston's maximum — 500,000 per cubic centimeter — is liberal as compared with other existing municipal standards, such as 300,000 and 100,000. The plain indication is that Topeka is getting dirty milk—some remarkably dirty milk; the visible dirt may be removed, but the milk has evidently been very carelessly handled, or is very old, or both.

Middlemen's milk, i. e., milk purchased in bulk and bottled at depots and creameries, made a poorer showing than that sold



WITHIN THE CITY LIMITS.
Unregistered and uninspected dairy. Also typical of the "family cow" problem. Some 300 of such cows being kept in the city. Incidentally this picture represents a survival of rural conditions in the city—as witness the cows, hens, well and privy.

A CLEAN MILK HOUSE.

A proper place for straining and bottling.

direct by the producers. Comparison of the figures below with those on page 34 brings out this point.

Here we have an average of 11,200,000 to compare with one of 6,352,000 for all samples taken. The proportion is the more remarkable in that 17 out of the 26 samples of mid-

BACTERIOLOGICAL COUNTS OF MIDDLEMEN'S MILK, TOPEKA IMPROVEMENT SURVEY, NOVEMBER AND DECEMBER, 1913.

Individual or firm	Number of Samples	Average count	Remarks
"S"	12	1,130,000	pasteurized
"T"	5	18,500,000	pasteurized
"U"	4	34,100,000	.....
"V"	3	6,770,000	.....
"W"	1	18,000,000	.....
"X"	1	11,000,000	.....
Totals....	26	11,200,000	.....

dlemen's milk had been pasteurized. Restricting the comparison to strictly store samples the average figures are 5,250,000 for farmers' samples as against 11,900,000 for those from middlemen. An inspection of the three largest depots in town discovered one in a cleanly condition, one fairly so, and one to be very dirty.

Altogether, these low scores and high counts indicate that Topeka has a very real milk problem; and that a proper be-

ginning towards its solution remains to be made. Under the existing inspection many of the producers (and some actually within the city limits) are unregistered and unknown to the inspector. Others probably receive a superficial examination, although there is no record on file to show that they receive any. In fact, if the only available records, those printed from month to month in the newspapers, are to be taken as an index, the inspection has consisted chiefly in taking samples from peddlers for fat and visible dirt determinations. It is only fair to say, however, that the salary paid the milk inspector, $100 a month, is inadequate compensation for a trained and experienced man, and that the inspector has been made to furnish his own equipage. The idea of monthly

A SLOVENLY MILK HOUSE.
Contrast this with the one opposite.

newspaper publicity of inspection results is also good, and its continuance is urged. Such considerations cannot, however, blind us to the fundamental inadequacy of the inspection system.

In considering improvements, certain changes in the milk ordinance are to be advocated; as for example, the removal of the clause specifying that the inspector shall be a veterinarian, a provision which is no guarantee whatever of famili-

arity with modern methods of milk inspection, and which is very likely to be an embarrassment in securing a suitable man. This provision is especially worthless if, as has been the case, it is not intended to enforce the requirement of tuberculin testing. For the rest it is sufficient to point out the necessity for more complete registration of producers and dealers; for the systematic inspection and scoring of dairy farms; for the institution of bacteriological examination, with the provision of more laboratory facilities; for the continuance of the present publicity idea; and for the encouragement of proper pasteurization. The fault with present conditions is not so much with the plan as laid down in the milk ordinance; but consists rather in lack of its application. The inspector[1] should be a properly trained and experienced man, and should be more liberally treated as regards salary, equipage, and assistance. With such a man installed, and with a campaign of education under way, Topeka should be able to make great strides in the improvement of its milk supply.

Ice Cream.

The quality and inspection of the city's ice cream are, of course, matters closely related to its milk problem. Dirty or stale cream is just as objectionable as dirty or stale milk, and the causes and prevention of both conditions are much the same. Manufacture of ice cream in Topeka is largely in the hands of three concerns, two of which are also large milk depots. Inspection of these places, and of a smaller manufactory, by Prof. E. M. Twiss and students from Washburn College, showed that both equipment and methods left much to be desired. One of the large places was found in a satisfactory condition, in another the equipment was poor and the methods only fair, while in the third both equipmnet and methods were extremely crude. These conditions are reflected in the results of the bacteriological examinations, which are listed in the table opposite.

The samples in question were all taken from drug stores, candy stores, hotels and restaurants; and were taken directly to the college laboratories and examined. The aim was to

[1]The city milk inspector in office during the Survey resigned during the preparation of this report.

Bacteriological Counts of Topeka Ice Cream, November and December, 1913.

(Examinations by Prof. E. M. Twiss and students at Washburn College.)

Bacteria per c. c. 37° C. 24 hours	MANUFACTURER "A"			MANUFACTURER "B"			MANUFACTURER "C"		
	No. of samples	Per cent	Average count	No. of samples	Per cent	Average count	No. of samples	Per cent	Average count
1,000,000,000 and over..	4	44.5	2,330,000,000	0	0	0	0	0	0
100,000,000 to 1,000,000,000.	2	22.2	309,000,000	0	0	0	1	16.7	973,000,000
1,000,000 to 100,000,000.	3	33.3	76,200,000	2	100.0	21,300,000	5	83.3	60,400,000
Totals.	9	100.0	1,130,000,000	2	100.0	21,300,000	6	100.0	213,000,000

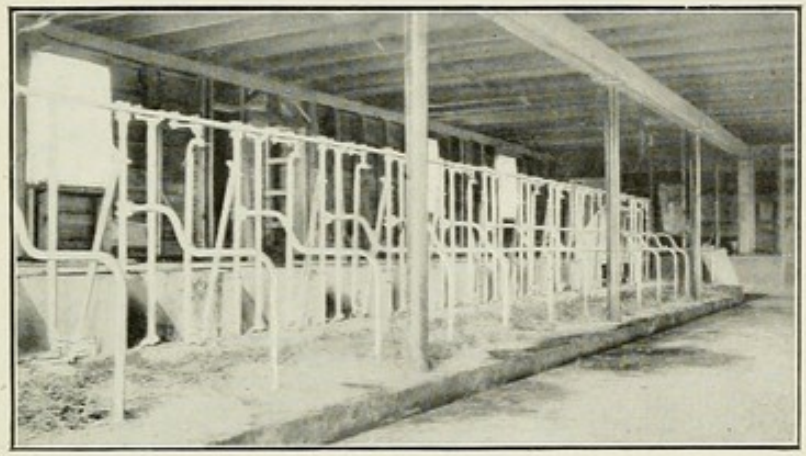
Bacteria per c. c. 37° C. 24 hours	MANUFACTURER "D".			ALL SAMPLES.		
	No of samples	Per cent	Average count	No. of samples	Per cent	Average count
1,000,000,000 and over..	3	7.9	2,140,000,000	7	12.7	2,250,000,000
100,000,000 to 1,000,000,000.	6	15.8	431,000,000	9	16.3	464,000,000
1,000,000 to 100,000,000.	29	76.3	14,500,000	39	71.0	25,500,000
Totals.	38	100.0	248,000,000	55	100.0	380,000,000

Meat Inspection, Topeka, Year Ending March 31st, 1913.

Source	Place of inspection	APPROVED				Condemned	Fees
		Cattle, lbs.	Hogs, lbs.	Sheep, lbs.	Calves, lbs.		
Shipped in dressed—							
Armour & Co.	U. P. tracks	127,541	11,957	5,150	1,352	0	$ 218.96
Fowler Packing Co.	U. P. tracks	57,671	1,871	476	57	0	90.09
Morris & Co.	U. P. tracks	135,648	37,085	3,942	30	0	265.04
Sulzberger Sons Co.	U. P. tracks	111,084	1,335	1,930	96	0	170.65
Swift & Co.	U. P. and C., R. I. & P.	193,923	15,610	30,775	4,441	0	395.69
Cudahy Packing Co.	111 East Second street	408,815	79,045	35,260	1,400	0	771.95
Totals		1,034,682	146,903	77,533	7,376	0	1,912.38
Locally slaughtered—		head	head	head	head		
Charles Wolff Packing Co.	Foot Quincy street	3,162	5,895	689	395	0	525.57
Jack Hammel	215 Adams street	37	.....	1	185	0	9.28
Leo Shapiro	215 Adams street	79	.....	...	305	0	17.05
William Dietzow	1719 Van Buren street	24	.....	...	242	0	9.93
L. O. Dana	323 Quincy street	3	.....	...	40	0	1.50
John Hentzler	R-2 So. Kansas ave.	12	.....	...	60	0	5.18
Frank Manse	On street	.....	.....	...	1	0	.03
W. L. Flickenger	Seabrook	17	.....	...	98	0	4.64
Buechner Bros.	933 No. Kansas avenue	.....	.....	...	31	0	.93
Ed. Wells	Golden avenue	2	.....	...	3	0	.29
H. M. Bush	North Central avenue	6	6	...	17	0	1.29
R. F. Hodgins	First and Jackson sts.	1½	.....	...	..	0	.15
Totals		3,363½	5,901	690	1,377	0	$ 575.84
Grand total							$2,488.22

secure samples of ice cream just as it was being eaten by consumers. No comment is needed to emphasize the fact that the counts are relatively gigantic, especially as presumably sweet cream is used in every case. In the nature of things cream always has a higher bacteria count than milk; but the normal differences are nothing like those exhibited above; nor is the content of fresh, carefully-handled cream anywhere near as great.

The remedy for the situation is the same as that for the milk problem: inspection and analysis by the city, with publicity for the results. Such a program, properly carried out, will quickly produce results of a surprising character. Pro-



IN ONE OF TOPEKA'S GOOD DAIRIES.
Contrast these conditions with those shown on page 31. The dairy has been built up with very little capital and is a financial success.

ducers and handlers readily become more careful and cleanly when they realize that the public wants these things. Here, evidently, is more work for the milk inspector.

FOOD SUPPLY.

The city's food supply, from a sanitary standpoint, involves the inspection of the various foods consumed and the places in which it is handled and sold. The problem is to see that the food is intrinsically sound and that it is handled in a sanitary way. The chief points which call for attention are the inspection of meats and groceries, and of markets, bakeries, restaurants, commission houses, and the like. Certain

well-recognized potential dangers to health exist in the food supply, to meet which definite municipal inspection systems have been devised. In Topeka, as in most cities, food inspection is under the city health department.

A brief survey of the local food situation shows that the city annually consumes well over a million pounds of meat; and that this, and other food commodities, is disposed of in some 160 groceries and markets. There are besides some five commission houses and about 24 restaurants. The particulars as to the source and amount of Topeka's meat supply are given in the table on page 41, based on the city food inspector's monthly reports.

The very large part of the city's meat is evidently slaughtered at Kansas City and other points, and shipped into the city dressed. This meat is all inspected by the federal government. Ninety-five per cent of the local meat is slaughtered by the Wolff Packing Company and also receives government inspection.

The Survey Inspection.

A very careful and complete inspection of groceries and markets was made during the Survey, again through the generous co-operation of the State Board of Health. Five state food and drug inspectors were called in from out over the state; and went over the situation in very considerable detail. Regular state score cards were used, the inspectors being instructed to give special attention to toilets and washing facilities. Altogether some 219 places were visited, and inspections were made covering 2,905 separate items. Of the latter 1,976 were found in satisfactory condition, while in 929 instances (32 per cent of the total) orders were issued for improvement. Ninety items (3 per cent of the total) received the lowest mark on the score card. The detailed findings are shown on the opposite page.

Examples of filthy floors and walls were found, as were considerable amounts of old and spoiled goods. The findings most serious from the sanitary standpoint are, however, the great prevalence of inadequate toilet facilities, especially

Food Inspection, Topeka Improvement Survey, Nov., 1913.

(Inspection made by State Board of Health.)

	Groceries and markets	Bakeries	Wholesale fruit and produce	Confectionary stores	Drug stores
No. of places	147	17	5	6	44
No. of employes	574	106	86	41	136
Items found in—					
"Good" condition	1456	132	31	24	333
"Fair" condition	586	77	24	11	141
"Poor" condition	53	22	2	2	11
Refrigerators found in—					
"Good" condition	66	...	..	..	9
"Fair" condition	23	1	..	..	4
"Poor" condition	11	1	..	..	4
Exposed goods—					
None	50	1	..	..	...
Some	36	3	..	..	...
Bad	4	...	..	..	...
Screening—					
Satisfactory	21	1	..	..	...
Fair	5	...	..	..	...
Poor	1	...	..	..	...
Down	25	...	..	..	...
Flies present—					
"Many"	10	3	..	..	...
"Some"	9	1	..	..	...
Few	10	4	..	..	...
None	4		..	..	...
Privy used	83	9	..	2	8
Connected with sewer	20	1	..	..	1
Vault	29	4	..	..	1
Not stated	34	4	..	..	6
Average distance from store	62 ft.	47 ft.	..	..	53 ft.
Least distance	10 ft.	30 ft.	..	..	30 ft.
Greatest distance	200 ft.	75 ft.		..	100 ft.
Water closet used	39	7	5	3	18
In cellar	9	2	..	1	4
Upstairs	8	...	..	..	...
Ventilates into store	6	2	4	1	3
In residence	4	1	..	..	...
In back room	3	...	..	..	...
In barn	1	...	..	..	...
Washing facilities—					
"Good"	17	5	3	3	11
"Fair"	46	7	2	..	3
"Poor"	42	4	..	..	1
"Bad"	3	1	..	..	...
None	11	...	3	..	...
Refrigerator drip	8	...	..	..	...
Residence	7	...	..	..	...

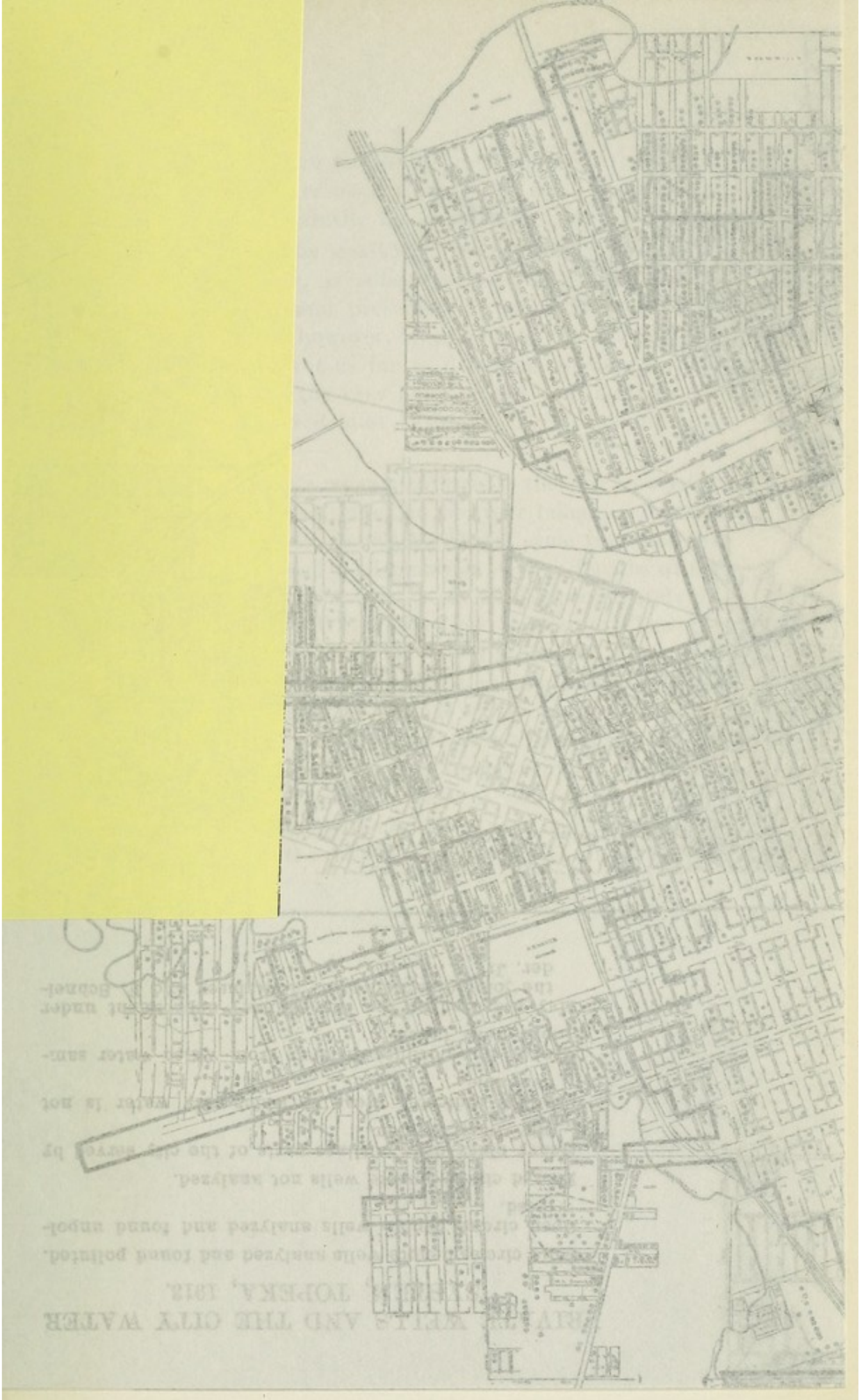
when taken with reference to lack of proper provision for washing the hands. In two-thirds of these food-handling places the only toilet convenience is the privy and in less than one-seventh of the places are the washing facilities such as would give a reasonable guarantee of clean hands. The practice of hurriedly washing the hands in the accumulated refrigerator drip water, and wiping them on the ubiquitous apron, cannot but be condemned.

While the lateness of the year did not allow a fair test of screening against flies, it is noteworthy that flies were found in a very considerable number of instances. Here again the nearby privy assumes an ominous portent, the inevitable inference being that the combination must give rise, during the summer fly season, to a real problem in food sanitation. The advisability of setting up and enforcing certain standards of toilet and washing facilities is obvious, and surely worthy of serious consideration.

The City's Food Inspection.

For the supervision of these various food problems the city provides one food inspector. A mere recital of his theoretical duties—including the inspection of all meats shipped into the city, the supervision of all local slaughtering, and the inspection of all markets, groceries, commission houses, hucksters, and eating places, quickly shows that the work is of impressive amount to be handled by one man. In the present instances, however, the inspector must also act as sealer of weights and measures. The result is what might be expected. The inspector does not give any systematic attention to stores and other food handling places, being content with the supervision of dressed meat as it enters the city.

And even this meat inspection is to a large extent a vain effort. We have seen from the table on page 40 that the very large proportion of Topeka's meat is shipped in by rail, and that over 90 per cent of the local meat is slaughtered by the Wolff Packing Company. The imported meat and that from Wolff's, making up over 95 per cent of the city's supply, has all undergone government inspection, which is much more



rigid and thorough than anything practicable for the city to attempt. It is with a re-inspection of this meat that the city inspector occupies practically his entire time.

Meat slaughtered by small local parties, and which has no government inspection, is sometimes seen by the local inspector on the hoof, and presumably always after dressing. The inspector cannot, however, be present at the time of killing—the most important as far as detecting diseased meat is concerned; so that at the very point where local meat inspection would be considered most desirable, the service is inadequate.

A very considerable revenue accrues to the city on account of its meat inspection activities, in the year taken as the basis of the table on page 40, $2,488.22. At the same time no meat was found which merited condemnation. Three-fourths of this income is derived from the outside packers, approximately another fifth from the Wolff Packing Company. The fees charged at present are 15 cents per 100 pounds on outside meat, and from 5 to 25 cents a head on various animals slaughtered locally. It would seem that these rates discriminate against outside meat, and are, furthermore, an unfair burden on packers who are already paying for government inspection. In addition, the city obviously makes a substantial profit on the enterprise, obtaining some $2,500 a year in fees as against outlays of $900 for the inspector's salary and an additional $50 for incidental expenses. Under the circumstances, the small salary paid the inspector (he must furnish his own equipage) and the inadequate food protective service rendered are particularly inexcusable.

Summary.

To sum up the situation, Topeka's food inspection system is entirely inadequate to the problem in hand, and may be characterized as chiefly a money-making proposition. Attention is limited to the inspection of meat, an operation which at present consists principally in distributing tags and collecting the fees therefor on meat which has already had rigorous federal inspection. A slight possibility exists of course that meat shipped from Kansas City might spoil in transit; but the pos-

sibility is remote, and a better place to look for such trouble would be at the market, where other conditions may be observed.

The situation can be met in part by shifting the inspector's attention from the refrigerator cars and the Wolff Packing Company to stores and markets. Very possibly, however, there is more work than can be handled adequately by one man alone. The inspector should be given more liberal financial treatment, and should share in the added clerical and administrative assistance offered by a more liberally financed and more closely organized city health department.

WELLS AND PRIVIES

A careful census of privies and wells within the city limits was made possible by the co-operation of Commissioner W. L. Porter and the city sanitary office. Three inspectors made a house-to-house canvas, listing both the number of and particulars as to the character of these appurtenances. The results of this inspection are tabulated in Tables 5 and 6, and are shown graphically in the figures opposite pages 22 and 44.

The Privies.

Four types of privy and three types of well exist in Topeka. The wells are readily classified in accordance as they are driven, drilled, or dug; but the matter is somewhat more complicated with the privies, there being besides the simple unconnected vault, a few "drawer" closets (which are in principle similar to the pail closet), a considerable number of vaults which are connected with the sewer, and many "tile" or "hopper" closets, which are also connected. The "tile" closets occur in back yards, being placed over the main house drain, and as is the case with connected vaults, have no water flush. In both cases the sanitary advantage gained by connection is but partial. Pollution of the soil is avoided, but, there being no water flush, the danger from fly-born infection is much the same as with the ordinary form of privy.

From an inspection of Table 5 it is evident that Topeka has a surprising, even startling, number of privies. Estimating roughly some 9,000 homes in the city it appears that over

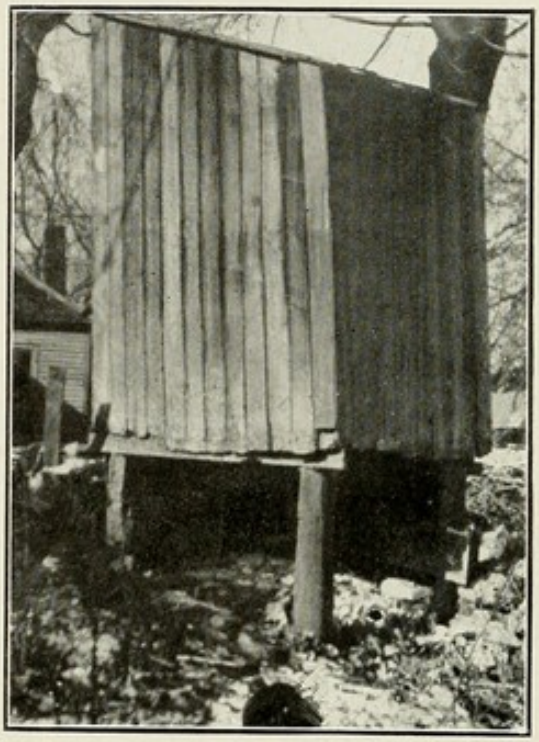
Table 5. Number and Distribution of Privies, Topeka, 1913.

(Enumerated by city sanitary inspectors.)

Ward	UNSEWERED AREAS			SEWERED AREAS			SEWERED AREAS WITH CITY WATER			TOTALS FOR WARD		
	Unconnected vaults	Connected vaults	Hoppers	Unconnected vaults	Connected vaults	Hoppers	Unconnected vaults	Connected vaults	Hoppers	Unconnected vaults	Connected vaults	Hoppers
1	646	9	4	271	401	35	136	306	29	917	410	39
2	1754	1	0	141	196	174	79	137	129	1895	197	174
3	7	0	1	278	362	121	274	344	121	285	362	122
4	14	4	2	108	432	345	110	410	336	122	436	347
5	641	18	0	202	372	62	161	327	61	843	390	62
6	357	2	0	131	68	98	106	60	88	488	70	98
Entire city...	3419	34	7	1131	1831	835	866	1584	764	4550	1865	842
All kinds of privies	3,460			3,797			3,214			7,257		

three-fourths of the people are privy users, and this despite the fact that the major portion of the city, that south of the river and west of Shunganunga creek, including over 70 per cent of the population, is equipped with a fairly complete sewer system.

The east side, with a population of about 7,000, which we have seen to be the largest without sewers in the state of Kansas, accounts naturally, for a large number of necessary privies. Still, taken as a whole, unsewered districts account for less



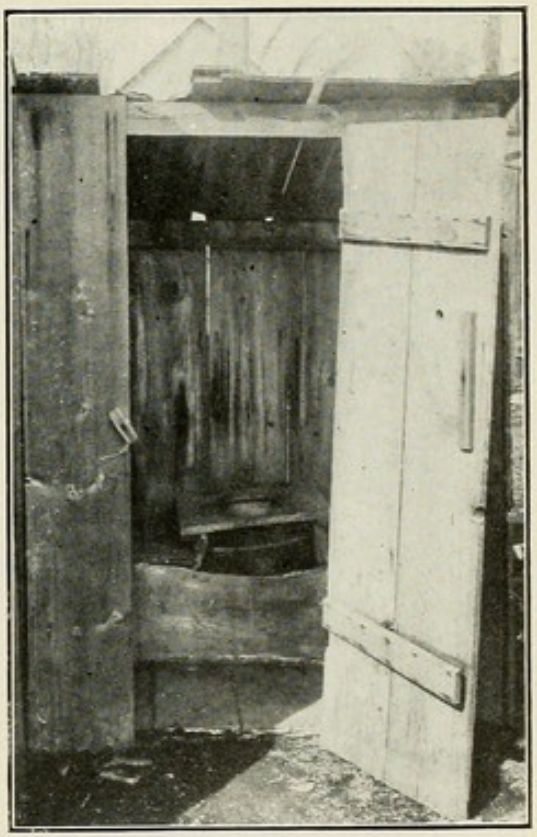
THE COMMON PRIVY AT ITS WORST.

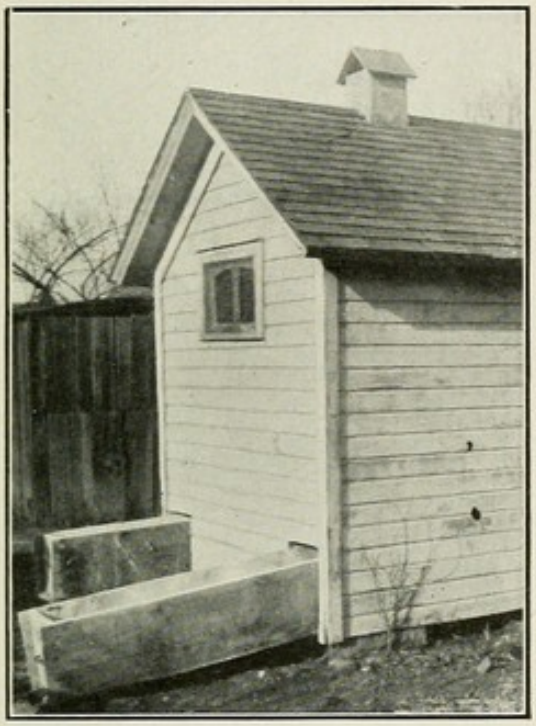
Contents entirely unprotected, with every opportunity for access of flies or other animals.

than half the privies; while 44 per cent of the total are in places where both sewers and city water are already in the street. Of the plain unconnected vaults one-fourth (1131) occur in sewered districts, and nearly one-fifth (866) occur where both sewers and city water are available.

Such a state of affairs is certainly inexcusable. The privy is manifestly a makeshift devised for country life and is in the nature of things not suitable for the more crowded city conditions. In these days when so much is heard regarding the

danger from flies, and necessity for swatting them, it must be remembered that the privy is probably the greatest source of potential fly danger. Flies of themselves would be of little harm; it is their ability to transport parts of the discharges of a sick person to some one else that makes them a sanitary menace; and their principal opportunity to come in contact with these infected discharges is in the open privy.





OTHER TYPES OF PRIVY

Above a "tile" or "hopper" closet; below a "drawer" closet. As far as fly dangers are concerned the "tile" closet presents little advantage over the common privy.

Topeka has in its privies one of the primary essentials for fly danger; it has, as well, that complimentary essential—ample opportunity for fly breeding. The number of animals kept within the city limits is, according to the County Clerk's books, as follows:

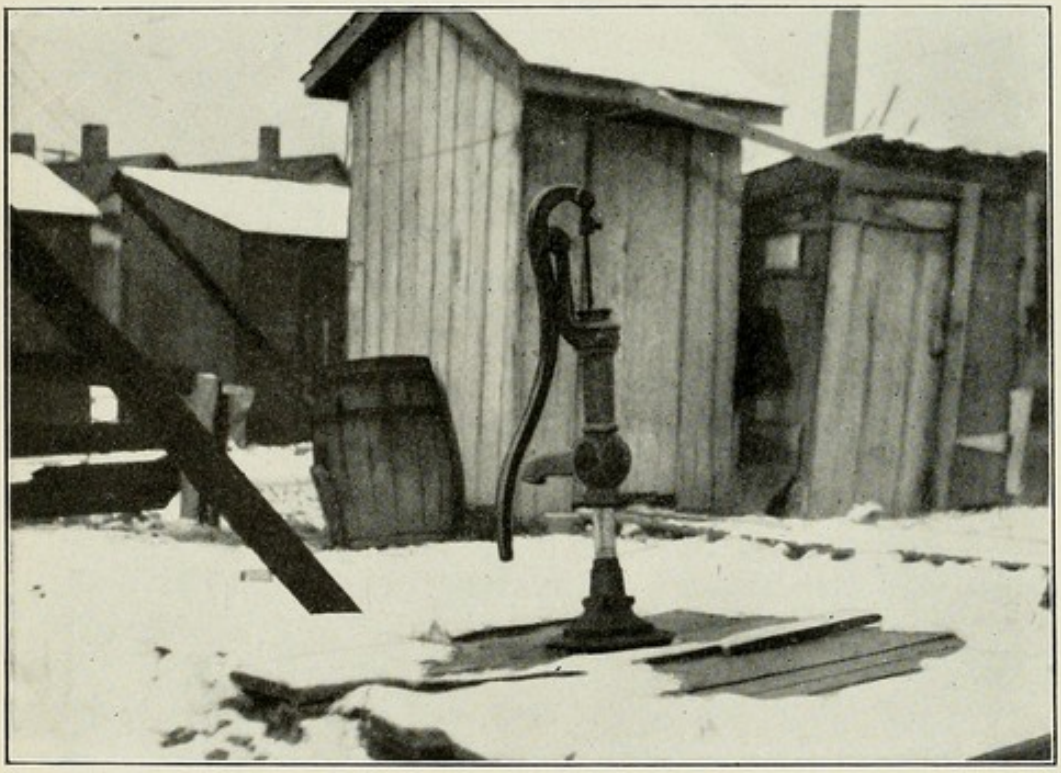
Horses	2,293
Cattle	330
Mules	127
Dogs	1,392
Hogs	35
Sheep	1
Goats	3

Horse manure is the pre-eminent fly breeding material.

and considering Topeka's lack of provision for its protection from flies and its sanitary removal, the ample opportunity for fly production is evident. The state and city health departments have both carried on vigorous and commendable educational campaigns against the fly, and it would seem that the time is now ripe for an organized city attempt to eliminate or control the great fly-breeding places. Such a step, coupled with one to eliminate its unnecessary privies, should surely yield the city a real hygienic reward.

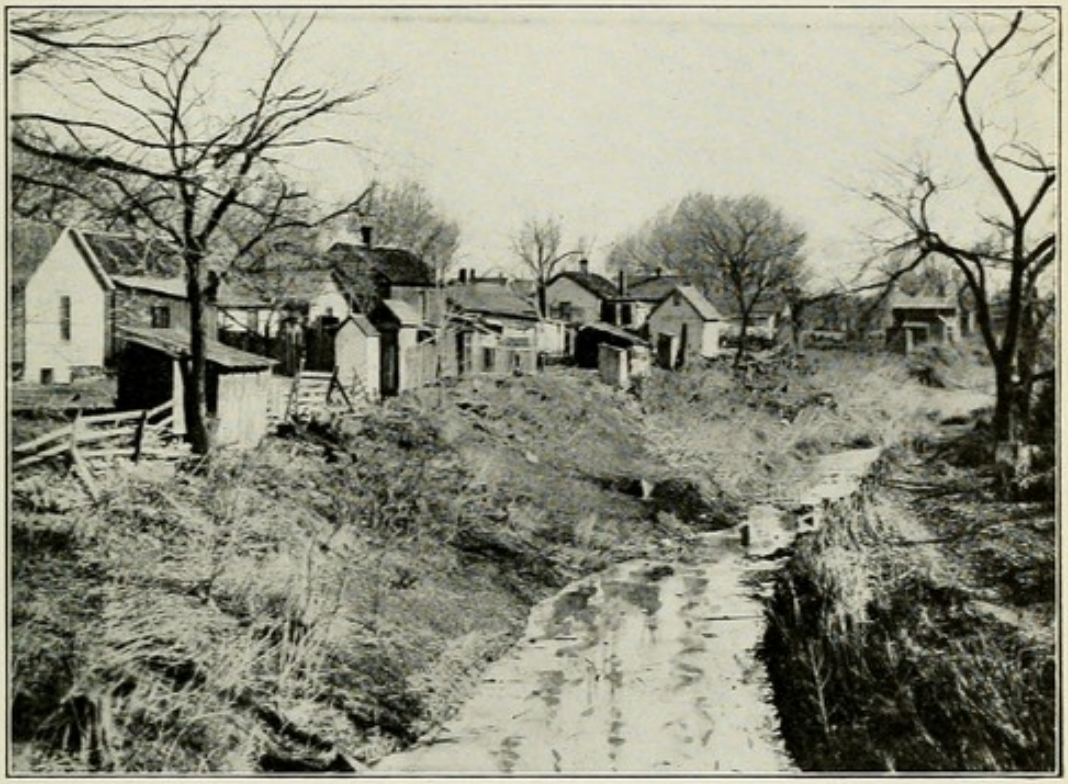
The Wells.

Having seen the great number of privies in Topeka it is not surprising to find that the city also has a remarkable number of wells. More than half the homes have wells; and more than half the wells are at places where city water is in the street. These facts are brought out in Table 6 and map opposite page 44. North Topeka and the east side, with the southern



THE PRIVY-WELL COMBINATION.

A sample of very close connection; separation about 10 feet. Opportunity for well pollution increases with the number of privies and the shallowness of wells. Examinations in some districts of the city showed nine-tenths of the wells polluted.



ALONG SHUNGANUNGA CREEK.

Note row of privies which ensure pollution of the water. Children frequently play along the creek. An opportunity to turn a menace into a civic asset.

edge of the city, are obviously responsible for the mass of the wells.

TABLE 6. NUMBER AND DISTRIBUTION OF WELLS, TOPEKA, 1913.

Ward	City water not available	City water available	Total
1	708	527	1235
2	924	863	1787
3	50	237	287
4	14	274	288
5	222	687	909
6	162	264	426
Totals...	2080	2852	4932

As in the case of the privy, the well is pre-eminently a rural institution. In the city, with habitations so much closer together, the chances for pollution are enormously increased. Fortunately, a very large number of the Topeka wells are driven and drilled, the type not so easily polluted. If such wells tap good strata, which bring their water a long distance

from the city, the water will probably be good; even so, in a city of Topeka's size, and one which has, furthemore, a commendable municipal water supply already pretty widely distributed, the continued use of wells is to be deprecated.

Whatever the general theory regarding the undesirability of wells in an urban community, we have, in the present instance, considerable specific information. Through the co-operation of the State Board of Health, the University, and Prof. C. C. Young, Director of the State Water Survey, it was found possible to analyze an unusually large number of samples of Topeka well water. All samples were taken in sterilized bottles, refrigerated[1], and shipped to Lawrence to undergo bacteriological examination. Tests[2] were made for the presence of the colon bacillus (the typical intestinal bacterium), as well as a determination of the number of organisms developing at blood heat. Altogether samples were taken from some 1,673 wells, a most unusual enterprise, and one that reflects much credit on the energy of Prof. Young and his associates at the University, and should secure for them the city's gratitude. The results are tabulated in the table below, and are shown graphically in the map opposite page 44.

RESULTS OF BACTERIOLOGICAL EXAMINATION OF WELL WATER. TOPEKA, 1913.

(Examinations by State Water Survey.)

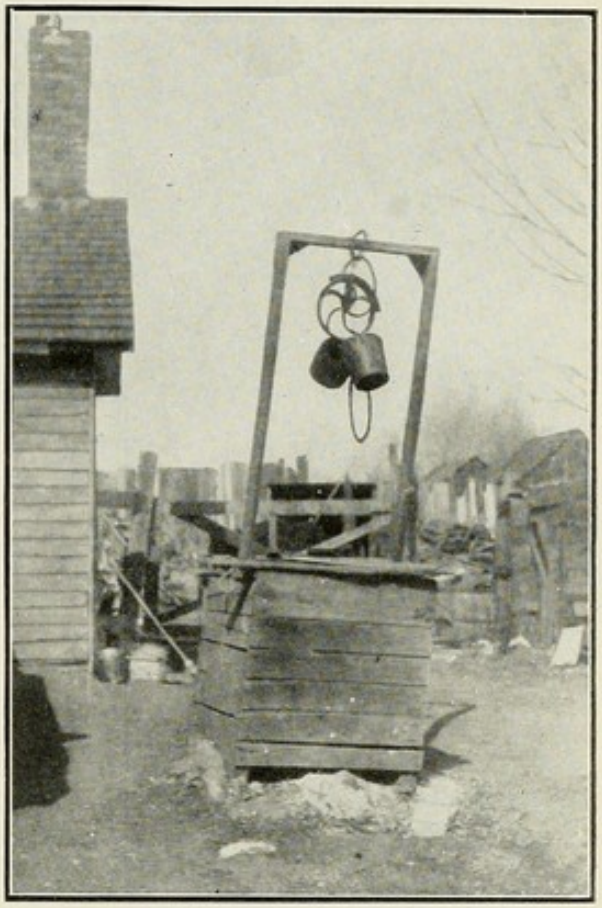
Ward.	City Water not available		City Water available		TOTAL		
	Unpolluted	Polluted	Uupolluted	Polluted	Uupolluted	Polluted	Per cent polluted
1	141	33	164	27	305	60	16.4
2	88	276	128	362	216	638	74.7
3	6	21	7	74	13	95	88.0
4	...	...	...	...	...	...	....
5	6	31	38	69	44	100	69.5
6	7	69	17	109	24	178	88.0
Totals	248	430	354	641	602	1071	64.0

Of all wells examined it is apparent that 64 per cent showed unmistakable signs of pollution of intestinal origin; and this is a percentage which holds in districts where city water is readily available. The showing of different parts of the city, as represented by the figures indicating the per cent

[1] Through the courtesy of the Seymour Packing Co.

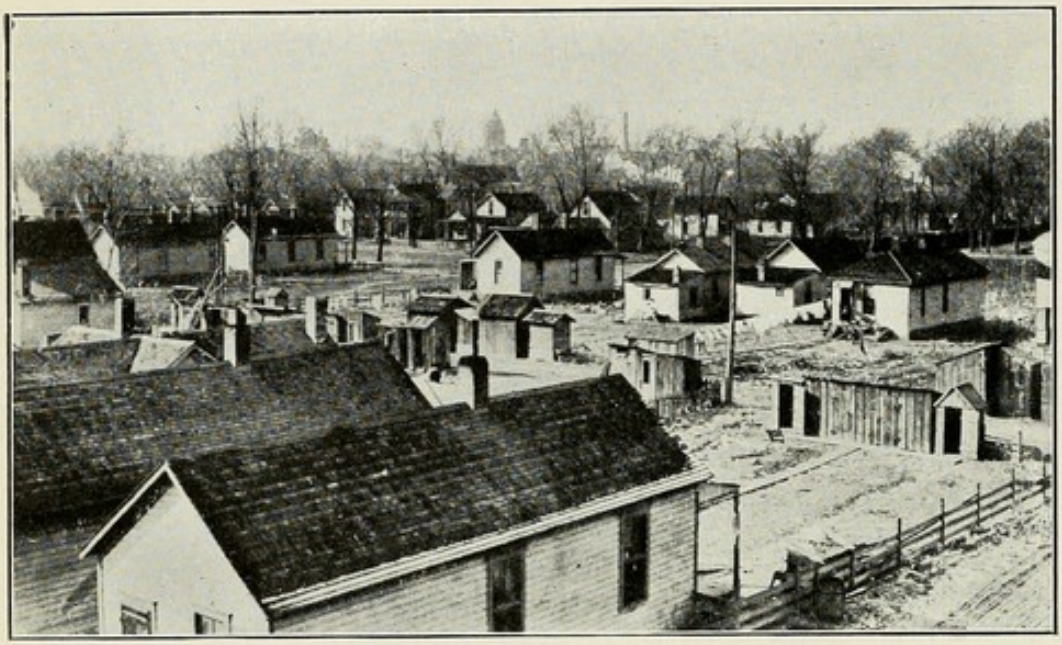
[2] Presumptive test in peptone lactose bile.

of polluted wells in the several wards, is of considerable interest. The marked relative superiority of the wells in North Topeka is doubtless due in large measure to the fact that these wells are practically all driven, and are said to penetrate impervious strata, taking their water from good sandy material beneath. The wells examined in Ward 2 are said to be in inferior soils, such as gumbo and dark clay, and to be, furthermore, mostly of the dug variety, so that their poor showing is in no way surprising.



A DUG WELL.
Note opportunity for pollution at surface of the ground. For city use probably the most insanitary type of well.

The existence of such a large number of wells in the city and the objectionable character of many of them, as indicated by the analyses, represent a serious sanitary problem and one which is not easy of practical solution. While the danger is not as great as might be at first thought, it is nevertheless real. A person hearing for the first time that there are some 5,000 wells within the city limits and that probably two-thirds of these are polluted, would wonder that serious sickness is not more prevalent. The answer to such an inquiry is that ordinary pollution from persons in good health (or from other warm-blooded animals), while aesthetically objectionable, is probably not dangerous. Only when pollution from persons suffering from intestinal diseases gets into a well does trouble start. Such infected persons are, fortunately, relatively rare, and the opportunities for their discharges to enter a well are statistically somewhat small. The



PART OF THE LARGEST UNSEWERED COMMUNITY IN KANSAS.

In East Topeka, looking across toward the Capitol.

opportunity exists, however; and, realizing that there are always a certain number of persons in the community harboring the germs of intestinal disturbances, some of whom may show no signs of disease, we know that in accordance with the law of chance a few wells will be dangerously polluted from time to time. The chance for dangerous pollution (infection) varies directly, of course, with the number of wells. These infections give rise to new outbreaks of the disease in question, and so form the basis of the accepted view that wells are not a desirable city institution.

If further evidence be desired of the undesirability of the privy-well combinaton, it may be had by looking back at the figures for the distribution of typhoid fever and diarrhoea and enteritis on page 11. Exact correspondence cannot be expected, as the figures for typhoid are somewhat incomplete, and the character of the wells and privies vary of themselves; it is clear, however, that there has been a good general correspondence between the number of wells and privies and the presence of these intestinal diseases.

To solve this combined well and privy problem, the city will probably find it best to set up restrictions against the construction of new privies and wells; to provide for the peri-

odic examination of existing wells, and to adopt a policy of gradual condemnation, at the same time extending the city water system; and to force connection with the city sewer system. Such a program is the more easily recommended because of the good character of the cty water supply and the already fairly extensive and too-little used sewer system.

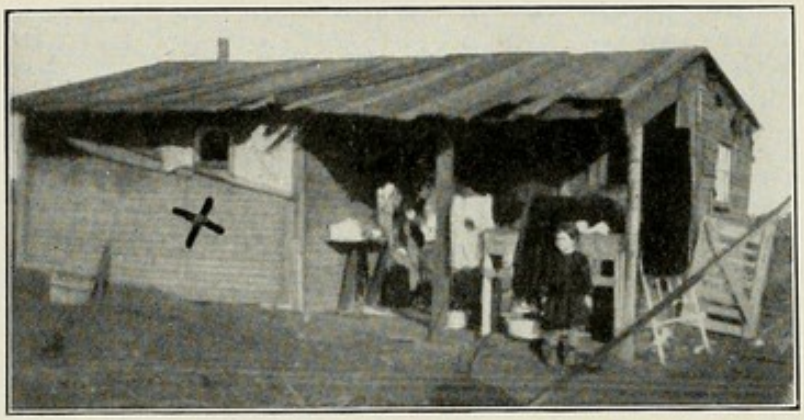
OTHER SANITARY PROBLEMS

Tuberculosis.

Compared with those of other cities, Topeka's tuberculosis problem is not of the first magnitude; at the same time it is of the first magnitude for Topeka. Resident deaths from this cause gave the city, in 1912, a death rate of 101 per 100,000 population; a figure which compares favorably with that of most large cities—the general lack of crowding and the char-

AT THE TUBERCULOSIS DISPENSARY.

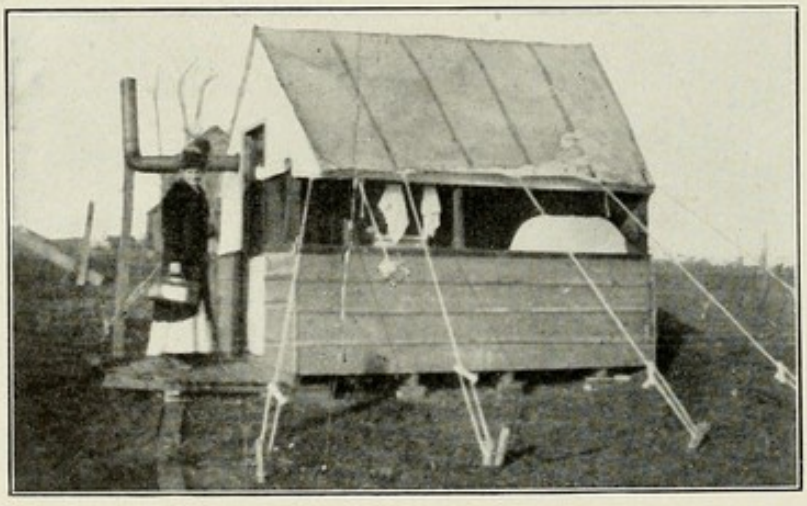
A part of the work of the Anti-Tuberculosis Association. Persons may come to the Dispensary for treatment and instruction, while a nurse visits more serious cases in their homes. Such work is legitimate activity for the city health department. The Dispensary is located in the Provident Association Building.



THE HOME OF A CASE OF TUBERCULOSIS.

A tuberculous man, his wife, and two children slept in the same bed, in the room marked X. The Anti-Tuberculosis Association built the tent shown below, and now the man lives alone.

acter of the city's population both tending to minimize the ravages of this ever-present enemy of the human race. At the same time 47 deaths occurred from the disease in the year mentioned, a mortality which, according to the usual estimates, reprents a body of three or four hundred cases. The truth is that tuberculosis is one of the most important of all the causes of death, and is, as we have seen in our discussion of vital statistics (page 9), perhaps the most important of the communicable diseases, and is of especial importance in certain parts of the city and among certain people.



AFTER THE ANTI-TUBERCULOSIS ASSOCIATION HELPED.

The tent built by the Association. More healthful accommodation for the man, and greatly increased safety for the children. An example of constructive work.

At present the city makes no effort to control the disease. Cases are reported, in accordance with the state law, to the health authorities; a record is made, and the report is transcribed and transmitted to the State Board of Health. No investigation is made of the case, no steps are taken to see that the spread of infection is limited, and no provision is made to care for sufferers from the disease. Without in any way minimizing the importance of proper disinfection after tuberculosis, such as by washing and srubbing with disinfecting fluids of

THE LOST TUBERCULOSIS CAMP.

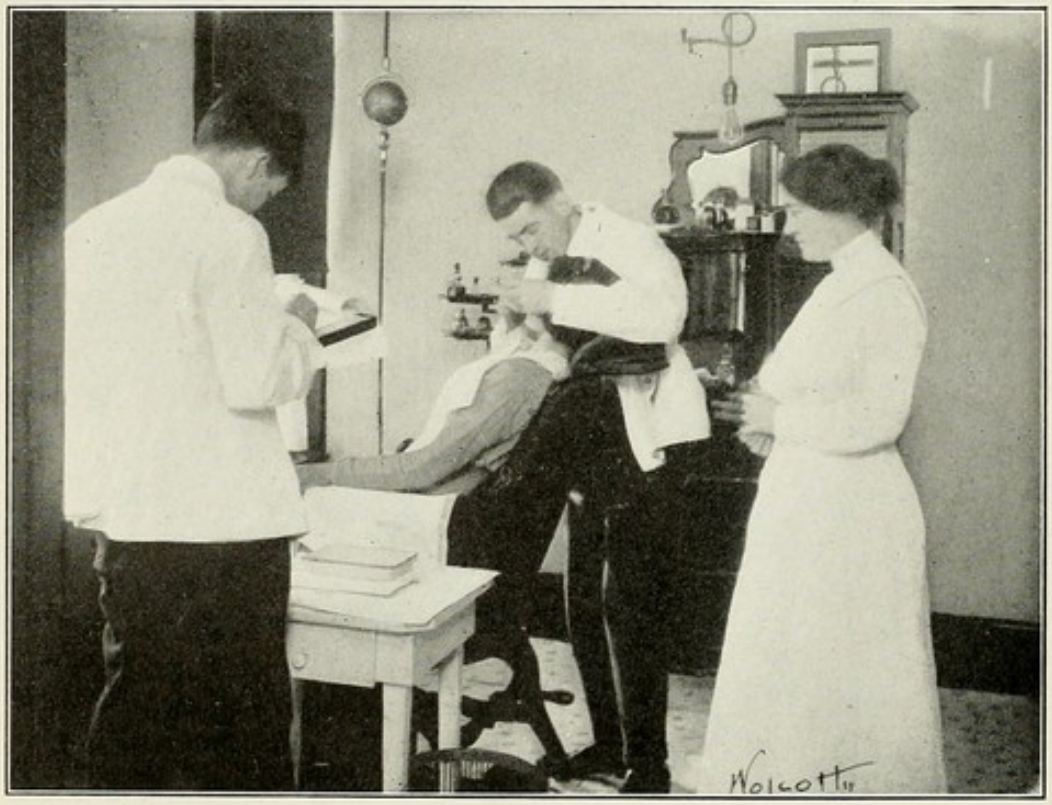
Opened in March, 1910, in North Topeka, by the Anti-Tuberculosis Association; closed in July, 1913, as a result of protests by persons in adjoining districts. In the absence of a sanatorium, as in Topeka, such a camp can do much useful work. Properly maintained it is of no danger to the neighborhood.

known strength, it is fair to say that the one thing which the health department does do, i. e., fumigation after death or removal, is probably of slight value.

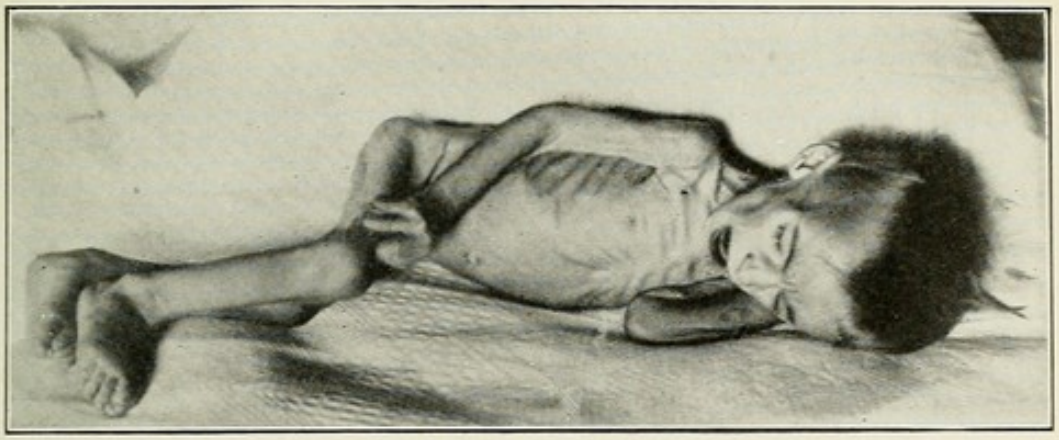
In contrast to this aspect of the situation, it is gratifying to see that private philanthropy has taken the initiative and is illustrating the course of action which the city in all probability will eventually adopt. The Topeka Association For the Study and Prevention of Tuberculosis now maintains a free clinic to which sufferers may come for examination and treatment, and

provides a visiting nurse to go about among the homes and advise and assist in the care of the patient and of other members of the family. This is good, solid, preventive work, similar to that carried on by our best city health departments. Such a program of investigation and education protects other members of the family, and especially children, from infection, and prevents suffering and death. The work of the anti-tuberculosis association has the support and co-operation of the State Board of Health, and desrves every encouragement.

The lack of sanatorium facilities for the treatment of tuberculosis should be noted before finishing our discussion of this disease. At present absolutely no such facilities exist—a relatively primative condition. Some relief will probably be obtained from the projected state sanatorium, but Topeka's allowance in this will almost surely be inadequate as compared with her proper needs, and she will do well to consider other means of meeting the situation. The estimate of the New York State Commission on Public Health allowed one bed for each yearly death; on this basis Topeka would need about fifty beds.



FREE DENTAL DISPENSARY.
Maintained at the Provident Association building by Shawnee Dental Association.



INFANT MORTALITY.

A baby brought to the Free Baby Hospital suffering from malnutrition, but too late to save. Active city health departments, through nurses and baby welfare stations, are preventing much of this kind of sickness and death.

One helpful method of attacking this phase of the problem is through a suitable day or night camp in the outskirts of the city. Such a camp was provided and maintained by the anti-tuberculosis association, with the support of the city, for a time in North Topeka. Objections on the part of residents of the neighborhood finally closed the camp. We may simply state, in this connection, that a properly maintained camp, sanatorium, or hospital need be no danger whatever to even its quite immediate neighborhood, and that it is unfortunate if groundless fear of such an institution be allowed to prevent such much-needed work.

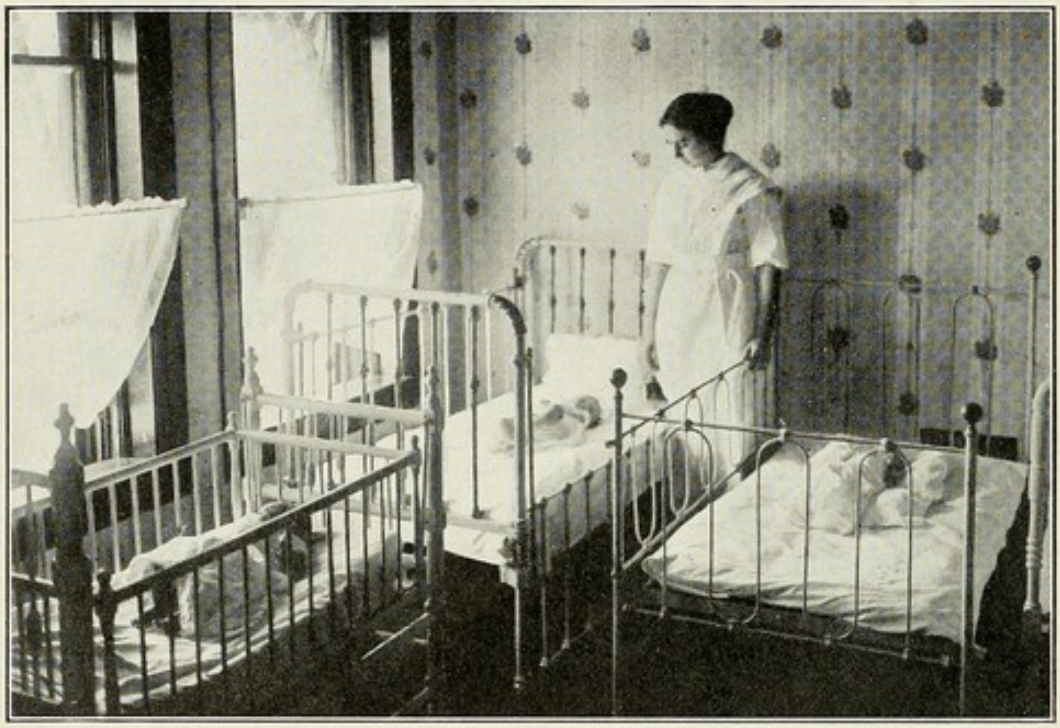
Infant Mortality.

The city's infant death rate, 96 per 1,000 births in 1912, is not a high one; but we have seen that it shows marked variations in different parts of the city, being nearly twice as high in North Topeka and the east side as in the Third and Fourth wards. This means simply that for a given number of babies born, nearly twice as many died before reaching the age of one in the First and Second wards as in the Third and Fourth. The incidence of diarrhoea and enteritis among infants we have also seen to be relatively much greater in the first districts as compared with the last two.

This variation of infant mortality in accordance with living conditions is generally recognized, and has generally

yielded to simple administrative procedures. The more particular causes of this mortality and the age at death are indicated in the table on the opposite page.

The heaviest mortality evidently occurs in the earliest age periods—18.6 per cent of it on the first day; another 15 per cent in the rest of the first week, and a total of 53.5 per cent in the first month. Of the causes listed, the first four, whooping cough, tuberculosis, broncho-pneumonia, diarrhoea and enteritis, causing 33 deaths (43.5 per cent of the total), are regarded as largely preventable, with a portion of the "diseases of



A CORNER OF THE FREE BABY HOSPITAL.

At the Provident Association. Another constructive work by private philanthropy. Sick infants are cared for during the hot summer months.

early infancy" to be contested for. Substantial reductions in this kind of infant mortality have been achieved in a number of cities by establishing infant welfare stations to which babies may be brought, and by sending, in the centers of the trouble, educational nurses among the homes. Unhygienic living by mothers before the birth, excessive summer temperatures, and improper care and feeding of the infants are important factors in causing the mortality; and are ones with which the properly trained public health nurse is best qualified to cope. Topeka may be confident that for a few hundred dollars a year ex-

Infant Deaths, Topeka, 1912.

(Figures by W. J. V. Deacon, State Registrar of Vital Statistics.)

Cause of death	Total	Less than 1 day	2 day	3 day	4 day	5 day	6 day	7 day	2 wk.	3 wk.	4 wk.	2 mo.	3 mo.	4 mo.	5 mo	6 mo.	7 mo.	8 mo.	9 mo.	10 mo.	11 mo.	12 mo.
Whooping cough	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Tuberculosis	2	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..
Broncho-pneumonia	14	1	..	..	..	..	..	..	..	1	1	1	1	1	2	2	..	..	3	1	..	..
Diarrhoea and enteritis	16	..	..	..	..	..	..	..	..	1	3	2	1	3	..	1	..	1	..	..	2	2
Diseases of early infancy	41	14	3	4	1	3	1	..	2	3	3	3	..	1	..	..	1	..	..	1	..	..
External violence	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Other diseases	9	..	..	..	..	..	..	..	1	..	..	..	..	1	1	1	1	1	..	1	1	1
Totals	86	16	3	4	1	3	1	..	3	6	8	6	3	6	3	4	2	2	3	4	3	4

pended in these ways, a number of babies could be saved, and the health of other infants much improved.

Here again private philanthropy has been quicker to respond to a need than the city authorities. The Provident Association has, during the past summer, maintained a free dispensary and, on a small scale, a baby hospital. The illustrations indicate the general character of the work. Much good has undoubtedly been accomplished in this way, and further advantage would be gained with a nursing service extended into the babies' homes.

Venereal Diseases.

The venereal diseases—chancroid, syphilis and gonorrhoea, are infectious, communicable, and preventable. Caused by specific micro-organisms, the are responsible for much suffering, loss of efficiency, and premature death in middle age. In most cities they are relatively widespread—in all probability the most prevalent of all serious communicable diseases. At the same time marked progress has been made in the last few years in their treatment and prophylatis.

Reasonably accurate information as to the prevalence of these diseases in Topeka is, as in most cities, very difficult to obtain. Reports of the diseases are not required by the health authorities and the only dispensary records which would shed light on the subject, those of the discontinued Washburn Dispensary, are confessedly inaccurate. No reason exists, however, to doubt that Topeka has its normal share of the diseases, responsible persons being found who believed even that the city has an excess. One well informed man stated that in his particular trade he had never had a helper who did not have one of the diseases at some time or other.

At all events, organized activity against these diseases would undoubtedly be an exceedingly valuable service to the community. In the largest cities the health authorities are coming to require the reporting of these diseases in the same manner as the other dangerous communicable diseases (by number instead of name, if desired), by offering free laboratory diagnostic facilities, and by offering free treatment to indigent sufferers—at the same time making the service such as will attract and secure confidence. These rational measures are rec-

ommended to Topeka, and it is doubtful if her health department can perform a more valuable service than to put our modern knowledge of these diseases into practical use.

Housing.

In the time available it was found impossible to make any detailed survey of housing conditions in the city. Through the co-operation of State Hotel Commissioner Mulroy, however, it was possible to have considerable work done on the condition of rooming houses, apartments, hotels, and restaurants. Altogether some sixty places were visited, and numerous orders were given for improvement. The data as to the conditions found are summarized below:

Inspection of Hotels, Rooming Houses, Apartments and Restaurants, Topeka, 1913.[1]

(Figures furnished by State Hotel Commissioner.)

	Hotels	Rooming houses	Apartment houses	Restaurants	Totals
No. places visited...	17	14	5	24	60
Insanitary yards....	4	4	2	3	13
Insanitary toilets...	2	4	1	3	10
Insufficient toilets..	1	3	0	8	12
Insanitary bedding..	2	4	0	0	6
Insanitary kitchens.	1	0	0	4	5
Insanitary cellars...	1	0	1	2	4
Insufficient fire extinguishers.	3	2	3	0	8
Insufficient fire escapes.	2	2	1	0	5
Insufficient lighting.	2	3	0	0	5
Inside rooms.....	1	2	0	0	3
Insanitary wash rooms.	2	2	0	4	8
Total unsatisfactory items.....	21	26	8	24	79

The rooming houses have manifestly come off worst in this inspection; of the defects found the most prominent are insanitary yards and insufficient and insanitary toilets. Overcrowding and grossly insanitary conditions were easily found in apartment houses where the rents extracted would seem to

[1] This does not include all of the places in Topeka but only the ones visited up to this time, which is probably three-fourths of such places.

warrant a much larger portion of decency. The photographs will give an idea of these and some of the other existing housing conditions.

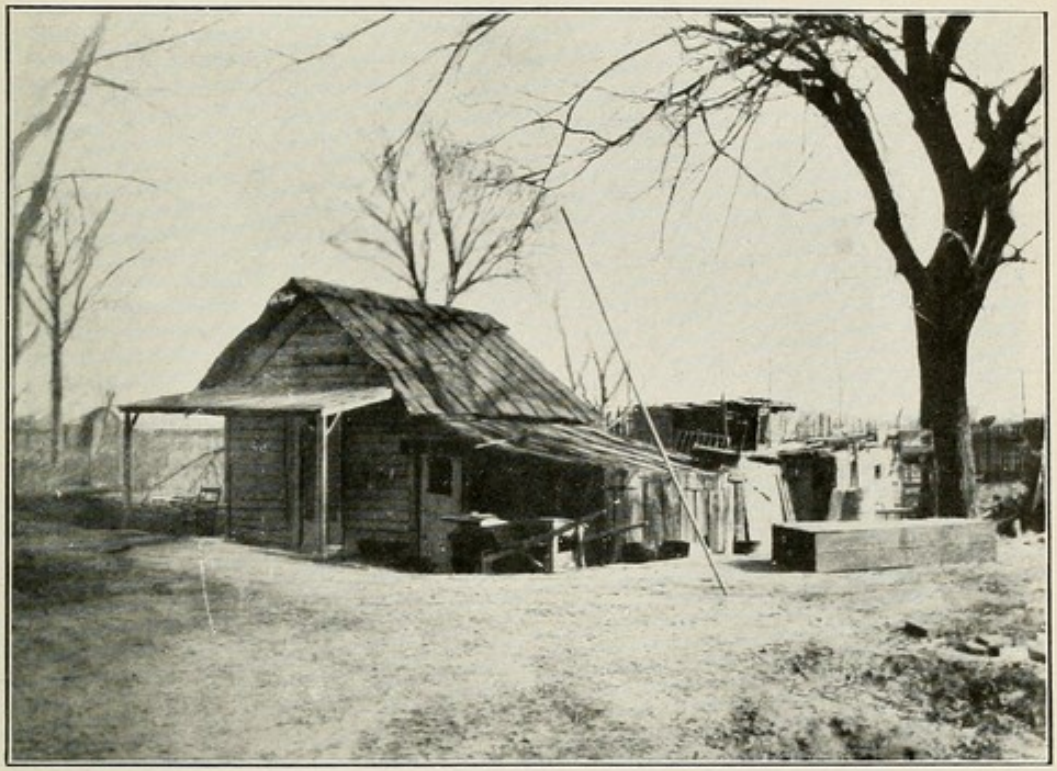
Altogether it is evident that there is need in Topeka for a housing law. Certainly in planning for the bigger Topeka it will be prudent to give careful investigation to existing housing conditions, and to create such regulations as will remedy existing evils and prevent the development of new ones.

Refuse Disposal.

Collection and disposal of garbage is a matter whose sanitary importance is very commonly exaggerated. As far as fly

ROOM OVERCROWDING IN TOPEKA.
This room, with two small windows which would not open, served as bedroom and living room for a family of four.

breeding is concerned, manure is probably of much greater importance; while the possibility of danger from any infectious material in garbage is undoubtedly very slight. The matter of refuse disposal is at the same time intimately related to civic cleanliness and decency, attributes which have a reflex effect upon health. While therefore an extended investigation of refuse disposal in Topeka has not seemed justified under the

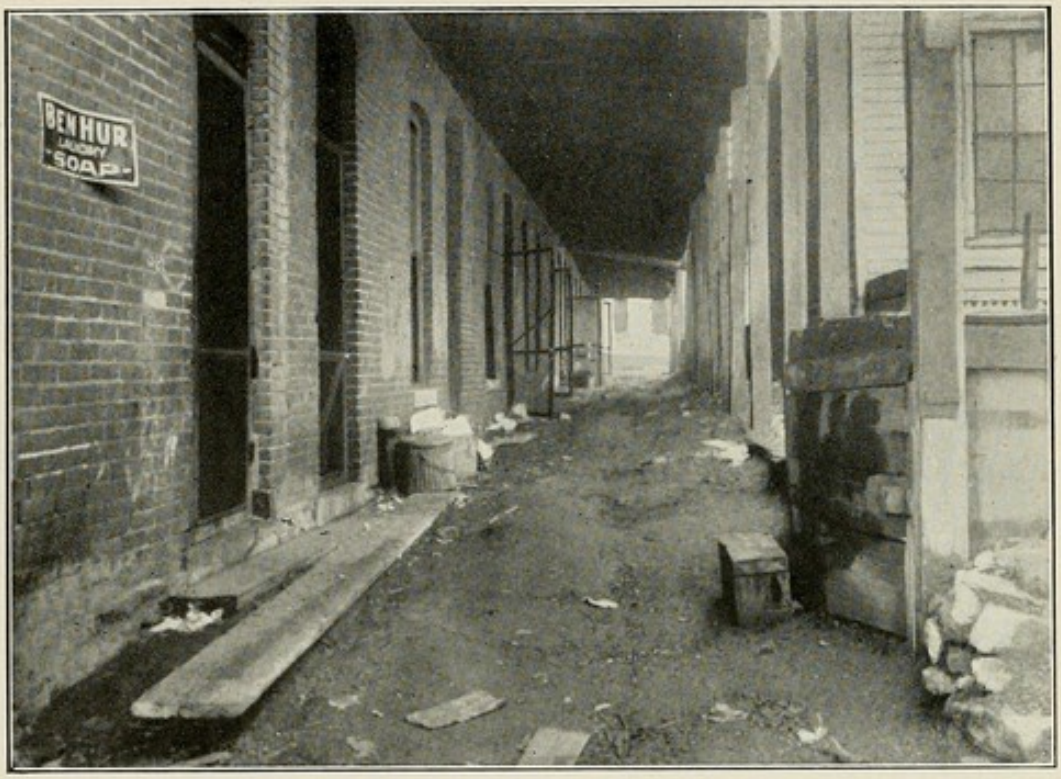


RUDIMENTARY HOUSING IN TOPEKA.

This house is set in a dug-out foundation and replaces an abode made of window blinds which are now used for a shed in the rear.

A DIRTY BACK YARD.

Showing opportunities for pollution of well by surface water.



RUNWAY IN REAR OF TENEMENT HOUSE.
The only uncovered area on a lot occupied by a three-story building.

time limitations of the present survey, a brief review of the question may be permitted.

The city refuse collection is under the general direction of the Commissioner of Parks and Public Property, the equipment consisting of three garbage wagons, two manure wagons, and a garbage crematory. Garbage is collected twice a week, and trash as required. Tin cans and ashes are collected once a year, when the Street Commissioner has a "Tin Can Week," and removes such material to low places about town. Two city dumps, one west of the crematory and one on South Kansas avenue, are maintained, as well as a few private ones.

While Topeka has thus a garbage collection system and a pretentious crematory, the service is entirely optional, the scale of charges being 40 cents for one 10 gallon can and 60 cents for one 20 gallon can per month. Altogether about 600 persons avail themselves of the garbage service, while 275 patronize that for manure. In North Topeka there are only something like a dozen customers. Many keep chickens and other animals, while others dispose of their garbage to private slop-haulers. The latter are under city supervision and pay a small fee. Even the

most cursory inquiry makes it wholly apparent that the city garbage collection system is very partial, and that but small use is being made of the capacity of the crematory.

Physical Examination of School Children.

A thorough investigation of school hygiene in Topeka was not included in the Public Health Survey because of the limitations as to time and assistance. It was found possible, however, through the generous co-operation of Drs. W. M. Mills, M. G. Sloo, M. B. Miller, F. L. Loveland, and Supt. of Schools H. B. Wilson, to make physical examinations of 216 children. It should be noted, of course, that a careful survey of the sanitary condition of the school plant is highly desirable, and that such an undertaking, which the school board now has under consideration, is to be heartily endorsed.

In the examination, as carried out, four schools were selected in representative parts of the city, the children being taken mostly from the third and fourth grades, a few from the fifth grade. Prior to the examinations a notice was sent to parents, outlining the plan, and asking permission to examine their children. No difficulty was encountered in obtaining per-

PRIMITIVE SANITATION—"EPIDEMIC ROW."
An alley lined with privy vaults and private wells. Note the piles of fly-breeding manure.

Physical Examination of School Children, Topeka Improvement Survey, December, 1913.

(Examinations by Drs. W. M. Mills, M. G. Sloo, M. B. Miller, and F. L. Loveland.)

School	Children examined	DEFECTS FOUND.							Defects per child
		Vision	Hearing	Breathing	Glands	Teeth	Other	Total	
Central Park—									
Number	55	5	2	44	24	50	5	130	2.4
Per cent having defect		9.1	3.6	80.0	43.6	90.9	9.1		
Garfield—									
Number	62	4	2	41	25	33	10	115	1.9
Per cent having defect		6.4	3.2	66.1	40.3	53.2	16.1		
Quincy—									
Number	44	8	3	36	15	20	8	90	2.0
Per cent having defect		18.2	6.8	81.6	34.1	45.4	18.2		
Branner—									
Number	55	7	2	44	30	54	6	143	2.6
Per cent having defect		12.7	3.6	80.0	54.5	98.2	10.9		
Totals	216	24	9	165	94	157	29	478	2.2
Per cent having defect		11.1	4.2	76.4	43.5	72.7	13.4		

mission, and no attempt was made to select defective children. The results of the work are indicated on the opposite page.

These findings accord in general with those obtained in other parts of the country. The commonest defects are obviously those of the teeth, including irregularities and decay, and those of the breathing passages—usually enlarged tonsils and adenoids. The relative showings of the four schools are not exactly what might have been expected. The large number of defects among children in the Central Park School, which is situated in a district where excellent living conditions and good medical service would be expected to prevail, is rather surprising. The matter is evidently not one concerning only the poor.

The more particular nature of the defects found is as follows:

NATURE OF DEFECTS FOUND.

Vision—		Teeth—	
Disease	4	Decay	99
Near sight	18	Irregularities	58
Astigmatism	2	Cardiac disease	4
Hearing—		Malformations—	
Disease of ear	6	Congenital	1
Discharge from ear	6	From abnormal positions	2
Breathing passages—		Acute or chronic inflammation	1
Adenoids	35	Malnutrition	13
Enlarged tonsils	116	Other	5
Elongation of uvula	14		
Enlarged glands	94	Total	478

The lesson of this test examination is, of course, the very considerable number of children found with easily correctable defects, which in the large majority of instances were previously unrecognized and were undergoing no treatment. It has been shown that these defects have very real effects on the activity and future welfare of the child, and are a severe handicap to its progress.

Realization of the seriousness of such a situation has induced practically all the large cities to institute careful and systematic examinations of all school children. Parents are notified of the defects found and are advised to have the conditions remedied; while nurses are employed to follow up cases in the poorer homes to help obtain proper treatment for the

child. Here surely is a situation where an ounce of prevention in childhood is worth its pound of cure to the adult, a fact which is now pretty universally recognized, and one which Topeka cannot afford longer to ignore. To deprive its future citizens of what is a fundamental necessity is unfair and unwise. By hiring a school nurse the school authorities have made a start; it is a step in the right direction, but cannot of course take the place of careful physical examinations by competent physicians.

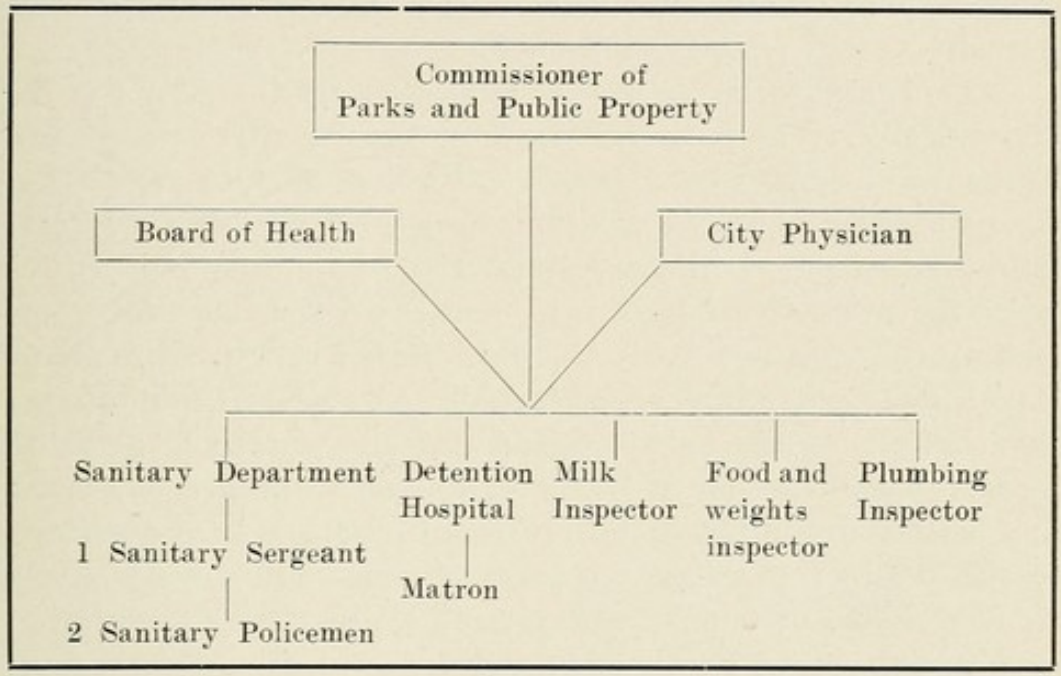
Such a systematic examination system is, at the same time, an added protection against contagious diseases; in the control of which early recognition and isolation of incipient cases is of prime importance. In the test examination described above, two cases of trachoma, a serious contagious disease of the eye, were found in the Quincy School. This disease is difficult to cure and dangerous to the eyesight, often resulting in complete blindness; it is communicated by personal contact, and the use of common towels and the like. The symptoms in the early stages are simple reddening of the eye or inflammation of the eye lids. The undetected presence of such a disease among school children is a matter the seriousness of which is obvious; as is the argument such a condition makes for a regular and systematic examination of all the children.

III. THE LOCAL HEALTH DEPARTMENT

Organization.

While the exact form of the city's public health work is somewhat vague, its general form is as outlined below:

Present Organization of Topeka's Public Health Work.



A kind of triple-headed directorate exists, the board being expected to direct the sanitary sergeant and the city physician in a general way and to regulate quarantine, while the city physician is responsible for the detention hospital and the general supervision of communicable diseases. The actual management of the work rests, however, with the Commissioner of Parks and the Sanitary Sergeant. The Board of Health consists of five members, including the Commissioner of Parks, Commissioner of Streets and the city physician; it meets at the call of the secretary (the city physician) and passes such resolutions as may seem necessary. At the time of the Survey it had met once in the last six months.

The city physician is engaged chiefly with treating prisoners at the city jail, emergency cases, and the poor in cases of contagious disease. Members of the city fire and police departments are entitled to his services free, and the detention hospital for smallpox is also placed in his care: jail and police de-

partment work, however, account for three-fourths of his city service, requiring daily visits to the jail. The city physician is appointed by the Commissioner of Parks for two years, and receives a salary of $60 a month.

The Commissioner of Parks under the Topeka Commission Form of government is, of course, an elective officer; and in addition to the sanitary department, is responsible for the city refuse collection and the crematory, the city parks, and all city property—such as the Auditorium.

The deficiencies in the present organization are readily discoverable. The most glaring defect is the utter lack of any trained and experienced health officer—a fact of which the Commissioner of Parks is keenly appreciative. The city employs no person who is competent, and whose duty it is, to review the work of the milk inspector, or of the food inspector, or to lay out the new work which is needed in other directions. The sanitary sergeant is undoubtedly an excellent administrative officer as far as his department is concerned, and the present Commissioner of Parks an active and progressive man; but neither would lay claim to the qualifications of the modern health officer. Present day health departments are no longer mere nuisance abatement offices, and their efficient operation calls for the specially qualified man.

Financial Treatment.

Other defects in the city's health organization relate to omissions from its program, such as the already-discussed work against tuberculosis and infant mortality. These, as well as the defects in organization above noted, are in a large measure due to the city's false economy in the matter of health work, as will be evident from a brief inspection of the department's financial resources, which are indicated on the opposite page.

The total expenditure on behalf of the Sanitary Department—$10,131.77—represents a yearly expenditure of 21.1 cents for each inhabitant. Limiting our figure to more strictly preventive work by disregarding expenditures for weed cutting and plumbing inspection, it falls to 17.5 cents. If further allowance is made for the fact that the city physician's work is almost entirely (say two-thirds) poor relief, and for the fact that the city obtains a revenue of over $2,400 a year from food

EXPENDITURES OF CITY SANITARY DEPARTMENT, TOPEKA, 1913.

Salaries—		
City physician	$ 720.00	
Sanitary sergeant	780.00	
Three sanitary policemen	2,160.00	
Fumigator	840.00	
Matron Detention Hospital	600.00	
Milk inspector	1,200.00	
Food inspector	900.00	
Plumbing inspector	1,200.00	
Other	28.03	$ 8,428.03
Expenses of Detention Hospital	231.52	
Expenses of milk inspector	102.00	
Expenses of plumbing inspector	125.00	
Expenses of food inspector	53.12	511.64
Expenses of Sanitary Department—		
Cutting weeds	421.59	
Labor	19.00	
Printing	8.00	
Board of Health meeting	5.00	
Merchandise	3.47	
Fumigating and other materials	610.58	
Miscellaneous	124.46	1,192.10
Total		$10,131.77

inspection fees, the figure drops to 11.5 cents per inhabitant per year. That such an expenditure is inadequate for a modern health department, one equipped to take advantage of demonstrated opportunities, is well known. In the table on the next page comparable expenditures are given for cities with populations of between 50,000 and 100,000.

Topeka ranks eighteenth in this list of thirty cities of similar size and it must be remembered that the expenditures of the other cities are by no means ideal. Most of them are in fact wholly inadequate, persons who have given the subject special study having recommended that a well-rounded health department be allowed a minimum per capita expenditure ranging from 50 cents to $1.00.

The plain fact is that Topeka cannot do its public health duty to its citizens without liberally increasing the health department's financial allowance. Even so, the increase and total

MUNICIPAL HEALTH DEPARTMENT EXPENDITURES.[1]

City	Population	Amount per year	Per capita
1. Yonkers	79,000	$45,099	$.570
2. Springfield, Mass	88,000	39,985	.454
3. Tacoma	83,000	28,045	.337
4. Lynchburg	89,000	29,637	.333
5. Elizabeth	73,000	23,068	.316
6. Covington	53,000	16,000	.301
7. Hartford	98,000	25,500	.260
8. Duluth	78,000	20,000	.256
9. New Bedford	96,000	22,500	.234
10. Wichita	52,000	10,920	.210
11. Portland, Me	58,000	12,100	.208
12. Peoria	66,000	13,500	204
13. Brockton	56,000	10,763	.192
14. Evansville	69,000	13,200	.191
15. Somerville	77,000	14,300	.185
16. Mobile	51,000	9,000	.176
17. East St. Louis	58,000	10,000	.172
18. TOPEKA	47,980	7,905	.165
19. Springfield, Ill	51,000	8,335	.163
20. Erie	66,000	10,365	.157
21. Waterbury	73,000	11,000	.150
22. Harrisburg	64,000	9,118	.142
23. Kansas City, Kan	82,000	10,000	.121
24. Trenton	96,000	11,575	.120
25. Reading	96,000	9,500	.098
26. Camden	94,000	8,965	.095
27. Altoona	52,000	4,330	.083
28. Bayonne	55,000	3,100	.056
29. Hoboken	70,000	2,600	.037
30. South Bend	53,000	2,000	.037

expenditure advocated are in reality very small. If the present expenditure be trebled, it will only represent an outlay of 50 cents for each inhabitant each year, and will still be only 1.9 per cent of the total municipal expenditure and 7.3 per cent of the money now allowed for police and fire protection.

Inspection Service.

The sanitary inspectors, three in number, placard contagious diseases, investigate complaints, and inspect privies, manure pits, and nuisances. For this purpose the city is divided into three districts; the first including wards 1 and 2 (east and north); the second wards 4 and 6 (west); and the third wards 3 and 5 (south). Each inspector keeps to his own district and is made responsible for conditions in it. In the time

[1] For directly preventive work; expenditures for general hospitals, refuse disposal, street cleaning and plumbing inspection not included.

available no attempt could be made at a thorough investigation of the efficiency of this service; but it is evidently carried out under careful and conscientious direction. A commendable campaign against flies during the last year may also be mentioned to the credit of the sanitary sergeant.

The inspection given milk and other foods having been already discussed at length in other parts of this report, it is necessary at this point only to re-emphasize the very serious shortcomings which exist in these two important services.

Control of Communicable Diseases.

The control of communicable diseases is theoretically under the supervision of the city physician; actually the work is carried out by the sanitary sergeant. Reports from physicians are required of a satisfactory list of diseases, including tuberculosis, typhoid fever, scarlet fever, diphtheria, measles, whooping cough, chicken pox, smallpox, cerebrospinal meningitis and mumps. Smallpox, scarlet fever, diphtheria and tuberculosis would seem to be fairly well reported, an exact idea being difficult to obtain because the death registration was incomplete until the fall of 1911 and no records of cases were kept until August, 1913. The other diseases, with the possible exception of typhoid fever, are probably reported with very little completeness. The reporting of cases is of prime importance in the control of contagious diseases, and it is hoped that vigorous efforts will be put forth to make the reports as full as possible. For a physician to refrain from reporting a case of contagious disease is a very mistaken kindness, both to the family in which the case occurs and to neighbors.

The quarantine regulations are laid down by the Board of Health and confirmed by the city commissioners. In scarlet fever, diphtheria, measles and chicken pox the house is placarded by a sanitary policeman, and printed instructions are left as to the care of the case. Further inspection is made only in the case of diphtheria and scarlet fever, in which diseases the city physician makes a final visit to lift the quarantine. In these two diseases wage earners must live outside the premises. Notice of all contagious diseases is telephoned to the school department but no individual notification is given milk men or the public library.

In cases of typhoid fever and tuberculosis, at the time of the Survey, no steps were taken, which is unfortunate. Typhoid is considerably more contagious than is generally understood, and proper instruction in bedside disinfection is of much value in preventing secondary infection of those associated with the patient. In tuberculosis, as we have seen, the lack of follow up work by the city authorities is also unfortunate, although the situation is somewhat relieved by the work of the anti-tuberculosis association. Here are opportunities to protect the public health, much more definite and valuable than those represented by weed-cutting and nuisance abatement; yet they are passed over, and probably will continue to be passed over until the city secures a full-time health officer.

Another serious handicap to Topeka's efforts to control contagious diseases is the lack of any facilities for their hospital care. While at first doubtful of the need for a contagious hospital, feeling that it might be difficult to get people to use it, the city physician stated that he had seen cases needing hospital care that none of the existing hospitals would probably take. After some consideration he suggested that it might be practicable if the county would co-operate, and expressed the opinion that it would probably prevent a good deal of contagion and would make things easier for doctors.

Very few cities find they can do without hospital facilities for these diseases. Cases are bound to occur in crowded homes where proper isolation cannot be maintained, and where contagion will inevitably spread. There are also cases in which the sickness is so serious that proper hospital treatment decides the issue as between life and death. For these reasons the advisability of making some provision is earnestly suggested. The facilities should be made attractive, that they may be used willingly, and modern, that they may allow every advantage in treatment. The report of the New York State Commission on Public Health recommended that the allowance of such beds in a community be not less than one to each 2,000 of population; on this basis Topeka's quota would be about twenty-five.

Regarding laboratory diagnosis and free anti-toxin, Topeka is fortunately situated, being the capitol city and so the seat of the State Board of Health laboratory. Prompt examination of specimens for tuberculosis, diphtheria and the like, is

thus secured, as is the possibility for prompt administration of anti-toxin.

Records.

The records of the sanitary department are few and simple, as corresponds with the nature of its endeavors. Too much simplicity, to the point of utter neglect, as we have seen in the case of records of contagious diseases and milk inspection, has characterized them in the past. The present sanitary sergeant has taken steps to improve these conditions and now keeps the following permanent books:

Tuberculosis cases
Contagious disease cases
Fumigations
Vault cleaning permits

The records now kept are satisfactory to the work in hand, but with the enlargements in the service advocated in this report, considerable enlargements and refinements in the record keeping system will be necessary.

Summary of Deficiencies in the City's Health Service.

We have now seen that the city's food inspection service misses the essentials in food protection; that the city's milk inspection does not in any way adequately meet its problem; that its communicable disease service can be measurably improved; and that important opportunities in infant hygiene and tuberculosis work are being neglected. Contributary to these deficiencies and principally responsible for them are lack of funds and a full-time health officer. The bars in the way of immediate improvement are probably inertia, and the desire to keep expenses at a minimum; the first should not count for much in a progressive Kansas community, while the second is surely false economy. Paint for a house is a wise investment, because it prevents decay; similarly with the health department for a community—the protection is as real, and the relative cost as trifling.

The first step in the improvement of the department should be the appointment of a full-time, trained, and experienced health officer. With the great advances which have occurred in sanitary science such a person is essential, and his

value is coming more and more to general recognition. A city represents, from a hygienic standpoint, a great complex machine, made up of a multitude of little living parts, intricately interrelated. Disease always exists in some of its parts, threatening both to spread to other parts and to decrease the efficiency of the whole machine. Modern science has pointed out the nature of these defects and the ways the inefficiencies may be kept to a minimum. Surely here is a matter calling for special knowledge. In industry or commerce no one would think of entrusting the supervision of such a complex organization to any but a trained superintendent or manager. Topeka, in fact, recognizes this principle in the employment of an expert school superintendent, at a salary of $4,500 a year. The field of public health is certainly as wide and intricate as that of the schools; and calls for the attention of a man of equal caliber.

Recommendations for the Improvement of the City Health Department.

With the above points in mind we may recommend Topeka a modern health department in the following terms:

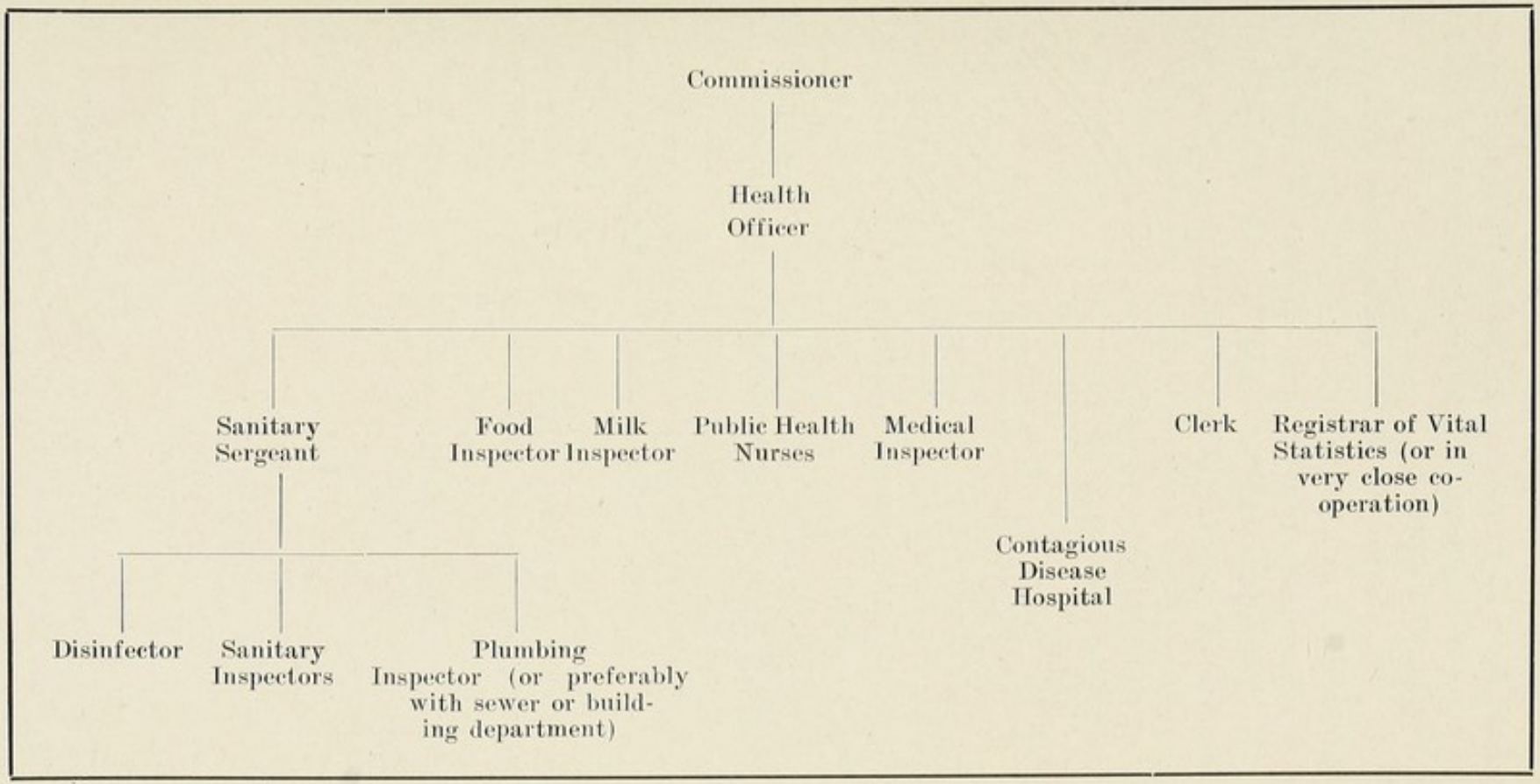
1. The appointment of a properly qualified, full-time health officer. His appointment should be for a term of years and his salary should compare favorably with that of the Superintendent of Schools. He should have supervision over the milk and food inspectors, and over all persons and work hereafter mentioned. The possibility of a co-operation arrangement with Shawnee county for the employment of such an official is suggested.

2. Radical improvement of the present milk inspection: including revision of some parts of the existing milk ordinance, the systematic inspection of all dairy farms and milk-handling places, and the introduction of the bacteriological examination of milk. The inspector should be supplied with proper laboratory and transportation facilities, and the results of tests should be given newspaer publicity.

3. A radical reorganization of the present system of food inspection, shifting the emphasis from the reinspection of government inspected meats to the inspection of markets and groceries, and of small local slaughter houses.

4. Extension of the present work against communicable

Suggested Reorgaization of Topeka Health Department.



diseases to include reinspection of quarantine, the visitation of typhoid fever and tuberculosis, the establishment of more definite periods of quarantine, and the release of diphtheria only after cultural diagnosis.

5. The institution of a comprehensive campaign against tuberculosis.

6. The institution of work against infant mortality.

7. The institution of work against veneral diseases, including reporting of cases to the health department (by number if so desired), and the provision of free laboratory diagnosis, and of free treatment in indigent cases.

8. The institution of organized work for health education and publicity.

9. Consideration of the advisability of a free dispensary service under the health department; such as would extend and reinforce the department's work against infant mortality and the communicable diseases, including tuberculosis and the venereal diseases.

10. The employment of two or more public health nurses, to be utilized in the inspection of quarantine and infant hygiene and tuberculosis work.

A reorganization of the city's public health work along these lines is indicated graphically in the diagram on page 79.

IV. SUMMARY AND CONCLUSIONS

Vital Statistics.

We have now seen that Topeka's death rate, while comparing favorably with that of the country as a whole, shows a considerable excess over that of the State of Kansas—and this after making the more important corrections. At the same time her birth rate is also under that of the rest of the state. Furthermore, not only does the death rate show marked variations in the several wards, but similar variations are found in the rates from the various preventable causes of death. The conclusion is justified that an amount of preventable death exists in the city which, while not alarming, is considerable, and very much worth fighting against. A public health problem exists which should yield to treatment.

Sanitary Conditions.

Survey examinations show that the city has a good water supply; but that its sewer system is poorly designed, poorly constructed, and poorly maintained. Both these systems need extending. The city's milk supply is in a markedly unsatisfactory condition, with the inspection system quite inadequate; while its food supply is in general good, but with a foolishly arranged inspection. Perhaps one of the most serious problems is represented by the presence of over 7,000 privies and over 5,000 wells. Two-thirds of the wells examined showed evidence of pollution, and many of them are unnecessary, as are a large number of the privies. Other conditions such a housing, should receive attention. There is also need for regular and systematic physical examination of school children.

The City Health Department.

The organization of the city health department leaves much to be desired. Not only are its food and milk inspection services pronouncedly inadequate, but some of the most important opportunities to protect the public health are neglected. The number of persons employed and the amount of money appropriated are both too small for a reasonably complete pro-

gram; and there is a lack of centralized and properly qualified authority. The latter is probably the most serious defect. A full-time, trained health officer, to be supplied with more liberal funds, is needed.

Conclusions.

Topeka has, accordingly, the combination of a considerable amount (15 or 30 per cent of the total) of preventable deaths and a number of objectionable sanitary conditions. In considering a practical program to meet the situation, consideration must be given to the relative importance of the several hygienic opportunities with regard to their relative cost. On this basis the city's most profitable investment will probably be one made in its health department. Important repairs and extensions of the sewer system are, for example, desirable, and undoubtedly would show good results; but the cost of such work is relatively large, and a perhaps larger and more immediate saving of life could be accomplished by the expenditure of a few thousand dollars for a few public health nurses and an expert health officer. The larger expenditures for comprehensive sanitary improvements are not to be deprecated; they certainly should be instituted; but if all cannot be attempted at once and if expense be a limiting factor, it should be remembered that the health department reorganization will probably give the largest return for the money expended. This need should therefor be given precedence. At the same time steps should be taken to solve the serious well and privy problem by a policy of restriction, condemnation and publicity.

The public health situation in Topeka is one of good natural resources, fair development of material sanitary improvements, and neglect of the modern methods of administrative control. The city's organized health work is relatively primitive, there being here a rich field for development. The necessary expense is, fortunately, not great, and the rewards, as expressed in increased welfare and prosperity, are substantial and considerable.

APPENDIX "A".

Part of a report on Topeka's vital statistics prepared by Mr. W. J. V. Deacon, State Registrar of Vital Statistics. Other parts of this report appear in the text of the Survey. For much of the detailed work of transcription and tabulation thanks are due Miss Veda Hodgson, Mr. Herbert A. Blinn, and Mr. Morris Sanders, students in Washburn College.

An Intensive Study of Vital Statistics for the Topeka Improvement Survey.

By W. J. V. Deacon, State Registrar of Vital Statistics.

Population April 15, 1910 (U. S. Census), 43,684.
Population April 15, 1900 (U. S. Census), 33,608.
Increase 30% for decade or 3% for year.
Correction (Arithmetical Method) = 46,578, population July 1, 1912.

Total number deaths in 1912, 835.

$$\frac{835}{46578} = 17.9 \text{ per thousand, Crude Death Rate.}$$

Number of deaths of non-residents, 171.
835 — 171 = 664, total resident deaths.
= 14.2 per thousand. Corrected death rate to residents.
White population, 41,734, deaths 553, rate 13.2.
Negro population, 4,844, deaths 111, rate 22.9

SPECIFIC DEATH RATES, TOPEKA.

AGE.	No. Deaths.	Population.	Death Rate.
Under 5 years.....	134	3,985	33.6
5-14.	25	7,162	3.4
15-24.	49	9,748	5.1
25-44.	103	14,680	7.0
45-64.	155	8,202	17.6
65 and over.....	198	2,745	72.1

TOPEKA DEATH RATE CORRECTED TO STATE OF KANSAS.

AGE.	Population.	Specific Death Rate, Kansas.	Calculated No. of Deaths.
Under 5 years.....	3,985	20.49	82
5-14.	7,162	1.74	12
15-24.	9,748	3.23	31
25-44.	14,680	5.15	76
45-64.	8,202	13.83	134
65 and over.....	2,745	63.81	175
			510

$\frac{510}{46578} = 10.94$, standard death rate.

10.16, crude death rate of Kansas.

$\frac{10.16}{10.94} = .9287$, factor of correction.

14.2, crude death rate Topeka, × .9287 = 13.19, Corrected to Kansas.

CORRECTED DEATH RATE OF TOPEKA TO STANDARD POPULATION OF SWEDEN.

AGE.	Population.	No. of Deaths.	Specific Death Rate.	Standard Age Distribution.	Index of Mortality.
0-1	815	85	104.29	25.5	2.6
1-19.	14,629	94	6.42	39.8	2.5
20-39.	17,765	110	6.14	269.6	1.6
40-59.	10,019	121	12.07	192.3	2.3
60 and over..	3,350	254	75.82	114.6	8.6
					17.85

CORRECTION BY AGE AND SEX TO UNITED STATES REGISTRATION AREA.

	POPULATION.		SPECIFIC DEATH RATE.		CALCULATED DEATHS.	
Age.	Male.	Female.	Male.	Female.	Male.	Female.
Under 5	2,775	2,712	56.26	47.39	156	129
5-14.	5,405	5,313	4.23	4.09	23	22
15-24.	4,821	4,624	6.51	6.06	31	28
25-44.	6,403	5,736	10.55	9.36	68	54
45-64.	3,774	3,024	25.02	21.09	95	64
65 and over.....	1,169	823	71.90	66.43	8	55

Total calculated deaths—Males, 381
Females, 352
733

$\frac{733}{46578} = 15.75$, standard death rate.

18.05, death rate for registration area.

$\frac{18.05}{15.75} = 1.146$, factor of correction.

14.2, crude death rate × 1.146 = 16.27, Corrected rate.

CAUSES OF DEATH AND RATES PER 100,000.

Diseases.	No. Deaths.	Rate.	Diseases.	No. Deaths.	Rate.
Typhoid Fever	9	19.3	Diarrhoea and Enteritis, under 2 years.	25	54.4
Small Pox	1	2.2	Diarrhoea and Enteritis, over 2 years..	7	16.2
Scarlet Fever	1	2.2	Appendicitis.	7	16.2
Whooping Cough	2	4.3	Diseases of Liver and Adnexa	7	16.2
Diphtheria.	16	34.8	Peritonitis.	4	8.7
Dysentery.	3	6.5	Other diseases of Digestive system	14	30.5
Tuberculosis (all forms).	47	102.2	Acute Nephritis	5	10.8
Cancer (all forms...	40	87.0	Bright's Disease	54	117.3
Rheumatism (all forms)	5	10.8	Other diseases, Genito-Urinary system.	5	10.8
Diabetes.	9	19.3	Puerperal state	10	21.7
Other general diseases.	13	28.3	Diseases of skin, etc.	2	4.3
Meningitis.	5	10.8	Diseases of bones, etc.	1	2.2
Cerebral Hemorrhage	31	67.4	Malformations.	5	10.8
Paralysis.	18	39.2	Diseases of early infancy	35	76.2
Other diseases of nervous system ...	22	47.8	Old age	36	78.4
Organic Heart Disease.	59	128.2	Suicides.	9	19.3
Other diseases of circulatory system.	31	67.4	Accidents	26	56.5
Broncho-pneumonia .	23	50.0	Homicides.	7	16.2
Pneumonia.	34	73.8	Ill-defined diseases ..	19	41.3
Other diseases of respiratory system.	12	26.1			

APPENDIX "B".

Ward Vital Statistics.

(Residents alone are considered.)

BIRTH AND DEATH RATES PER 1,000.

Wards.	Death Rates 1912	Birth* Rates 1912	Birth* Rates 1913	Birth* Rates Avg. 1912-13	Rates of Increase 1912	Infant Death Rate per 1,000 Births†	
						1912	1910-13
I....	16.2	18.8	17.5	18.2	2.6	108	98
II....	16.1	21.0	20.3	20.7	4.9	108	97
III....	19.1	10.7	11.7	11.2	— 8.4	66	46
IV....	12.0	17.8	14.9	16.4	5.8	38	66
V....	7.6	26.4	19.1	22.8	18.8	100	84
VI....	11.6	18.5	18.3	18.4	7.1	161	71
Totals.	14.2	19.8	17.4	18.6	5.6	96	74

*Excluding hospital births except in totals.

†Registration incomplete.

TABLE SHOWING NUMBER OF BIRTHS, AND DEATHS FROM CERTAIN CAUSES.

Wards	Births 1912	Births 1913	Infant Deaths 1912	Infant* Deaths 1910-13	Diarrh'a and Enteritis Under 2 Years 1912-13	Diph-theria* 1908-13	Scarlet Fever* 1908-13	Measles* 1908-13	Whoop'g Cough* 1908-13	Typh'd* 1908-13	Sm'lp'x* 1908-12	Tubercu-losis* 1908-13	Pneumo-nia* 1910-13
I.....	120	115	13	46	12	14	0	3	5	8	0	33	36
II.....	260	258	28	100	29	27	0	4	5	22	11	42	75
III.....	91	103	6	18	5	5	2	0	2	3	0	31	22
IV.....	130	112	5	32	5	0	0	0	1	9	1	26	26
V.....	201	149	20	42	2	2	0	2	3	6	7	36	32
VI.....	81	82	13	23	10	3	0	1	2	9	0	37	23
Totals .	883	819	85	261	63	51	2	10	18	57	19	205	214
Hospitals .	40	12											
	923	831											

*Registration incomplete.

DEATH RATES FROM CERTAIN COMMUNICABLE DISEASES, PER 100,000.

Wards	Tuber-culosis 1908-13*	Pneumonia 1910-13*	Total*	Smallpox 1908-13*	Typhoid 1908-13*	Diarrhoea and Enteritis under 2 yrs. 1912-1913	Diarrhoea and Enteritis under 2 yrs. per 1,000 Births. 1912-1913
I....	90.4	143.4	233.8	0.	21.9	92.6	51.1
II....	59.4	154.3	213.7	15.5	30.7	115.6	56.0
III....	63.6	65.6	129.2	0.	6.2	28.9	25.8
IV....	61.3	90.4	151.7	2.3	21.2	33.7	20.7
V....	82.8	107.0	189.8	16.1	13.8	13.0	5.7
VI....	146.6	134.0	280.6	0.	35.6	112.8	61.3
City	76.6	117.0	193.6	7.1	21.3	66.6	35.9

* Registration incomplete.

DEATH RATES FROM CERTAIN COMMUNICABLE DISEASES OF CHILDREN, PER 100,000.

Wards.	Diphtheria* 1908-13	Scarlet Fever* 1908-13	Measles* 1908-13	Whooping Cough* 1908-13	Total* 1908-13
I.....	38.3	0	8.2	13.7	60.2
II.....	38.2	0	5.7	7.1	51.0
III.....	10.3	4.1	0	4.1	18.5
IV.....	0	0	0	2.3	2.3
V.....	4.6	0	4.6	6.9	16.1
VI.....	11.9	0	4.0	7.9	23.8
City....	19.1	0.8	3.7	6.7	30.3

*Registration incomplete.

NET DENSITY OF POPULATION, TOPEKA WARDS, 1910.

(Persons per acre of platted area.)

Ward I.....	13.8	Ward IV.....	21.8
Ward II.....	24.5	Ward V.....	12.7
Ward III.....	24.2	Ward VI.....	8.9
City			17.0

APPENDIX "C".

Analysis of Topeka City Water, Oct. 15, 1913.

By State Water Survey.

		MINERAL ANALYSIS.	
Laboratory No.	6148-24		
Source.	C. S.	CL.	143.
Collected by	J. Shaw	SO_4.	6.58
Date of Collection.....	10-15-13	HCO_3.	256.
Analysis Completed	10-20-13		
CHEMICAL ANALYSIS. Results in parts per million.		BACTERIAL EXAMINATION.	
Color.	None	Bacteria per cc. on Agar, at 37°—24 hrs.....	16
Odor.	None	Presumptive Tests for B. coli.	Negative
Turbidity.	None	No. of Positive Fermentations:	
Oxygen consumed	1.5	In one 10 cc. tube.....	1—
Nitrogen as Free Ammonia	.102	In five 1 cc. tubes.....	5—
Nitrogen as Alb. Ammonia	.082	In five .1 cc. tubes....	5—
Nitrogen as Nitrites.....	0.0		
Nitrogen as Nitrates.....	0.0		
Solids Total	619.		
Soap Titration (CaCo)....	250.		

APPENDIX "D".

FIELD NOTES OF PROF. G. R. JONES' INVESTIGATION OF TOPEKA SEWERS.

Inspection of City Park Outfall and Branches.

November 17, 1913.

1. Beginning at the river bank, a six-by-five-foot, egg-shaped combined sewer. Material of which constructed, soft brick laid in lime mortar. The flow at the outfall is about one foot in depth, and the velocity is very high. This sewer has been in use something like twenty-five years. The invert is badly worn; advancing into the sewer, a wide crack was found in the top. This crack was an inch and a half wide and extended for two hundred feet back from the entrance. Also, at the springing line, many bricks were missing.

2. One hundred feet south of the outfall, a three-foot V. C. P. enters. This branch has six inches of flow in it. Two hundred feet from the outfall, a large closet in the City Park is connected with the sewer by means of two 18-inch V. C. P. These pipes enter the main sewer at an angle of sixty degrees with the vertical. The connection is poorly made, no care having been taken to replace loosened bricks or to cement around the pipes.

3. In many places, the walls of the sewer were wet, due to ground water seeping into the sewer. Three hundred feet from the outfall, two catch-basins drain into the sewer by means of 8-inch pipes. These catch-basins were in filthy condition.

4. From this point on, properly designed V. C. P. inlets for house connections were found in the walls of the sewer. These inlets occurred every twenty-five feet, but in the majority of the connections, no use has been made of them. It seemed to have been the practice, in making house connections, to enter the main sewer in the most convenient manner, no attention being given to replacing loosened brick, or making the sewer tight around connections.

5. At Van Buren and Crane Sts., the manhole cover was buried under the street. Inspected from below. The brick was in good condition. The manhole was circular and of good design.

6. One hundred feet south of the intersection of Van Buren and Crane Sts., a place was found where the invert was badly worn.

7. Manhole at First and Van Buren Sts. The cover is under the street. Inspected from below. The masonry was in good condition and clean. No perceptible odor was noticed.

8. The sewer here turns west on First Street. At the alley between Van Buren and Harrison, a 15-inch V. C. P. enters from the south. Manhole on alley between Harrison and Topeka Avenue in good condition. The Harrison Street sewer enters four feet above the invert of the main sewer.

9. Manhole at Topeka Avenue and First Street, 12-inch pipe enters in good condition.

10. Manhole at Tyler and First is circular brick, 12 feet deep. No connections enter here. There is considerable ground water at this point. The sewer here turns south. House connections occur every twenty-five feet, but many are unused.

11. Manhole one hundred feet south of First and Tyler Sts. Brick in fair condition; three inches of flow in sewer; current very rapid. The sewer turns west up and east-and-west alley. Three inches of flow. Sewage is hot and considerable steam is present.

13. On Second Street, between Polk and Tyler, a creamery discharges into the sewer a large quantity of boiling hot water, and fills the sewer with steam.

14. Line turns west on Second Street. At Polk Street, there are two inlet catch-basins on each side of the street. These are in good condition. Line turns south on Polk Street. Steam and considerable odor issues from the manhole and inlets at Second and Polk.

15. Sewer reduces to a 50 x 66-inch at Second Street and Polk. At Third and Polk Sts., there are four curb inlets draining into sewer.

16. Manhole at Fourth and Polk Sts., 14 feet deep. The bottom in bad condition. Three street inlets enter here.

17. Manhole at Fifth and Polk Sts., 13.2 feet deep. Three street inlets enter at this point. Sewer branches at this point, a 24 x 36-inch egg-shaped brick sewer going south, and the main sewer—a 48-inch egg-shaped—turns west. Did not pass through these sewers. Remainder of inspection on this system was from manholes. Following the 48-inch on west, there is a crack in the top running west on Polk, evidently due to the settlement.

18. Manhole at Fifth Street. A 16-inch pipe enters from the west, a 12-inch from the north. This manhole is built to one side of the main sewer, and there is no manhole in the main sewer. There is an inlet on both sides of the street. The main sewer turns south and follows Western Avenue.

19. Manhole between Fifth and Sixth on Western Avenue. Size of main sewer, 42 inches. 10-inch laterals enter from the east and west. 4 inches of flow in the main sewer, with a good velocity. Two street inlets at Sixth and Western enter the sewer.

20. Manhole on Western between Sixth and Seventh. One 10-inch lateral from the east and one from the west enter here. The size of the main sewer is 42 inches.

21. Manhole at Seventh and Western Avenue. There are four inlets that enter sewer at this point, also a 15-inch pipe from the east. The main is a 42-inch on the lower side, reducing to a 34 x 26 on the upper.

22. Manhole on Seventh, 150 feet west of Western Avenue. Three inches of flow at a good rate. A 24-inch pipe enters from the west, an 18-inch pipe from the south. This is the end of the brick sewer on this branch.

23. Going back to the manhole on Fifth and Polk, where the main line branches, and following the 36 x 27-inch line that goes south on Polk Street at this point.

Manhole inlet built in curb at Sixth and Western Avenues. No laterals enter at this manhole. The manhole is in bad condition. Design and construction are very poor. Impossible for one to enter.

24. Manhole 150 feet west of Sixth and Western Avenues. Size of main 27 x 36-inch, egg-shaped brick.

25. Manhole on Tyler and Sixth Street. This is the end of the brick sewer. A 24-inch V. C. P. comes in from the south. Rapid rate of flow.

26. Following south on the 24-inch pipe, manhole 100 feet south of Sixth on Tyler Street. A 24-inch pipe, an 8-inch lateral coming in from the east. Two and one-half inches of flow at a slow rate. No manhole on Seventh. There are two inlets at Seventh and Tyler.

27. Manhole 100 feet north of Eighth and Tyler. Two 8-inch laterals enter, one from the east and one from the west. Slow rate. 2-inch flow.

28. Manhole between Eighth and Ninth on Tyler. Depth, 12 feet. A 12-inch pipe enters from the south, a 15-inch from the west, and a 9-inch from the east. This manhole is in bad condition. The seepage from the ground water is bad, and the mortar is falling from between the bricks. There is a good rate of flow in the line from the west.

29. Following the 12-inch line on the south. Manhole on Tyler and Ninth. Fair rate of flow. One inch in depth

30. Manhole at Tenth and Tyler was not opened. Inlet manhole on alley 200 feet north of Eleventh, between Tyler and Topeka. Little flow and slow rate.

31. Manhole on alley at Eleventh was not opened.

32. Manhole on alley between Topeka and Tyler at Twelfth. No flow here, as it is the end of the line. The grade falls away to both the north and south.

33. Beginning at manhole on Seventh Street, 150 feet west of Western Avenue, at the end of the brick sewer, and following the line south on the 18-inch pipe:

Manhole 100 feet north of Eighth was not opened, but a bad odor was noticeable at a considerable distance.

34. Manhole 100 feet south of Eighth was not opened. Some odor noticeable here.

35. Manhole on alley 100 feet north of Tenth. Bad odor and slow rate of flow. Depth of flow, 3 inches. The main is a 15-inch pipe. No laterals enter here. Four inches of sludge in the bottom in a septic condition.

36. Manhole 100 feet south of Tenth was not opened. Noticeable odor. Sewer turns east here.

37. Manhole on Western 100 feet south of Tenth. One inch of flow. Septic action noticeable, and a bad odor. 12-inch main and a 12-inch lateral from the north. The line crosses Western Avenue, goes through to the alley east and turns south. There is supposed to be a manhole at this point, but unable to find it, nor the one on Eleventh. Evidently, both are under the pavement.

38. Manhole at Twelfth and Western Avenue. A 12-inch main. Two inlets from the street. Line turns west.

39. Manhole at alley on Twelfth, 150 feet west of Western; a 12-inch main sewer, benches flat, and septic action in evidence. Fair rate of flow. Surface drainage from the street enters the manhole through the grating. The result is that the manhole is in a filthy condition.

40. Manhole at alley on Huntoon, between Western and Fillmore. A 12-inch main, a 9-inch pipe from the southeast, an 8-inch from the south. The pipe from the south is filled with dirt, little or no flow. We were able to see through to the next manhole by means of a lantern, so the alignment is good.

41. Beginning at the manhole on the alley at Seventh, 150 feet west of Fillmore, and going south; septic action is evident. An 18-inch V. C. P. enters from the south. A 21-inch east and west main. A light could be seen for two blocks south through an 18-inch V. C. P. The alignment is good, rate of flow good; septic action due to deposits on the benches.

42. Manhole 100 feet north of Eighth Street was not opened. Some odor.

43. Manhole inlet at 100 feet south of Eighth. Bad odor, septic action, slow rate of flow. An 18-inch main with 9-inch pipes entering from the east and west. One inch of flow. Sewage rather heavy.

44. Manhole on ninth was not opened.

45. Manhole on Tenth. 12-inch main flowing in, and a 15-inch flowing out. Some odor. Car tracks interfere with the entrance to the manhole. The rate of flow was very slow.

46. No manhole found on either Eleventh or King Streets.

47. Manhole 150 feet south of King Street. A 12-inch main. No laterals enter here. Small depth of flow, but good rate. Very little odor. It was possible to see a light through for one and a half blocks.

48. Manhole at Huntoon. A 12-inch pipe out. This is a dead end. A 6-inch pipe from the southwest. No odor. Little or no flow.

49. The 36-inch Brick Sewer at City Park outfall going south past the State House. This sewer flows into the 72 x 54-inch sewer 200 feet from its outfall.

Manhole in City Park. The cover is 18 inches under the surface of the ground. Eight inches of flow. Rapid rate of flow.

50. Catch-basin 100 feet south is filled up. Catch-basin stopped up at Rock Island right-of-way.

51. Manhole on Second Street, north side of the street. No laterals. A 36-inch brick sewer with seven inches of flow. Good rate and good conditions.

52. Manhole on Third Street. Two connections, each an 8-inch pipe, enter here. Depth of flow 5 inches. Bottom in good condition. 36-inch sewer with high velocity. Alignment is good.

53. Manhole halfway between Third and Fourth. Casting is broken.

54. Manhole north side of Fifth Street, a 12-inch lateral from the southwest and a 12-inch lateral from the southeast entering the above-mentioned main. The masonry is in good condition. Depth of flow is 4 inches. Good alignment and high velocity.

55. Open inlet halfway between Fifth and Sixth Streets. 10-inch laterals from the southeast and the southwest.

56. Manhole on Sixth. 8-inch V. C. P. from the west. Main sewer 24 x 36 inches.

57. Manhole on alley between Sixth and Seventh: brickwork in bad shape. Six inches of flow. 15-inch pipe from the west and a 12-inch from east.

58. Manhole at Seventh Street. 24-inch main. Two 12-inch V. C. P. One from southeast and one from the southwest.

59. Manhole between Seventh and Eighth Streets, at alley. Depth 11.6 feet. Ladder brokeen and two 4-inch and a 10-inch heating pipe passing through the manhole and obstructing same.

60. No manhole found on Eighth Street. The sewer angles off to the southeast here, 100 feet south of intersection of Jackson and Eighth.

61. Manhole 150 feet east of Jackson Street. 11.5 feet deep. One and a half inches of flow. Masonry in good condition. Sewer turns south on alley.

62. Manhole at alley on Ninth Street. One and one-half inches of flow. A 12-inch V. C. P. main, 9-inch branch. In good condition.

63. Manhole 200 feet south at bend in alley. A 12-inch V. C .P. main. 12.9 feet deep. Very little flow.

64. Manhole 75 feet north of Tenth. A 9-inch V. C. P. main. Is 12.4 feet deep. Also has very little flow. Manhole very small. Hard to enter.

65. Starting at alley on Fifth Street, between Jackson and Van Buren, going west from the 36-inch sewer along the 15-inch V. C. P.

66. No manhole found at Van Buren and Fifth. Three street inlets.

67. Manhole south of Court House had a 4-inch flow. Conditions good.

68. Manhole on alley west of Harrison and Fifth Sts., covered by pavement. Sewer turns south here.

69. Manhole in alley 200 feet south of Fifth Street. Practically no flow. 18-inch V. C. P. enters, and a 15-inch pipe going out. Six inches of flow and three inches of sediment in the bottom, showing either an obstruction or else too flat a grade. The manhole construction is good.

70. No manhole found on Sixth and Seventh Sts.

71. Manhole 200 feet south of Seventh. A 12-inch main. Rate of flow very slow. Two and one-half inches of flow.

72. Manhole 100 feet south of Eighth Street. 2-inch flow, 12-inch main, very slow rate of flow.

73. No manhole found on Ninth or Tenth Sts.

74. Manhole at 100 feet south of Tenth. A 12-inch V. C. P. main. Sewer turns east here. Also a branch going south.

75. Lamphole, dead end at Eleventh on alley between Harrison and Van Buren.

Jackson Street Main.

76. Beginning at Sixth and Jackson Sts. No manhole. Three curb inlets.

77. Manhole at Fifth and Jackson Sts., has been covered by the asphalt pavement.

78. No manhole at Fourth and Jackson Sts. Two street inlets here.

79. Manhole at Third and Jackson. 8-inch V. C. P. enters, and a 12-inch leaves. Three inches of even flow. Manhole in fair condition. Two inlets here. Grade is less going out than coming in.

80. Manhole cover at Second and Jackson Sts. cemented shut.

81. Manhole 100 feet south of Rock Island tracks. Lateral coming in from the east. Main is 15 inches V. C. P. One inlet and one catch-basin here.

82. Open drain on east and west sides of Jackson Street from First to Park. This drain is 2 x 3 feet and carries storm water only.

83. Manhole at Jackson and Crane Sts. A 21-inch V.-C. P. main. A 10-inch lateral enters from the east. Rapid rate of flow. Four inches of flow. 8.5 feet deep. There is a 60-inch brick storm sewer built from here to the river. This connects with the two open drains that run down the sides of Jackson Street. The Jackson Street sewer empties into the 36-inch brick sewer.

Inspection of North Topeka Sewer.

November 22, 1913.

1. Inlet-manhole at alley west of Kansas Avenue on Kious Avenue. The sewage here is in bad condition, giving off bad odor.

2. Manhole at alley west of Kansas Avenue on Kistler Avenue. The sewage has a fair velocity.

3. Manhole 100 feet east of Central Avenue has considerable sludge in the bottom. The odor is bad.

4. Manhole at Park and Central. Sewer is in good condition and the flow is good.

5. Manhole on Gordon Avenue one half block west of Jackson Street. This manhole was not entered, but the odor was very noticeable.

6. Manhole on Park Avenue, one-half block west of Central. There is 13 inches of flow and a very slow rate. A 42 x 28-inch sewer flows east, and a 24-inch V. C. P. comes in from the west. There is a 12-inch V. C. P. from the north, and a 10-inch V. C. P. from the south, both being submerged.

7. Manhole on Fairchild Avenue, one-half block east of Quincy. There is a bad odor here. 12-inch V. C. P. enters from the south, also a 15-inch enters from the south. The manhole was full of mosquitoes which is good evidence of stagnant water. The 46 x 30-inch sewer goes east, with six inches of flow.

8. At Fairchilds and Monroe there are four curb inlets that need cleaning badly. There is no manhole at this corner.

9. Manhole on Fairchild one-half block east of Monroe. A 12-inch V. C. P. enters from the north. A 12-inch V. C. P. enters from the south The flow is very rapid.

10. Manhole on Fairchild Street one-half block east of Madison. A 12-inch V. C. P. enters from the north. A 12-inch V. C. P. enters from the south. The size of the main sewer is 34 x 54 inches. There are nine inches of flow in the main. The rate is very slow, and the odor is very bad.

11. Inlet manhole on Fairchild 50 feet east of Santa Fe and Rock Island tracks. The flow is rapid. It is 9.8 feet to water line. There is considerable sludge in the bottom, and the odor is bad.

12. Outlet into the Kansas River.

The outfall of this line is 100 feet west of the present stream channel. There is a flood gate four feet in from the outfall. There is nine inches of flow, and considerable mud in the bottom of the sewer.

At this point is located the only sewage pumping station in the city. This pumping station is on the land side of the concrete dike, and is used to pump the sewage when the water surface is above the outfall.

Inspection of Places Reported as Being in Bad Condition.

1. Eleventh and Lane Streets. The catch-basins here are in bad condition, and there is a bad odor coming from the same.

2. Manhole north of Eleventh Street on Lane Street. The benches are flat and covered with refuse. The main sewer is a 24-inch V. C. P., the depth of flow is one inch. An 8-inch tile pipe enters from the west. The odor here is extremely bad.

3. Alley between Lincoln and Lane Sts., between Tenth and Eleventh Sts. The main is 21-inch V. C. P. with a one-inch flow. A 6-inch V. C. P. enters from the east two feet above the invert of the main sewer The benches in this manhole are flat and covered with deposit. The sewage is quite heavy, and the odor is bad.

4. Manhole at alley west of Lincoln and on the north side of Eleventh Street. There is an 18-inch V. C. P. from the east, and a 21-inch going north, and a 15-inch V. C. P. from the south. There is one-half inch of flow, and considerable mud in the bottom. There is a bad odor here, and practically no flow from the south. This may be accounted for by the flush tank further south being out of working order. This flush tank is on the north side of Huntoon, between Lincoln and Lane Sts.

5. Manhole on alley north of Sixth and west of Western Avenue. The manhole is in bad repair, the alley is in filthy condition, and the sewage is septic.

6. Manhole on alley north of Sixth and west of Horne Street. Sewage is in fairly good condition, but the velocity small.

7. This line was followed to Willow Park and north on an alley to Park Avenue, and a little way beyond. A lateral was then picked up on the Drive, and followed up on Hawthorne to where it joins in on the 12-inch from the Circle Street, and then continues to the 15-inch iron pipe across the creek, and thence to the river. In time of heavy rains, the water backs up and throws the manhole covers on this line. The outlet at the Kansas River was not under water, as shown by an old blue-print; but was well above the water line. In nearly every manhole on this line, the flow was very slow.

8. Inlet-manhole at Morris and Eighth Sts. A 24-inch V. C. P. enters from the south and a 36 x 22-inch goes on to the north. A 12-inch V. C. P. enters from the east, with a good flow. There is three inches of flow in the 24-inch and in the 36-inch sewers, and the alignment is good.

9. Inlet-manhole between Seventh and Sixth in the alley, and west of Morris in the jog. The 36-inch turns and goes east here for half a block. The alignment is O. K. A 12-inch V. C. P. enters from the north. There is two inches of flow, and four inches of mud in the 36-inch sewer. The depth to the water line is 6.4 feet. The masonry is in good condition.

10. Manhole at Morris and Sixth Sts. At this manhole a 36 x 22-inch brick enters from the south, and a 30-inch V. C. P. enters from the east, while all of this flow is carried away by a 15-inch V. C. P. to the north. The sewage was backed up into the manhole above the top of the 15-inch pipe.

11. Inlet-manhole at Fifth and Morris Sts. The 15-inch pipe enters and leaves this manhole. The flow stands above the benches, and with storm water must rise much higher.

12. Manhole at Elmwood and Willow Park. Here the 15-inch line picks up a 10-inch line from the east. The flow is very rapid, and the depth of flow is four inches.

13. Inlet-manhole at Cherokee and alley west of Elmwood Sts. The 15-inch turns here and goes north on the alley. Velocity is high, with four inches of flow.

14. Manhole at Park Street and alley west of Elmwood Street. This is the same 15-inch main. Velocity is high with six inches of flow.

15. Manhole at Park Street and the Drive. The 15-inch pipe turns here and goes in a northwest direction on the Drive. Flow is very fast.

16. Manhole at Laurel and Knox Sts. The 15-inch line goes through here, the velocity is good, and the flow is four inches. A 10-inch V. C. P. enters from the east.

17. Manhole 250 feet east of the junction of Hawthorne and the Circle. The 15-inch line enters from the south three-fourths full, and with a good velocity. A 12-inch pipe enters from the west. There is very little flow in this pipe, and it is three-fourths full of mud and gives off a bad odor. This manhole is just south of the creek, and there is a 15-inch overflow into the creek. A 15-inch iron pipe crossed the creek and continues in a V. C. P. to the river. This line has been described elsewhere. The line entering from the west is in a very bad condition.

18. Manhole at Circle and Hawthorne Sts. Following the 12-inch line back to the west. This line is in very bad condition. The manhole bottoms are full of mud to the middle of the pipes. The line branches here, a 12-inch line going west, and another of the same size to south.

19. Manhole on Circle Avenue. There is no flow here. The sludge covers the pipes and is in a stagnant condition. Odor is very bad.

20. Manhole on Circle Avenue. A 6-inch V. C. P. enters from the south, and a 12-inch leaves to the north. The flow is in a stagnant condition, and the odor is very bad. Depth to water surface is 7.4 feet. This line ends with a lamp hole on Circle and the Drive Sts.

Inspection of Jefferson Street Outfall Sewer.

November 19, 1913.

1. This sewer empties into the Kansas River directly north of Jefferson Street. The sewer is a 44 x 56-inch egg-shaped brick. A concrete apron carries the effluent down to the water line of the river.

2. Manhole one block north of Crane Street. The masonry is in good condition. The depth of the flow is one foot. A 16-inch pipe enters from the Santa Fe shops. The rate of flow is very rapid. There are house connections every twenty-five feet on each side. Below Crane Street, the bottom is badly silted, but above Crane, the bottom is clear.

3. The manhole at Crane Street is covered up and was not opened.

4. Manhole one-half block south of Crane Street. The masonry is in good condition, the rate of flow is very rapid, and there is considerable odor. The depth of flow is 8 inches.

5. Manhole at First Street is covered up and was not opened.

6. Manhole one-half block south of first Street. Two 12-inch laterals enter here, one from the east and one from the west. There is 8 inches of flow in the main sewer. The rate of flow is very rapid, and there is considerable odor. The crown of the sewer is cracked and settled. Also, there is indication of natural gas being present.

7. Manhole at Third Street. The rate of flow is very rapid, the depth of flow is seven inches. Two 12-inch laterals enter, one from the east and one from the west. The crack in the crown is still present, and the odor is bad. There is considerable seepage of ground water, and the bottom is quite badly silted. Masonry is in good condition.

8. Manhole at Fourth Street. A 10-inch pipe enters here. The odor is bad. The flow is very rapid and ten inches deep. The sewage is very heavy. Sewer turns east.

9. Manhole at Fourth and Adams Sts. Depth of flow is six inches. The rate of flow is very rapid. Masonry is in good condition, and the odor is not so bad as it was a short distance back.

10. Manhole 100 feet south of Fourth Street. The depth of flow is six and the odor is bad. 12-inch laterals enter from the east and west. The effluent is rather heavy, and the velocity is good.

11. Manhole at Fifth and Adams Sts. The masonry is in good condition, the rate of flow is rapid, but the odor is bad. 12-inch lateral enters here some 15 feet south of the manhole. A reverse curve is in line here, with a manhole in each end of the curve. Depth of flow is 9 inches. The size of the sewer reduces. Reduction is of good construction. The size after the reduction is 54 x 40 inches. 100 feet south of this, a 12-inch line from the east enters. The flow in this line is good.

12. Manhole between Fifth and Sixth Sts. Depth of flow is nine inches, three inches of sludge in the bottom. No laterals enter here. Rate of flow is rapid, and there is considerable odor. Size, 54 x 40 inches.

13. No manhole on Sixth Street.

14. Manhole between Sixth and Seventh. Depth of flow, ten inches. Rate of flow fairly rapid. An 18-inch lateral enters from the west.

15. Manhole on Seventh and Adams Sts. Depth of flow, 8 inches. Rapid rate of flow and little odor. A 15-inch line enters from the west. There is a large amount of gravel in the bottom and for a hundred feet south.

16. Manhole between Seventh and Eighth. Bad odor, depth of flow eleven inches, rate of flow very rapid. There is four inches of gravel in the bottom. A 15-inch line enters from the west. One-half block south of this the sewer reduces to a 42 x 30-inch.

17. Manhole one-half block south of Eighth. There is seven inches of flow, and twelve inches of mud below this. Rate of flow rapid. A 12-inch line enters from the east, and a 16-inch line from west.

18. Manhole between Ninth and Tenth. A 15-inch line enters from the west. Depth of flow six inches. Rapid rate. Six inches of sand in the bottom. The main sewer is 42 x 30 inches.

19. Outfall of overflow into the creek at foot of Eleventh Street. This sewer is 6 x 4½ feet, egg-shaped in design, and in good condition. Forty feet in from the outfall is the overflow dam from the 40-inch sanitary sewer. This dam is 32 inches high. The condition of the creek at this outfall is bad—in fact, filthy.

20. Manhole at Thirteenth Street, between Monroe and Quincy Sts. A 40-inch brick sewer in good condition. Rate of flow is very rapid and no odor is apparent.

21. Manhole on Fifteenth Street, on the alley beyond Quincy Street. A 15-inch lateral enters from the north, a 21-inch V. C. P. going east. There is one-half inch of flow in the main sewer. Conditions in general very good.

22. Manhole at Monroe and Fifteenth Street. The masonry needs attention. The alignment is good. A 15-inch pipe enters from the north, a 21-inch from the west, and the main line east is 24-inch.

23. Manhole at Fifteenth Street, just beyond the Santa Fe tracks. A 40 x 45-inch egg-shaped sewer. The odor is very bad. The depth of flow is three inches on top of three inches of sludge. Masonry is in good condition. No laterals enter here.

24. Manhole beyond Euclid on line with Monroe. Manhole cracked on top. The bottom is badly silted, and the sewage is heavy. Alignment is good. There is a bad crack along the top to Eighteenth. Four inches of flow and three inches of silt. An 8-inch lateral enters below the water line. The size of the sewer is 45 x 40, egg-shaped brick.

25. Manhole at Quincy and Eighteenth Sts., at turn. Four inches of flow. Masonry is O. K.

26. Manhole on Eighteenth Street, alley one-half block east of Kansas. Flow of three inches. Four inches of silt. A 12-inch V. C. P. from the northwest. Alignment is good, but the sewage is very heavy.

27. Manhole at Eighteenth and Kansas Avenue. A 15-inch V. C. P. from the side. A bad crack in the crown of the sewer, and six inches of sludge in the bottom.

28. Manhole west of alley on Kansas Avenue, a 20-inch line from the north, and a 20-inch line to the south. Odor is bad, but the velocity is good. Depth of flow is three inches. Seven inches of sludge in the bottom.

29. Two manholes on Eighteenth Street and Van Buren Street. Masonry is in good condition, and street drains enter here. No reduction in size, still 45-inch.

30. Manhole at Eighteenth at alley beyond Van Buren Street. A 52 x 40-inch egg-shaped brick. A 21-inch V. C. P. enters from the south side; a 12-inch V. C. P. enters from the north. These lines are badly stopped up—in fact, the flow is less than two inches, while there is 12 inches of silt in the bottom. The alignment here is good, but odor is very bad.

31. Manhole inlet Harrison and Eighteenth Sts. Size 45 x 31 inches. Twelve inches of mud; two inches of flow. A 12-inch V. C. P. enters from the south, and there are four surface drains.

32. Manhole east of Topeka Avenue. A 12-inch V. C. P. from the west, a 30 x 24 from the north, with water backing up in it. Eighteen inches of water in this. A 12-inch pipe enters from the west. The pipe from the south is under the water line. Bad condition in general.

33. Manhole at alley south of Eighteenth Street. A 27-inch V. C. P. with three inches of flow. No noticeable odor.

34. Manhole west of Nineteenth and east of Topeka Avenue. No slope on the benches. A 12-inch V. C. P. from the west, with four inches of flow and two inches of mud. No odor and good masonry.

35. Manhole west of Twentieth and on the alley. A curve in the 27-inch line. The sewage is clear, with five inches of flow. An 18-inch V. C. P. enters from the south. Flow and alignment are good.

36. Manhole at Topeka Avenue and Twentieth Sts. and Fair Grounds. A 24-inch enters, and a 27-inch goes out. Three inches of flow. A 15-inch overflow to ditch, and a 12-inch drain from the northwest. The rate of flow is good.

37. Outfall of 60 x 36-inch concrete-lined storm sewer. This outfall is into Shunganunga Creek. There is very little flow. Outfall is nine feet above water. Good alignment.

38. Manhole at Fillmore and Twentieth Sts. Made of concrete, 36 x 60-inch. An 18-inch dam to the overflow. There is three inches of flow and two inches of mud. Concrete line is 36 x 30 to the north, and 32 x 18 to the south. This manhole has been repaired quite recently, and in good shape.

39. Manhole at Third Street and alley, between Monroe and Madison. The manhole is in poor condition, and odor is very bad. 15-inch V. C. P. 10-inch V. C. P. from the southeast. Depth of flow is one inch.

40. Manhole on Second Street, between Monroe and Madison. Odor very bad.

41. Manhole between Second and First Sts. The odor is bad, sludge and mud in the bottom, slow rate of flow. A bad place in the invert here, as the bottom is entirely covered with water. Ladder rusted away, and the masonry in bad shape.

42. Manhole between First and Crane on the alley. Sludge in the bottom. The odor is bad; the ladder is gone.

43. Manhole on Crane Street, between Monroe and Madison. A 15-inch V. C. P. The odor is bad and the velocity is slow. A 15-inch V. C. P. from the west. Water and raw sewage stand in the bottom. Rotten condition.

44. An 18-inch line going north. Depth of flow is seven inches. Outlet of sewer between Monroe and Madison. A 20-inch V. C. P. Odor is bad and the rate of flow is slow.

45. Outlet on a 16-inch V. C. P. with one inch of flow. High velocity.

46. Outfall number 2 a 22-inch V. C. P., carrying slaughter-house refuse. Depth of flow is two inches. Effluent stands along the bank in a stagnant condition. This evidently a private sewer of Packing Company.

47. Manhole on Crane between Monroe and Quincy Sts. A 15-inch V. C. P. There is two inches of sludge and water. An 18-inch V. C. P. from the northwest. Masonry is in bad condition. The odor is bad.

48. Manhole on Second Street, between Monroe and Quincy Sts. Could not open. No flow and the odor is bad.

49. Inlet manhole on north side of Third, between Monroe Street and Quincy Street. Very little flow. Septic action in evidence.

50. Manhole on the south side of Third, between Monroe and Quincy Sts. No flow and septic action in evidence.

51. Inlet manhole Third and Fourth. No flow and septic action in evidence.

52. Manhole between Fourth and Fifth. Rotten condition. No flow and septic action in evidence.

53. Manhole on Crane Street, between Quincy and Kansas Avenue. A 12-inch V. C. P. comes in from the northwest, with a good flow. The top of the manhole is skewed over to allow for the street-car tracks. Sewage is in good condition.

54. Lamphole on Fourth Street, between Quincy and Kansas Avenue. There is a bad odor here, and a rapid rate of flow.

55. Manhole Fourth Street, between Quincy and Kansas. 18-inch V. C. P. going out north, and a 15-inch V. C. P. coming in from the south. Depth of flow is one inch. 8-inch drain from the west. Manhole is in fair condition, but needs a new cover.

56. Manhole at jog between Sixth and Seventh and between Quincy and Kansas. 12-inch V. C. P. Depth of flow is 2-inches. Good rate of flow.

57. Manhole Eighth Street, between Quincy and Kansas. 12-inch V. C. P. There is one inch of flow here, and five inches of mud. Flow has good velocity.

58. Manhole at jog between Eighth and Ninth Sts. There is a good flow here. There is a steam pipe intercepting the manhole.

59. Manhole at Ninth Street, between Quincy and Kansas. There is a good rate of flow here. 1.5 inches of flow.

60. Manhole at jog between Ninth and Tenth, between Kansas and Quincy. There is a slow velocity here. There is 1.5 inches flow.

61. Lamphole near Tenth Street in the alley between Quincy and Kansas.

Inspection of Flush Tanks.

1. On the north side of Huntoon, between Buchanan and Lincoln Sts., the water was running freely, but not filling the tank. This was probably due to a leak in the siphon.

2. On the north side of Huntoon between Lincoln and Lane, the valves broken and bell of siphon gone. The water flowing directly into the sewer in a steady stream.

3. On the south side of Euclid Avenue, in the alley between Lane and West Sts., tank is in good condition. Diameter of the tank 44 inches. Depth at which it flushes, 24 inches. Flushes at intervals of 36 minutes.

4. On the south side of Euclid Avenue, between Clay and Buchanan, tank is in good condition. Same size as No. 3. Flushes at intervals of 30 minutes.

North Topeka Flush-Tanks.

1. On Saywell Avenue, and alley west of Kansas Avenue, tank stands full of water. No flow in or out.

2. North of the Union Pacific Station and one-half block east of Kansas Avenue, tank is in good order. The dimensions: 4 feet square; depth of flush, 21 inches. Flushes at 20 minute intervals.

(These are all the flush-tanks found and inspected.)

APPENDIX "E".

MILK PRODUCERS ACCORDING TO AMOUNT PRODUCED, TOPEKA, 1913.

(Figures furnished by City Milk Inspector.)

Producing Average qts. per day	Number of producers	Per cent	Average daily qts. produced	Per cent
0— 25	63	35.6	931	10.3
26— 50	57	32.2	2152	23.6
51—100	37	20.9	2584	28.4
101—150	13	7.3	1631	17.9
151—200	1	0.6	160	1.8
201 and over	6	3.4	1640	18.0
Totals	177	100.0	9098	100.0

CHEMICAL EXAMINATIONS OF TOPEKA MILK, NOV., 1913.

(Examinations at State Agricultural College.)

Dairy	Butter Fat	Total solids	Dairy	Butter Fat	Total solids
1	3.50	12.27	15	4.10	13.16
2	4.10	12.28	16	4.20	12.80
3	4.20	13.36	17	4.05	12.83
4	3.50	12.58	18	3.40	11.91
5	4.10	13.20	19	4.05	13.20
6	3.90	12.56	20	4.20	12.90
7	4.05	13.21	21	4.10	13.10
8	3.40	12.50	22	4.30	13.40
9	4.10	13.18	23	4.05	12.28
10	3.80	12.60	24	4.15	12.80
11	4.00	13.18	25	4.00	12.48
12	4.30	13.20	26	4.05	12.60
13	3.80	12.51	27	3.40	11.16
14	4.40	13.73			

MAIL PRINTING HOUSE, TOPEKA, KS.