1932

The public health engineer's part on a health program

Walter Eric Casey

Department:

THE PUBLIC HEALTH ENGINEER'S PART ON A HEALTH PROGRAM

by

Walter Eric Casey

A

T H E S I S

submitted to the faculty of the

SCHOOL OF MINES AND METALLURGY OF THE UNIVERSITY OF MISSOURI

In partial fulfillment of the work required for the

D E G R E E O F

CIVIL ENGINEER

Rolla, Mo.

1932

Approved by Joe B Butler

Professor of Civil Engineering

TABLE OF CONTENTS.

I...INTRODUCTION

The drought of 1930 and the conditions affecting public health as a result of it have been the most important problems before the State Department of Health during the past year. Deprivation, the lack of the right kind of food and sufficient clothing, along with the inability to secure medical aid, have, to a certain extent, lowered the resistance of the people thruout the drought affected area of Missouri.

Reports sent out by the Bureau of Vital Statistics at Jefferson City show that contagin and nutritional deficiencies have increased during the past year, especially in the drought area. Typhoid fever, for example, has increased 125 percent in the southern part of the state as compared with 59.5 percent increase north of the Missouri river. Scurvy, pellagra, rickets and such deficienies are increasing. Tuberculosis also is increasing because of the lowered resistance.

The children in particular have suffered from the lack of proper foods so necessary for

sturdy development. This fact coupled with the insanitary environment in the rural communities has caused a marked increase in the mortality of early childhood. A great deal has been done by relief agencies to maintain life but more was needed. In addition to furnishing food, clothing and other necessities a thorough immuzation program was started early in the work. Results were accomplished very slowly at first on account of ignorance on the part of the people, superstition and local teaching among certain religious groups. Adults suffer temporarily from deprivation but with the children it is a different matter. Permanent disabilities will be noted in later years if this relief work is not carried on.

The State Board of Health has been doing what it could in disease control thru quarantine, immunization and education but in the past very little has been done in the improvement of sanitation. However in the last few months there has been much more interest shown in sanitation. It seemed to be the custom of the medical profession

to veil their work in a sort of mystery and by so doing the general public was kept in ignorance as to the cause and prevention of disease. It also seemed that the average Doctor was to busy or did not wish to be troubled with such every day problems as filth and its adequate disposal. At any rate the Doctor and his nurses have done little to improve the sanitary conditions of the community in which they found themselves. Perhaps the Doctor took it for granted that the people knew all these laws and principles of sanitation which are so familiar and commonplace to the Doctor, and not worth his serious consideration. If so the Doctor has errored. It has been shown by careful investigation that the common people, with all their modern, up-to-date, labor-saving machinery, are still about a hundred years back in matters of sanitation. Especially is this true in the rural districts. A generation or two ago it was considered more healthful to live out in the country than in the cities, but now conditions are reversed. After much diligent research it has been definitely determined that the average city or

town is a more healthful place to live and rear a family than out in the rural sections. This change was brought about by the improved sewage disposal systems in the cities. People are beginning to wake up to the fact that about three fourths of all our diseases in this part of the country are filth borne and in order to break the chain of transmission from the old patient to the new and thereby stop the spread of disease, it is necessary to improve the sanitary conditions of the community.

It has been a hard, bitter fight for the State Public Health Engineer in the past due to a lack of adequate funds and a trained personnel to carry on the work. Fortunately Congress made available, thru the United States Public Health Service, funds to assist the drought-stricken states in meeting the health emergencies. The funds, $2,000,000 in all, were available Feb. 6, 1931 and as soon as the different state plans were submitted and approved by the Public Health Service a corps of trained men and women were put to work in the field on the Co-operative Rural Health Program. The funds

made available by that appropiation were to be used in studies of and demonstration work in rural sanitation. The states receiving Federal Aid were;

Alabama	Indiana	Missouri	Tennessee
Arkansas	Kentucky	Montana	Texas
Georgia	Louisiana	Oklahoma	Virginia
Illinois	Mississippi	Pennsylvania	West Virginia

In order to simplify matters as much as possible and still maintain a working organization, the southern part of Missouri, which suffered most from the drought of 1930, was divided into five districts of nine or ten counties each and these districts were designated as the Rural Health Districts of Missouri. Each district is under the supervision of a full-time, trained district Public Health Director who is assisted by a District Public Health Engineer, five nurses and a public health laboratory with a trained Technician in charge who is prepared to take care of bacteriological, serological, and parasitological examinations directly related to the detection and control of communicable diseases.

It will be noted that altho the funds were appropiated for a demonstration in rural sanitation, when the plans were finally worked out they provided for a Doctor and five nurses to carry on the work, mostly child hygene, while there was only one Public Health Engineer in each district to demonstrate what could be done in rural sanitation.

In this work the Public Health Engineer should not be confused with the Sanitary Engineer as the term is commonly used today. The Sanitary Engineer is primarily a designer or builder. He is, in fact, a civil and hydraulic engineer specializing in a rather restricted field, confined for the most part to works relating to municipal water supply and sewage.

The Public Health Engineer on the other hand is primarily a student and worker in the field of public health. The range of his activities is wider, and his training and knowledge are of essentially different character. It is not so important that he know how to build a sewer as that he know why sewers are necessary and what results may be antici-

pated from the discharge of their contents without treatment into a body of water. Trained to think with the clearness and acuracy of an engineer, he employs as his material the data of physics, chemistry, and biology which underlie the present-day practice of public health.

When the District Health Units were organized in April 1931 the writer was assigned to the duties of District Public Health Engineer of District Number 2 in the southwestern part of the state. The counties included in this district are;

Barry	McDonald	Taney
Christian	Ozark	Webster
Douglas	Stone	Wright

The original plan was to include Greene, Lawerence and Newton with district headquarters in Springfield. Later those three counties were excluded from the district and Ozark, Christian County, was made district headquarters. An office was established and about two months later the branch laboratory was sent into the district.

II HIGHWAY, TOURIST CAMP AND RESORT SANITATION

Now that our State Highway system is so nearly completed and it is so easy for the public to use the automobile in traveling for business and pleasure, the outdoor life seems to be increasing in popularity. Because of that fact the need of better sanitary conditions in the resort areas of Missouri has caused the State Board of Health to give the problem due consideration in the past five or six years. Each year there seems to be a greater number of people who leave the sanitary environment of the cities and spend from a few days to six months in the rural sections, where the knowledge of sanitation is limited and its practice almost unknown. This is becoming a serious problem in sanitation. Up until the last decade it was quite possible to trace the course of an epidemic of most any kind across the country along the trunk line railroads, but now they follow the highways and the danger of spreading the communicable diseases is thereby increased.

The State Board of Health has been studying the problem in the past and tho sufficient funds

for a detailed study of the problem have never been available, the camps and resorts thruout the state have been inspected at least once each year by an Assistant State Public Health Engineer and in these inspections special attention was given to water supplies, sewage and garbage disposal and location of the camp or resort.

A definite program has been worked out to secure satisfactory camp and resort sanitation in Missouri, and has been developed along two lines;

FIRST - in places along the highway where the traveling public stops, for business or pleasure, such as filling stations, garages, parks, camps, etc., rest stations have been installed by cities, corporations, companies or individuals and all those that meet certain rigid requirements of sanitation and are approved by the State Board of Health are given standard rest station markers by the Highway department. When the work was begun there were very few rest stations along the state highways which could be approved by the Board of Health but the number is steadily increasing now and as a result the health

conditions are improving for the traveling public.

SECOND - all tourist camps and resorts are required to have an annual permit from the State Board of Health in order to operate as such. These permits are granted only when the camp or resort has met all the requirements of the State Board of Health in regard to water supply, sewage and garbage disposal and general sanitation. No fee is charged for the inspection and the permit cannot be bought. As in the case of rest stations the camps and resorts along state and federal highways are given approved tourist camp markers by the State Highway Department.

Up until May 1931 all the tourist camp and resort work in the state was done by an Assistant State Public Health Engineer from Jefferson City but when the District Health Units were organized this phase of the work was given over to the District Public Health Engineer. Since the district is one of the greatest resort areas of the state and being unfamiliar to the District Public Health Engineer it was necessary for the Engineer to devote the greater part of his time from May to September of last year among the camps and

resorts.

During the 1931 season a total of 138 camps and resorts were inspected by the District Public Health Engineer, some camps visited as many as eight times, and 73 of them or 54% were approved. This does not include all the tourist camps and resorts in the district because some of the camps were inspected by the Assistant State Public Health Engineer before the District Health Units were organized and later when he came in to work with the District Public Health Engineer. The thing that caused more grief than any other one thing was the sewage disposal. The summary shows 22 camps having defective pit privies on the first inspection and of that number 15 camps made corrections during the summer. Several camps were using the filthy, fly-breeding open-back privies and in many cases where the water flush toilet had been installed a careful investigation showed that the septic tank was not working properly.

There were many defective water supplies also but as a rule it was much easier to get action in correcting a defect in the water supply than in a privy.

In most instances it required merely disinfecting the well with chlorinated lime but in some cases it required a reconstruction of the supply or an entirely new supply. Camp owners owners and managers seemed willing enough to improve the water supply but with the sewage disposal it was different. They did not seem to appreciate the value of adequate sewage disposal in the camp or resort.

Altho it is unlawful for any camp or resort to operate without a permit from the State Board of Health no attempt was made to close a camp or resort in the district last year because it failed to meet the requirements of the State Board of Health. It is the belief of the Department that more lasting good can be accomplished by working among the camp and resort owners and bringing up the standards rather than fighting a few individuals who would try to operate regardless of whether they had a permit or not. Then it is hoped that by educating the public as to the advantages and safety of the approved camps and resorts the others will make improvements to meet the requirements of the Board of Health or will have to close of their own accord because they will not get

enough business to justify their existance.

At the time the District Health Units were organized there were 10 approved, Grade "A", rest stations in the district. These rest stations have been regularly inspected by the District Public Health Engineer to see that they are maintained and kept in a sanitary condition. In addition to the original 10 rest stations 41 others have been inspected and 9 new ones have been put on the approved list. Several others will probably be approved on the next inspection.

Along with the tourist camp and resort work comes the swimming pool sanitation. Since they are used by the public the State Board of Health has decided that they need some type of supervision if the health of the community is to be safeguarded. There are in the district five privately owned and one municipally owned swimming pools. All these pools were inspected by the District Public Health Engineer last season giving particular attention to; source of water, frequency of change, purification, number using the pool daily, time and method of cleaning, care of rent suits, and other sanitary features which may affect the health of those using the pool.

III PUBLIC WATER SUPPLIES

The State Board of Health has worked out a program for the supervision of public water supplies and many improvements have been noted in the supplies since the Board of Health became concerned with the source of supply, purification and storage of water to be used as public drinking supplies. Water is one of the necessities of life and history is full of instances in which water was the means of carrying filth borne disease germs which caused epidemics and threatened to wipe out entire communities.

The drought of 1930-31 brought on problems which taxed the ingenuity and resources of the water works officials. In many cases it was almost impossible to procure a water supply of any kind to replace those which had failed or dwindled so low as to cause a serious water shortage. Even the underground water supplies began to fail and it is difficult to say whether wells and springs have returned to normal yet or not. Many of the emergencies supplies resorted to were not safe for human consumption and that caused a serious health problem

to rise, but the unusual condition was kept so well in hand by the Public Health Engineers and water works officials that no marked increase in the water-borne diseases was noted in the affected area.

There are 218 public water supplies in the state and 141 or 65% of them are ground water, that is, drilled wells or springs. The remaining 77 cities depend on surface water from lakes, resevoirs, or running streams and the water must be put thru a process of purification before it can be used for drinking purposes. In some cities the water purification is a very complicated and costly process but even so it is more economical than to use the raw water and suffer from the filth-borne diseases carried by the water.

In this district there are 16 public water supplies and all are drilled wells. There are 3 private owned and 13 municipal owned public water supplies in the district and 14 of them are approved by the State Board of Health. One supply, Monett, is being chlorinated at present and the Board of Health recommends that another, Mansfield, be chlorinated because of a

number of bad samples sent in for bacteriological examination last year. Two complete sanitary surveys of the public water supplies in the district have been made by the District Public Health Engineer since April 1931. In these surveys particular attention was given to method of sealing pump to well casing, storage of water, cross connections with other supplies and all other possible sources of contamination. In addition to the samples sent in annually by the water works superintendents for chemical analysis the District Public Health Engineer sends in samples quarterly for bacteriological examination. Altho there is a branch laboratory in the district it was deemed advisable to continue sending the samples from the public water supplies into the central laboratory for the bacteriological examination.

Last year only 9 of the 16 public water supplies were approved by the State Board of Health while at present 14 of the supplies are approved. The District Public Health Engineer was instrumental in 3 new deep drilled wells; Cassville, Mountain Grove and Noel and one complete new water system at Hollister. In each

case the plans for the proposed improvement were submitted to the State Board of Health for approval before the construction work was begun.

The State Highway Department has agreed to work with the Board of Health by placing an approved water sign at the city limits of all cities having a water supply approved by the State Board of Health.

IV SEWAGE DISPOSAL

The problem of adequate sewage disposal, while equally as important as the problem of securing a safe and reliable water supply, is usually given far less consideration by most small cities and towns. It is a problem that is demanding more attention each year due to the rapidly growing cities and the tendency of many industrial establishments to dump their wastes into the rivers. This practice, if allowed to continue, will soon render our rivers unfit for anything except to act as open sewers. Of course the large cities with their various industries are necessary for the future development of the state but the time has come when it is also necessary for all wastes, whether they be

domestic or industrial, to be properly taken care of.

The State Board of Health is meeting the problem of sewage disposal to the best of its ability. The lack of necessary funds and a trained personnel has been a serious handicap yet a great good has been accompliahed in the last few years. In the present program all plans and specifications must be submitted to the State Board of Health for approval before construction work on new sewage works is begun. The Board of Health makes regular annual inspections of all sewage treatment works and follows up with recommendations for desired improvements.

Complete sanitary surveys are made of cities not having adequate sewage disposal and interested in constructing a new sewer system or improving the one in use at the time of the survey. Later the Public Health Engineer reports his survey along with his recommendations for improving the conditions. Talks are given before mass meetings to point out the dangers to public health that are ever present with the existing system.

The Board of Health is often called upon to

make investigations on a stream which is being polluted by untreated city sewage or industrial wastes. The present state laws are somewhat out of date and indefinite in regard to these violations of health regulations but it is hoped that suitable legislation and adequate funds may be at hand to help solve these problems in the very near future.

The Monett sewer system is the only public sewer system in the district. It was installed about 25 years ago and at present it is not working with any degree of satisfaction. The sewage is given only primary treatment. A septic tank which was probably built so small it could not take care of the growth of the city is quite overloaded at present and the effluent is discharged directly into a dry creek bed just outside the city limits. The effluent constitutes a serious menace to the health of the community yet the city officials, when approached by the District Public Health Engineer, said they had no funds with which to remedy the condition. Some new city officials went into office this spring and it is hoped that these new officials may be able

to remedy the unhealthful condition that now exists at the sewage treatment plant,

The city of Ozark has a semi-public sewer system that serves about one half of the city. It has no treatment whatever but empties directly into Finley River. Numerous complaints have been received by the city in regard to empting the raw sewage into the river. The District Public Health Engineer has met with the city officials in an effort to get some kind of a treatment plant so the sewage could be given primary treatment at least before being discharged into the river. An Imhoff tank was recommended and a location was chosen with an idea of adding secondary treatment sometime later. As yet no action has been taken and it is doubtful if the city will feel able to undertake such a construction at this time.

V MILK SANITATION

The larger cities of the state have succeeded in getting rid of the milk-borne epidemics of disease by enforcing the use of pasteurized milk and effective supervision of the raw milk dairies. In the smaller

cities there is practically no sanitary supervision of the milk supplies and, as a result, there are more epidemics of disease in these communities each year which are traced to the milk supplies.

To meet this need the State Board of Health working with the United States Public Health Service has developed a program of co-operative milk sanitation control which will insure a safe and reliable milk supply for any city or town in the state. The program includes the adoption of the Standard Milk Ordinance and appointment of a local enforcement officer by the city and the active assistance of the State Board of Health in the operation and enforcement of the ordinance.

By the Standard Milk Ordinance we mean a city ordinance to control the production of milk to be used in the city. The Standard Milk Ordinance, as recommended by the State Board of Health, has been adopted and is being used in about thirty cities and towns of Missouri at present. It has been tried out and found to be a workable ordinance in the smaller towns as well as in the larger cities. The orcinance does not work a hard-

ship on the dairyman as it only supervises him in his milk production and helps him to do the things he should do anyway to safeguard the health of his own family and friends. It does not prohibit any one from selling milk but it does grade the milk and requires that the milk be labeled according to its grade. It does not cost the city much to enforce the ordinance. The laboratory equipment required for testing the milk when grading the dairies is very simple and inexpensive. The city is required to appoint an inspector who will go into the dairies and inspect them four or five times a year and report conditions as he finds them. In the smaller cities the inspector need not be a full time man. One of the Assistant State Public Engineers out of Jefferson City who is the State Dairy Speciallist will make regular trips of inspection and thus keep the dairies under the supervision of the State Board of Health.

There are five reasons for the adoption of the Standard Milk Ordinance by any city;

FIRST - Stop the use of adulterants in milk, both water and preservatives.

SECOND - Insure a safe milk supply by requiring T.B. test for cows, medical examination of all employees at the dairy, properly protected water supply, and adequate toilet facilities on the dairy farm.

THIRD - Promote cleanliness about the cow yard, stable, milk house, untesils, etc.

FOURTH - Increase keeping quality of the milk by proper cooling and disinfecting the milking utensils to lower the bacteria count of the milk.

FIFTH - Increase consumption of milk in the community.

Milk is our cheapest food and is the best all-round food, especially for growing children. It contains more of the elements necessary for body growth than any other one food yet if the milk is not properly taken care of it becomes an ideal breeding place for many of the disease producing bacteria which are detrimental to the health of the child.

Monett had adopted the Standard Milk Ordinance and was enforcing it when the District Health Units were organized. When the work was started and well under way the District Public Health Engineer,

assisted by the District Director, proposed the Standard Milk Ordinance in six other cities of the district. Talks were given before mass meetings, city councils, dairymen, amd others interested in better milk production. One of the cities has adopted the odrinance but has not started enforcing it yet. In the other cities where the Standard Milk Ordinance was proposed the only opposition that was noticed was among the one and two cow men and in some cases they happened to be members of the city council. The more progressive dairymen all favored the ordinance. The District Public Health Engineer has inspected 38 dairies in the district and had 206 conferences with dairymen and others interested in milk production.

VI SCHOOL SANITATION

By school sanitation we mean the control of the environmental factors which may affect the child's health while attending school. The State Board of Health is more concerned about the health of the school child than any other phase of the work. The school children of today will be the men and women of tomorrow

and the responsibility for the welfare and prosperity of the state depends on them. In the school children we have the social raw material of the atate and the schools are the nurseries where this raw material is developed. It is as logical that the state conserve this raw material as any other natural resource. The problems facing society and government today demand trained leaders as well as an understanding and informed public. It is quite evident that effective mental activity during the school years as well as later in life, is founded upon good physical health and while the child is receiving the mental training for future success he is also building the foundation of his future health.

During the school ages the greater part of the child's active day is spent in the school. In this environment the child develops mentally, morally, and physically and a healthy physical development depends, to a great extent, upon the sanitation of the school environment. Diseases and defects resulting from insanitation cause irregular attendance, lowered efficiency and, with few exceptions, the aftereffects

of sickness will constitute a hardship to the individual throughout life.

Statistics now show that in any school 50 to 75 percent of its pupils are suffering from one or more physical defect. Although the school conditions cannot be blamed for all the defects, some are, no doubt, entirely or partially due to this cause. Defective vision, due to improper school lighting, disturbances of the nose, throat and ears due to poor school ventilation, and many other physical defects can be traced to school conditions.

The actual value of school sanitation is not a theoretical consideration. I n Missouri there is a marked contrast between the sanitation of the average rural school and the modern city school. The occurance of physical defects in county children is from 15 to 25 percent greater than among city children. It is evident that the immediate surroundings of the child, environment in homes and schools, are responsible for this condition. Consequently, the problem of rural school environmental sanitation is a subject that is receiving serious consideration at

this time.

The educational value of satisfactory school sanitation should not be overlooked. For the past ten years health officials have been getting away from the force method of proceedure and adopting the educational method instead. There are two reasons for this change;

FIRST - The force method was necessarily slow and laborious, as well as unpopular.

SECOND - It was necessary to educate the individual in the technique of disease prevention to secure adequate results.

In recent years courses of study pretaining to matters of health and hygene have become standard in most schools. Demonstration constitutes an important method of education, especially when connected with text-book studies and the school with proper sanitation facilities is a daily example and reminder to every pupil. When the boys and girls understand that the school sanitation equipment is for their own safety and welfare, good psychology has been employed. The pupils can be taught more in regard to sanitation by the daily contact with, and example of the sanitary

equipment than in any other way.

School sanitation is based on scientific research and it took the educator, engineer and doctor all working together to develop the fundamentals and work out the details. Special training and experience is required for those in health positions today so the school authorities have turned to the health officials for direction in matters of school sanitation. Consequently, the State Board of Health has developed a program based on the following;

FIRST - The establishment of specific standards of school sanitation.

SECOND - Provision for inspection of school sanitation features and suitable action for remedy of defects.

The State Board of Health revised its sanitary code in 1928 and included a complete new section on school sanitation and since that time there has been quite an increase in the interest of school teachers and county superintendents of school in rural school sanitation. In order to carry out the program of the State Board of Health it became necessary to place the responsibility

and authority for school sanitation in the hands of a single trained health authority in each community. In developing the program the following facts were given due consideration;

FIRST - Schools must receive regular periodic sanitary inspections.

SECOND - This must be done by a trained sanitarian.

THIRD - At least one individual in each county should be responsible for school sanitation.

FOURTH - The inspection must include all phases of rural school sanitation.

FIFTH - The defects must be reported to the school directors and county superintendents with recommendations for necessary changes. In other words, adequate follow-up work.

This program requires that each county health officer or deputy state health commissioner make a sanitary inspection of the schools under his jurisdiction each year. In many instances, however, it was found that the county health officer was not performing his duty because of a lack of compensation from the county court. When the District Health

Units were organized last year it was not planned for the District Public Health Engineer to take over the work of the county health officer in the rural school inspection. It would have been a physical impossibility because of the number of rural schools in the district and the limited time school was in session. In a few of the counties the local health officer was being paid by the county court to make the inspections and in those counties the plan was for the District Public Health Engineer to work with the county health officer to secure more and better inspections of the schools.

In the past the rural schools of the state have been inspected annually by the Department of Education and rated as first, second or third class according to certain standards. Since the inspectors from the Department of Education were not sanitarians and not interested in matters of sanitation many of the sanitary defects were overlooked. Last year the Department of Education ask the Board of Health to make the sanitary inspection of the schools and agreed to not give any school a first or second class rating

until the State Board of Health approved the sanitary features of the school. When school began the District Public Health Engineer was instructed to make an inspection of all the first and second class schools in the district and a list of the schools so rated the preceding year was furnished by the Department of Education. In this district there were 47 schools on this list, 36 of which were first class. The District Public Health Engineer visited all the schools listed in addition to the inspections made by the county health officers. In each case a report of the inspection was sent to the central office in Jefferson City, the County Superintendent of the county in which the inspection was made, and the Clerk of the school board. The report to the clerk was accompanied by a letter recommending the changes to be made about the school. Often the District Public Health Engineer was able to locate some members of the school board and make his recommendations direct. From time to time calls were received from teachers, board members or others from various schools and these also were inspected. During the past school

year 224 school inspections were made by the District Public Health Engineer and 472 conferences were held with teachers, school board members, county superintendents and others interested in school sanitation. Of all the schools inspected none were found which met all the requirements of the State Board of Health in regard to sanitary features. First grade certificates were issued to four of the schools in the district but neither of the four met the requirements for approved lighting. 95 percent of all the schools inspected were measured and the ratio of window area to floor area was calculated. The requirement for an approved school of the first class is for the window area to be 20 percent of the floor area, however, the average was found to be about 12.8 percent. One school room was found in which the window area was only 5.4 percent of the floor area and many were found that were below 10 percent. The defects in Water supplies are gradually being overcome. Eleven new wells were drilled in the district for improved school water supplies. Only 19 percent of the schools inspected are still using the old type, open-back,

fly-breeding privy. The consolidated schools are installing the water-flush toilet and septic tank and in the rural schools they are turning to the fly-tight pit privy. The thing most noticable about the school toilets, especially for the boys, was the maintenance rather than the construction. It seems as if the teachers might give the toilets a little more personal supervision and thus help maintain more sanitary school toilets.

VII JAIL SANITATION

Most of the jails of the state are in an overcrowded condition at present and because of the overcrowding many of them are not maintained with due regard to health and sanitation. The jails have never been given much sanitary supervision until recently when the State Board of Health instructed the District Public Health Engineers to make a complete sanitary survey of the jails in the district. Jail inspection was added to the work only a short time ago and at present the District Public Health Engineer has not completed the

sanitary inspection of all the jails in the district. Those visited were found to be in a fair condition as far as the sanitary features were concerned. The floors showed that they had been recently cleaned and the prisoners were fairly well groomed. The problem of lighting and ventilating did not seem to get much attention or consideration at the time of construction, especially in the older jails.

VIII MALARIA CONTROL

In a few of the counties of southeastern Missouri the malaria problem is a big one. The local health authorities have been working on it for years but did not seem to be accomplishing the desired results. Two tears ago the State Board of Health began to consider it seriously and last year a Public Health Engineer especially trained and qualified in mosquito control work was sent into that district. Much has been done to relieve the situation but the Board of Health is not satisfied with the results attained thus far and more extensive work is planned for this year.

In other districts of the state where large impounding resevoirs have been built the mosquito menace is increasing and health problems have developed that demand the immediate attention of the State Board of Health. There is comparatively little malaria in this district, however. Only 5 deaths were reported in the last 3 years. There is a small impounded resevoir, Lake Taneycomo, on the White River but the mosquito menace does not seem to be of very great consequence. The District Public Health Engineer has devoted very little of his time to malaria control work.

IX COMMUNITY SANITATION

As stated before in this paper the funds appropiated by Congress Feb. 6, 1931 were to be used in studies of and demonstration work in rural sanitation but when the plans were finally completed there did not seem to be much provision made for rural sanitation. With one Public Health Engineer in a district the size of this and all the tourist camp and resort work to take care of along with the

public water supplies, school sanitation, jail inspections, nuisance complaints and numerous other duties not much time is left to devote to the actual sanitation of the community where there is such a great need for the work. However, a certain amount of time was given to this phase of the work.

There are several semi-public water supplies in the district. They consist chiefly of wells or springs owned by a group of individuals or used by a number of families. Whenever such a supply was found it was carefully inspected by the District Public Health Engineer and a sample was taken for bacteriological examination. Recommendations were made for necessary improvements, which, in many cases were carried out.

From the time the work first started numerous requests have come in for inspection of and recommendations for improvements of private water supplies. These calls have all been answered by the District Public Health Engineer and many of the supplies were found to have very little, if any, protection from surface contamination. A sample was

usually taken from the supply for bacteriological examination and no charge was made for the service altho the instructions from the central office were to collect $1.^{00}$ for each sample taken from a private water supply. Several new wells were drilled in the district during the past year and whenever the District Public Health Engineer happened to see a well driller at work along the highway he stopped to talk with the property owner and the well driller in regard to the depth of the well, depth of casing and method of sealing surface water out, and how water was to be drawn from the well. Most of the private water supplies in the district are drilled wells but there are many springs still in use and some few cisterns and dug wells. The springs in this part of the state are not reliable drinking supplies. Almost all of them get cloudy or muddy when it rains and even the best ones show contamination at certain times of the year.

The sewage disposal in the rural communities is still a problem to be solved. Most of the homes are using the old open-back privy and even in the

built-up communities and fair sized towns they are in a very bad condition. The District Public Health Engineer has made a complete sanitary survey of six of the towns in the district. A program to improve the sanitation of three or four towns has been started in which the sanitary, fly-tight pit privy was recommended as being the most suitable type of sewage disposal to install at the present. This program includes a complete sanitary survey of the city, talks before mass meetings to arouse the people and wake them up to the need of better community sanitation, the adoption of the sanitary privy ordinance and direct supervision by the District Public Health Engineer during the construction of the sanitary pit privies.

With most of the towns and even in the larger tourist camps and resorts the problem of garbage disposal has not been solved to the complete satisfaction of all concerned. A few of the towns have their garbage collectors but usually it is up to each individual to dispose of his own garbage and many of them get negligent about it.

There are several cheese factories, tomato canning factories, and a few privately owned slaughter houses scattered over the district, all of which are having more or less difficulty in disposing of their wastes. The cheese factories seem to be giving more trouble because they operate continuously and usually they are located in the towns while the canning factory and slaughter house is located outside the town. The cheese factories, tomato canning factories, and most of the slaughter souses have been inspected by to District Public Health Engineer but little improvement has been noted from the recommendations made.

Numerous complaints regarding nuisances have been received but the District Public Health Engineer has not given much time or attention to them. Strictly speaking nuisances are not public health problems and should be taken care of thru local authorities. Spite work or neighborhood quarrels were usually found to be back of the nuisance complaints. In not a few cases it was found that the one who complained was maintaining a nuisance as bad or worse than the

one he was complaining about.

Very little work has been done so far in an effort to control the breeding of flies but a campaign is now being started in each town which may eventually lead to the closing up of all possible fly breeding places in the community. It is hoped that the filth-borne diseases can be kept better under control without the aid of the fly in carrying the germs about.

The problem of weed control is being given some consideration in a few of the towns of the district. People are beginning to realize that weeds harbor flies, mosquitoes, rats and other vermin which may carry the germs of disease. Some of the towns are taking care of the situation by planting vegetable and flower gardens in all the vacant lots in the town. This helps to make the town more attractive as well as a more healthful place to live in which

I N D E X