ANNUAL REPORT

OF THE

Commissioner of Health

TO THE

GOVERNOR OF VIRGINIA

FOR THE

Year Ending September 30, 1913

RICHMOND:
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CONTENTS

LETTER OF TRANSMITTAL 5
GENERAL REPORT OF THE COMMISSIONER 6

Appendices.

I. REPORT OF THE BUREAU OF RURAL SANITATION 43
Hookworm Disease 43
Typhoid Fever 50
II. REPORT OF THE LABORATORY 61
III. REPORT OF THE BUREAU OF PUBLICITY 66
IV. REPORT OF THE BUREAU OF INSPECTIONS 73
V. REPORT OF THE BUREAU OF SANITARY ENGINEERING 92
VI. REPORT OF THE BUREAU OF VITAL STATISTICS 106
VII. REPORT OF THE RESIDENT PHYSICIAN OF THE CATAWBA SANATORIUM 114
VIII. REPORT OF THE BUSINESS MANAGER OF THE CATAWBA SANATORIUM 142
IX. GENERAL FINANCIAL STATEMENT 143
X. DISTRIBUTION OF ANTITOXIN AND VACCINE VIRUS 144
XI. SUMMARY OF MORBIDITY STATISTICS 144
XII. MORBIDITY STATISTICS 145

ANNUAL REPORT

OF THE

Commissioner of Health

LETTER OF TRANSMITTAL

RICHMOND, *October 30, 1913.*

His Excellency, WILLIAM HODGES MANN,
Governor of Virginia.

SIR:

Herewith I have the honor of transmitting to your Excellency my report as Health Commissioner for the year ending September 30, 1913, together with appended reports of the various officers of the board.

In performing this duty, as prescribed by law, permit me to express to your Excellency my profound appreciation of that confidence and co-operation given this board during your term of office. If this board has been able to perform a service to the people of the Commonwealth, much of the credit is due your Excellency for the wise counsel and the far-sighted advice you have always shown in dealing with the public health.

I have the honor to remain, sir,

Very respectfully,

ENNION G. WILLIAMS,
Commissioner.

General Report

INTRODUCTION.

Five years have elapsed since the State Board of Health was reorganized by act of Assembly and was given an appropriation sufficient to permit the introduction of modern methods of sanitation. Year by year, as the operation of this law has been reported, it has been a pleasure to announce that the enlightened support of the General Assembly, the sympathy of the other officers of government and the hearty co-operation of the people of the Commonwealth have made possible new triumphs over disease and fresh advances toward the goal of public health. The year covered by this report has not been an exception. Thanks to a kindly Providence and to the care of our people we have not only escaped the serious ravages of unusual epidemics but have been able in large measure to overcome the handicap of an unfavorable season and to make certain important advances. For the first time in the history of the Commonwealth we have collected scientific vital statistics for every county and city; we have pressed further than ever our war against communicable diseases; we have examined a larger number of persons for hookworm disease than during any previous year; we have carried to completion an extensive medical inspection of the schools of a typical county; we have been privileged to publish and distribute more literature and to study on a larger scale other aspects of the public health.

The detailed reports of the various officers of the board are appended to this report and below is a brief discussion of the more important parts of these reports, especially in their bearing on the general field of our endeavor.

TYPHOID FEVER AND RURAL SANITATION.

Nothing has occurred to shake our conviction, formed through the years, that the great field for public health endeavor in the Commonwealth is in the country districts. Much remains to be done in the cities and still more in the small towns, but it is in rural Virginia that the work of the State's health officers is most needed. Here we find no effective local organization, no system of sewers or of water-supply to protect the health of the people. Here are none of those city conveniences that take from the individual the responsibility of domestic sanitation. Here, indeed, every household is a law unto itself and can only be kept healthful through the efforts of the individual.

In particular, experience has shown that certain sections of rural Virginia suffer to an alarming degree from communicable disease. Typhoid fever claims a dismal toll, diphtheria is prevalent, tuberculosis is widespread, a very large percentage of all the population is suffering from hookworm disease, malaria brings its chills and its fevers to thousands. Viewed in one way, these diseases are statewide problems; viewed in another, there are questions which each man may settle for himself. If a river overflows along the bottom-lands, stagnates and affords a breeding-place for mosquitoes, the whole community may suffer; yet if any householder will drain his own lands and destroy the breeding-places of the pest, he may have at least relative immunity. Typhoid fever, again, may be spread through the

country-side by the contamination of a stream from which all drink; yet if each farmer has his own water-supply and keeps it protected, he may gain freedom from water-borne typhoid. General neglect of sewage-disposal may place the germs of typhoid where they may be carried by flies; nevertheless the careful farmer, with a sanitary privy, may keep the pestilence from his own family.

This combination of communal and individual responsibility for the appearance and spread of communicable disease makes the problem of fighting any disease at once communal and domestic. Much can be done by teaching every man how he may protect his own household; much can be accomplished by preaching to the community its responsibility. Yet the full measure of protection from disease can only be had when the community works to protect the private citizen and the citizen works to help the community as well as himself. This means, in turn, that the State's health work in rural districts must be aimed to make every citizen keep his own premises in a sanitary condition, while so arousing the sentiment of the whole community as to have every householder responsive to the demand for better health. We can never get a country-side healthful until every citizen has been prevailed upon to keep his own farm in a sanitary condition; but we can never hope to do this until at the same time the community as a whole is educated.

To this end, we have attempted to go into the rural communities of Virginia and there to preach the gospel of good health to the people. Along with this has been the campaign among the individual citizens—advising them how they may protect their families, sending them literature, pointing out at what a small price great security may be purchased. Wherever typhoid fever has appeared in a community, we have endeavored to send one of our officers there to inspect conditions and to urge upon all the importance of the essential safeguards, the sanitary privy and pure drinking water.

It is too much to say that five years' work in rural Virginia has made every farm a model and every community ideal. That must be the work of at least a generation. Yet it is safe to state that there is to-day more widespread information regarding sanitation and public health than ever before. Even if he does not utilize his knowledge, the average farmer understands that the insanitary privy is the great danger-center on his farm and that soil pollution is the gravest menace to his health. There is observable, too, an increased interest in sanitation and in personal hygiene, a larger number of sanitary privies and a great increase in the number of well-protected, sanitary wells. One has but to compare any community in Virginia with the same neighborhood a few years ago to appreciate the progress that our people have made.

These conditions have during the last year called for and have made successful two important advances—the vigorous prosecution of our campaign against typhoid fever and the extension of our hookworm work at a rapid rate.

The year 1913 was not a favorable one for typhoid fever. The winter of 1912-13 was extremely mild, with few long freezes and temperature generally above the normal. This meant that many flies survived the winter and that from early breeding we should expect a widespread prevalence of this pest. From this, experience taught us, we might anticipate that our morbidity from typhoid fever would be heavy. Accordingly, very early in the spring, we began a campaign of publicity, the purpose of which was to caution the people that unless precautions were taken, they might expect typhoid fever. We are glad to report that this and subsequent warnings were heeded and that, despite the handicap of a mild winter and an early spring, the increase in the number of cases for the year was but 2101,

the estimated number of cases being 8470 for 1912 and 10,571 for 1913. In view of the fact that 1912 was a phenomenally low year, this record can at least be regarded as satisfactory.

Of serious outbreaks during the year there were few. The first of these occurred at Front Royal. As soon as we were notified of its appearance we dispatched to the scene our epidemiologist, our sanitary engineer and our director of inspections, and upon their report we installed our emergency hypochlorite plant to sterilize the drinking water. The epidemic promptly subsided. This outbreak, however, is significant in that it illustrates what may occur in a number of Virginia towns. In February, 1911, our sanitary engineer visited this town and made an investigation of its water-supply. In his report he said:

> "On the watershed above the reservoir there are about six habitations. A large portion of this land is used for grazing and some for cultivation. These habitations have been kept under more or less observation and several cases of typhoid have been discovered among the families at different times. In spite of these facts the water used by the town has always been of good quality and no cases of typhoid have been traced to its use. Nevertheless, there is always some danger of pollution where people live on such a small watershed and near the stream which supplies the reservoir. If there is no way by which the town can control its whole watershed, regular and frequent inspections should be carried on, regulations regarding the disposal of wastes and excreta, especially where there are cases of typhoid, should be enforced in order to protect the people who drink the water. Numerous examples of epidemics might be cited which have been traced to one case of typhoid infecting the source of a water supply. The fact that Front Royal has never had an epidemic is no argument why there may not be one in the future."

It is a melancholy reflection that in two years the expected epidemic occurred and the community suffered severely. But for the prompt action and hearty co-operation of the local authorities, the whole community would have been swept. In no desire to criticise the good people of Front Royal, their sad experience must be held up as a warning. Subtle conditions affect the spread of water-borne typhoid, factors that cannot always be controlled lead to an outbreak; the neglect of every possible precaution may frequently fail to include the one thing necessary to protect the community. This applies to the appearance of water-borne typhoid with such force that no town can afford to neglect the complete protection of its water supply.

The only other serious outbreak of typhoid during the year occurred in Winchester, where prompt investigation enabled our epidemiologist to check the spread of the disease, though not until a considerable number of citizens had been stricken. The health officer of Winchester gave us all possible co-operation and carried out our suggestions to the letter.

During the summer, the investigation of rural typhoid, which has been carried on for several years, was again organized with headquarters in Roanoke as well as in Richmond. Surgeon General Rupert Blue of the United States Public Health Service detailed Surgeon L. L. Lumsden and Past-Assistant Surgeon Hugh de Valin to co-operate with the board. As field investigator, we procured Dr. J. A. Waddell of the University of Virginia for a few months. Dr. Freeman, working

from Richmond, and Dr. Waddell, working from Roanoke, were able promptly to investigate all outbreaks and to gather material for the laboratory investigations. The results of this investigation, when complete, will be issued as a special bulletin.

Our studies during the past year have led us to believe that the final conquest of typhoid fever in rural Virginia will depend upon (1) the better sanitation of every farm, and particularly upon the installation of a safe supply of pure water and the construction and regular use of a sanitary privy (2) increased individual prophylaxis, (3) the use of typhoid vaccine in infected families and (4) the employment of special district inspectors to co-operate with local authorities and to direct the community in the improvement of sanitary conditions. Each of these deserves a few words of comment.

As has been indicated, the conquest of the diseases of filth is essentially the control of filth itself. We can never hope to prevent the contamination of water-supplies and of foods, to say nothing of overcoming the typhoid fly, until we have as a people a satisfactory system of sewage disposal. We need not have expensive or complicated sanitary devices. We need not insist in rural communities upon the installation of water-closets. But we must insist that every farm have a simple and safe dry closet, kept in a sanitary condition and used by every member of the family. We realize that this is a work of years and that the introduction of sanitary privies will be precisely in proportion to the better sanitary knowledge of our people. We realize, too, that the item of expense must be kept in mind and that we cannot expect the man whose life is a daily struggle for existence to equip his farm with a sanitary privy of expensive design. To meet this objection, we devised and issued during the year a plan for the simplest possible form of privy and have, at every opportunity, spread literature showing how cheaply a safe privy may be made.

2. The part which individual prophylaxis plays in the prevention and eradication of typhoid fever is precisely the part that information and education play in enabling the average man to protect himself. Inform the citizen what he may do to prevent disease, and, if the precautions be not too extensive or troublesome, he will apply that information. Show him that the general care of the body, scrupulous cleanliness of the premises, the quarantine of the sick and the use of typhoid vaccine will protect him from the disease and he may, in time, be expected to avail himself of at least some degree of the protection thus offered him. Here again, it will be observed, the problem of prevention is essentiallyone of education and our work is to inform the people what individual prophylaxis will do, having by careful tests determined the facts for ourselves.

3. We have reached the conclusion that typhoid vaccine can be made to play an important part in preventing the spread of typhoid fever, especially if it be used in the families where typhoid appears. We have not become of this opinion on the strength of a few scattered tests, nor were we converted to the use of typhoid vaccine upon its first introduction. We rather felt, when this preventive was announced, that it should be carefully tested and that it should not be recommended by us until it had passed the experimental stage. During the years 1911 and 1912, we kept typhoid vaccine in stock for the use of those who wished to purchase it, but we neither urged or recommended its use. During the past year, however, our observations and the reported tests in other States have convinced us that in this vaccine we have a potent weapon in the war on typhoid. It produces no serious after-effects, it reduces the infection from typhoid to a minimum where

the full treatment is given, and it probably has some value, as yet undetermined, in treatment. Once convinced of these facts, we placed typhoid vaccine on the same footing with diphtheria antitoxin and entered into temporary arrangements with the manufacturers (The Lederle Laboratory) by which we have been able to dispense the vaccine to those requesting it, the bill therefor being rendered by the manufacturer. In addition, we gave the treatment to the various members of the staff. During the fiscal year we have dispensed 2370 treatments, from none of which we had the slightest complaint.

During the summer, it might be noted, we observed in the newspapers a report from Bristol to the effect that a number of cases of typhoid in that city had been attributed to the use of the vaccine. We investigated at once and found that a gentleman of that city, observing symptoms of fever in five of his children, administered the vaccine to the four who were well enough to take it. The fifth child, too sick to be given the treatment, was not immunined. As was to be expected in the circumstances, the cases all developed, though it was noticeable that the vaccinated children had far milder symptoms and a briefer illness than the unvaccinated child. As the period of incubation was well advanced when the first dose of the vaccine was given, none familiar with the facts attributed the disease to the vaccine. On the contrary, the use of the vaccine was thought to be responsible for the mildness of the symptoms. While we are not prepared at this time to recommend the vaccine as a remedy or as any part of the regular treatment of typhoid, we are glad to register our unqualified recommendation of its use as a prophylactic.

At the same time, it is useless for obvious reasons to expect that the entire population of the Commonwealth, or even any considerable proportion of them, will at present use the vaccine. It is somewhat expensive (45c in the cheapest individual treatment), it must be administered by a physician and its use is usually accompanied by a slight reaction, which, though by no m ans serious, will deter the timid. Taking these three factors into consideration, and remembering that smallpox vaccine, though subject to none of these objections, is still opposed by a certain element of the population, we do not look to typhoid vaccine for any immediate or noticeable reduction in our morbidity rate from this cause.

Yet we do expect that typhoid vaccine will play a great part in protecting those families where the infection is already seated. Here it can be used and will be used. People who would hesitate to be vaccinated while the danger is remote, will be quick to avail themselves of it when there is fever in the family. Furthermore, this vaccine will in many instances effectually prevent the spread of typhoid in a rural household where nothing else will. In the city, where trained nurses and hospitals are available, it is easily possible to stop typhoid with the first case in the house; in the country, the task is by no means as easy. Frequently the mother of the family is forced to nurse the sick, to cook the meals, even to wash the dishes and to milk; and inevitably she is more than apt to carry the infection from the sick to the well. Even with the greatest pains and the utmost care, there is thus grave danger that the whole family may be infected from the first case. In the circumstances, therefore typhoid vaccine can be used effectually to protect those not exposed to the infection before the immunity from the vaccine begins. It will be our policy hereafter to recommend the immunizing of the entire family with typhoid vaccine as soon as a case appears in the house. This policy, if followed and encouraged by the physicians of the Commonwealth, will materially reduce the spread of typhoid from the original foci. It may indeed end the stigma of a dozen cases from a single infection.

4. But to better farm sanitation, individual prophylaxis and the use of typhoid vaccine at the foci of disease must be added a fourth preventive. This is the service of competent district or local health officers who shall give their whole time to the work. As was pointed out in our report for 1912, our greatest need in public health work in Virginia today is more efficient local administration. Until we have available in the locality a man whose interests and sympathies are local, but who has, in addition, the mastery of modern sanitary methods, we cannot hope to achieve that general cleanliness and sanitation without which, in this climate, typhoid can never be eliminated.

HOOKWORM DISEASE.

Our policy of combating typhoid fever and hookworm disease through the same officers of the board is something more than a matter of administrative economy. It is based upon a knowledge of the fact that the causes which are responsible for the one are in part at least responsible for the other. Were all human excrement disposed of in a sanitary manner, the germs of typhoid fever would not be scattered nor would the eggs of the hookworm disease be able to hatch into the larvae which reinfect those exposed to them. Both are filth-borne diseases, the fruit of our carelessness in the disposal of human waste; the conquest of one means the conquest of the other, for the sanitary privy will prevent hookworm as surely as it will reduce typhoid fever.

Our hookworm work in Virginia has been made possible by the establishment of the Rockefeller Sanitary Commission, to which Mr. John D. Rockefeller of New York City has given $1,000,000. This sum is being spent in the Southern States of the Union, through the State boards of health. To Virginia, Mr. Rockefeller's trustees give annually about $15,000, which is spent in hookworm work exclusively. During the past year, this campaign of education and treatment has advanced in a brilliant and most satisfactory manner. Our field inspectors (paid by the Commission) have as heretofore spent the winter months in visiting the schools, lecturing, inspecting and collecting specimens, and they have held dispensaries during the summer. In the last fiscal year, dispensaries were held in the following counties, all of which received our inspectors most cordially: Amelia, Appomattox, Caroline, Dickenson, Hanover, Lee, Roanoke, Prince Edward, Surry, Sussex, Tazewell and Wise. In these twelve counties, 30,474 persons were examined for the disease and treatment was dispensed to 7,174, or 23.5% of those examined. As is explained in the detailed report of the assistant commissioner in charge of this work, the infection varied much, running from 1.5% in Tazewell to 45% in Wise.

It is impossible to estimate the splendid results which will accrue through the years from this work. Thousands of children who have been handicapped for life and whose prospects have been blighted by this disease have been given treatment and have been started on the road to health. Hundreds of men and women, suffering from symptoms they could not understand and striving to work with impaired bodies and minds, have been cured and restored to efficiency. The full fruits of this work will be reflected as much in the material as in the physical condition of those who have been treated.

During the summer was held a dispensary which, for deep interest and successful outcome, was the most remarkable ever held in Virginia. This was in Lee county. After a careful campaign of advertising, Dr. W. A. Brumfield, the in-

spector in charge, opened on July 7, for the examination and treatment of cases. From that date until the close of the dispensary, four weeks later, he and his assistants were fairly overrun with patients. Of a day spent by him at this dispensary, the assistant commissioner wrote at the time:

> "I came up on the train from Appalachia this morning to have a look at the Jonesville dispensary. For several stations approaching Ben Hur, people began to get on, thin, anemic people. The automobile which runs from Ben Hur to Jonesville was crowded, the bus was overflowing, and ten or twenty, lacking hack fare, walked the five miles over two mountains. At Jonesville the town was full of people, men almost entirely, serious-looking farmers in slouch hats and high boots.****The hitching posts were all filled with lines of saddle horses; down the road you could see more coming, all on horseback, four or five abreast. I counted twelve in one group. There was no trouble locating the dispensary. The tide was setting to the courthouse, the portico was full of men waiting for their reports and medicine. The courtroom, up two flights, was crowded. Inside the rail were the workers, four of them, two at each table—microscopes all busy and the table piled with specimens. About the table men were standing four deep, anxious to get reports or to get a peep through a microscope. We rang the bell at nine o'clock for the lecture. The room, aisles, jury-box and all, was crowded. They listened like graven images to the story. Then the crowd thickened around the tables again and all day long it has been there, always changing but never lessening. Almost all are men and all are in dead earnest. Four microscopists have been going since eight o'clock and now at four they are a long ways from the end. All day long these four men have worked like beavers, smearing, examining, noting the results and giving out treatments. They have examined nearly 500 so far today and I am afraid two or three hundred will have to go to Richmond tonight for examination there. The striking thing about the situation is the matter-of-course way in which practically every farmer in the community is having his whole family examined. ****Everyone has from two to ten specimens, usually brought by the head of the house. They wait three, four or five hours, patient and interested, and then ride away again. All the local physicians have been here today, boosting the thing along; every school teacher left here has been helping, every preacher has aided the work. If we had the men and the time, I believe we could examine 90% of the population of the county in this campaign. ****None of us has had time for dinner and will probably work right up to darkness. We have had many interesting reports from the first week's treatments, all favorable. Some have been made sick, but that does not bother them.****The thunder storm this afternoon made no difference. They came riding through the rain just the same.**** Appreciation, desire to help, determination to get rid of the hookworm are in the air. The Lee county campaign has caught on—it's the people's campaign."

We regard the co-operation given our inspectors by the population of Lee county as a splendid evidence of the new appreciation of sanitation and we are glad to report that everywhere our inspectors have been in the last year they have been received with the same cordiality and sympathy. To this more than to anything else we attribute the remarkable progress of our work during the past season.

Two aspects of the hookworm problem in Virginia are deserving of more than passing consideration: These are the serious part that hookworm disease is playing in the decreased efficiency of our farmers in many counties and, secondly, the loss occasioned by this disease in our educational system.

As to the former, detailed statistics are not yet available to show how the cure of hookworm in families long afflicted with it has resulted in increased economic efficiency; but frequent instances have come to our attention where the treatment has brought about the literal transformation of the families to whom it was administered. We have received numerous reports of families which had been given up as hopelessly shiftless, but which have regained their strength after treatment, have harvested good crops and are now adding their share to the industrial strength of the Commonwealth. In some counties, it is not too much to say that from the operation of the hookworm dispensaries new vigor has been given to farm life and new impetus given discouraged men and women—influences which will be felt in the agricultural output of the counties. Were our hookworm campaign to do nothing else, it would be economically profitable by reason of the improvement and saving it brings about in agricultural labor.

As to the effect hookworm disease is having on the school children of the State, we do not believe the people of the South have, as a whole, the slightest conception of what an enormous loss we are annually suffering. Our inspections in practically every county of Virginia have shown us that about twenty per cent of the school children of our public schools in rural districts are affected with hookworm disease. Investigation has also shown that the average mental efficiency of children infected with hookworms is not more than half that of the normal, healthy child. If, therefore, half our labor spent on twenty per cent of our children is in vain, we may reasonably reckon hookworm disease as one of the most expensive items of our educational system. At least ten per cent of the millions we spend annually for the public schools is absolutely wasted because of the decreased mental ability of the children who have hookworm disease. Rid the school population of hookworm and there is a clear gain in the benefits to be conferred by our schools.

Before leaving this subject, it is necessary to point out the approaching end of the work originally begun by the Rockefeller Sanitary Commission. The greater part of the million dollars given to this work by Mr. Rockefeller has been spent and no definite announcement of the continuation of the work has been made. We are hoping that Mr. Rockefeller will see fit to devote more money to this magnificent work, but we must bear in mind that the commission was organized primarily for educational purpose and in the hope that once the Southern States appreciated the menace of hookworm disease, they would carry on the work with their own means. In case the Rockefeller Commission should suspend or reduce its activities in the Southern States, the people of Virginia must be prepared to carry on the work. So much has been achieved and so much more is in store that we cannot even consider the possibility of abandoning the crusade.

THE LABORATORY.

The past year has not been marked by any significant change in the work of our bacteriological laboratory. Our bacteriologist has been given the assistant whom he so much needed and has thus been enabled promptly to examine the increasing number of specimens that have come to him. During the fiscal year just closed our laboratory has examined 16,628 specimens of all descriptions as

shown in the appended report of the bacteriologist. This is an increase of 2,858 over the number examined in the fiscal year 1911-1912. It can but be a source of gratification to note that the State is thus giving to the physician better methods of clinical diagnosis and thereby is helping the physician to do better work while giving the patient the benefit of science in the treatment of his case. Our records show that a large number of physicians not previously using the laboratory have availed themselves of its resources during the last year, and we hope that this number will be increased until every practitioner not himself equipped to make these microscopic tests will use the State's laboratory.

Our bacteriologist had the honor of being designated by the Governor during the winter of 1912-13 as one of the representatives of this Commonwealth in the investigation of the oyster industry in the Potomac river. We were extremely glad that our bacteriologist could get help in the laboratory to enable him thus to assist the executive and we feel that this time was employed in a manner helpful and profitable to the whole State. Indeed, the recent discussion of the oyster question in Virginia and the indication of the purity of the great majority of marketable oysters tonged in Virginia has been a source of gratification to us. Our staff made the first comprehensive sanitary investigation of the oyster industry ever conducted in the United States and we are naturally much pleased that our findings at that time have been proved and amplified through more elaborate tests. The purity of the Virginia oyster has been vindicated from interested or ignorant slanders.

Our work for the prevention of rabies has increased during the last twelve months. As the appended report will make plain, we have treated an average of 10 persons each month or precisely 120 during the year. Estimating the cost of treatment in each case to be $100 at the Pasteur Institutes, there has thus been a saving of $12,000 to persons who were unable to pay the expenses of the treatment. We still limit this free treatment to those persons who will sign a certificate that the payment of the expenses at the Pasteur Institutes would be a hardship.

The treatment of 120 cases, however, and the report of three deaths from hydrophobia in Virginia during the last year have confirmed us in our belief that legislation is needed to prevent the spread of this dread disease. Practically every case, if taken in time, can be saved from the horrors of rabies, but at best the treatment requires an absence of three weeks from business with all the expenses of residence in Richmond. How much better it is by wise legislation to save this expense, this anguish of mind and these occasional but horrible deaths. Were the General Assembly to require that all sick dogs be securely tied, we might reasonably expect a general reduction in hydrophobia. To our mind, there is something barbarous about the slaughter of unoffending dogs by the score because a rabid, worthless cur is allowed to go at large, and there is something equally inexcusable in our failure to tie up our sick pets.

THE EDUCATIONAL CAMPAIGN.

It is somewhat difficult to dissociate our educational work from that of the other bureaus, for the reason that in all that we do the idea of public education is fundamental. We never attempt a campaign against any disease and we never endeavor to improve sanitary conditions with any other idea than that of educating the people in matters of self-protection and prevention. In all and through all, this idea must run.

During the year, however, our educational campaign was marked by a number of distinct advances of interest in themselves and of vital importance to the general work of the public health. One of the most striking and grateful of these resulted from our co-operation with the Negro Organization Society during the spring. This society, which has as its object the improvement of the living, moral and intellectual standards of the colored race, announced to us its intention of having a general "clean up" day for the colored people of the Commonwealth. Following their request for assistance, we convinced ourselves of their ability to do the work they proposed and then agreed to issue a special handbook for use in their campaign This was done and 30,000 of the Health Handbook for Colored People were distributed, largely to persons whose names were furnished by the executive secretary of the society, John M. Gandy. Since April, when the clean-up day was observed, we have received frequent reports of the results, all of them most encouraging in tone. In many communities the colored people observed the day with great care, cleaning up their premises, removing wastes, building sanitary privies, white-washing, etc. In others, the colored people gathered to listen to a health lecture; in still others, the day was devoted to a presentation of the anti-tuberculosis cause. Altogether the campaign was a most decided success and fully warranted the outlay on our part. The executive secretary of the Negro Organization Society, to whom reference has already been made, was extremely active in this matter and deserves great credit for his efficient service. It is needless to add, in comment, that we realize the part the colored population of Virginia plays in the spread of disease and appreciate fully that unless we include them in the general campaign for better health, we can never hope to secure that sanitary standard necessary for health and safety.

To popular education regarding the prevention of typhoid fever we devoted during the past summer even more time and energy than heretofore. Convinced that the advanced spring presaged a bad year for this desease, we began early a vigorous series of announcements in the newspapers, the purpose of which was to caution the people that insanitary premises and flies constituted more than the normal danger. As the spring opened, we sent out large numbers of bulletin on Typhoid Fever and on the Sanitary Privy and we continued our newspaper agitation unbroken. A little later we prepared and issued a special bulletin entitled Good Health in Summer, which pamphlet included succinct facts regarding the protection of wells and springs, the conquest of the typhoid fly, malaria, etc., with brief directions for the care of children during the summer. Along with this was sent out a new edition of our pamphlet on the Care of Infants ("The Mother and Child"). In August, when the necessity for extensive precautions was greatest, we prepared and sent out a special bulletin of four pages with a poster-supplement of equal size in two colors. These were sent to our mailing list, to the postmasters and, as far as possible, to those whom we could hope would post the little announcement where it would do the greatest good. From our morbidity returns we were enabled to locate the unsual prevalence of typhoid fever and, when we found that a certain community was having more than this normal number of typhoid cases, we sent to every household in the locality literature regarding the disease. With this went the special "Bedside Directions for the Care of Typhoid Fever," printed on cardboard and punched to be hung on the wall. In addition, to send health literature where it was most needed, we mailed to each person examined for hookworm disease in the dispensaries our bulletin on Typhoid Fever. To this campaign—the most extensive yet conducted—we attributed our relatively low typhoid morbidity at a time when we might have had a severe and disastrous season.

In addition to these extraordinary publicity campaigns, we devoted the usual attention to lecture-tours, to the farmers' institute trains, to special gatherings, etc., and we pushed as far as our means would permit the agitation for the better registration of births and deaths.

In this connection, we trust it may not be improper to call attention to the fact that from the International Congress on Hygiene and Demography, our board received an award of merit for our exhibit of popular bulletins, literature, forms, etc. During the past year, also, we have been honored to find several of our charts diagrams and cartoons reproduced in a number of standard publications on sanitation.

SANITARY INSPECTIONS.

The pressure of work on our sanitary inspector made necessary the temporary appointment during the summer months of an assistant, who could take over the inspection of summer hotels which required particular attention at that time. With this assistance and with such co-operation as the other bureaus of the board could give, our inspection work in 1912–13 was more extensive than during any past twelve months.

Hotel Inspection.

As directed by law, all the hotels required to be inspected were visited and examined during the year. In the main conditions were found good. Travelers report to us a general improvement in the sanitation and cleanliness of small hotels and they are of opinion that this statute has operated to increase the safety and comfort of travel.

Our experience in administering the law, however, has shown us the necessity of at least two amendments to the act, which we would respectfully recommend. These are, the abolition of the scale of fees now in use and, secondly, the extension of the law to those small hotels regularly conducted for the entertainment of guests but not included in the present inspection law.

As to the fees now required of hotels, if the funds of the Commonwealth will permit a different arrangement, we do not think these should be exacted. The fees are adjusted to the size of the hotel, ranging from $3.50 to $10.00 and are payable upon inspection. The law requires that every hotel be inspected once a year and that, if complaint be received by us, an additional inspection must be made, for which the proprietor is required to pay. Conceivably under this law, complaints might be made and inspections had so frequently as to ruin the proprietor. But this apart, we doubt the wisdom of a law which requires the hotel proprietor to pay for what is a public guarantee of sanitation and cleanliness. It must be borne in mind, in this connection, that the return from the inspection of hotels is now about $1,792.90 the year and that, if these fees be abolished, an appropriation must be made to carry on the work. We think, however, the result will well be worth the additional expense, should the Assembly see fit to increase our appropriation to cover this loss.

What Constitutes a Hotel.

Again, we feel that the present law works injustice in that it arbitrarily draws the line in defining what constitutes a hotel. Two men may keep hotels in the same town, the one with eleven guest rooms, the other with ten. The man who has the eleven room hotel is required to conform to the provisions of the law at a consider-

able expense, must pay the inspection fee and must maintain his premises in the condition prescribed by statute. His neighbor, with ten rooms, is put to none of the expense of making changes to meet the terms of the law, does not have to stand inspection and can maintain his premises as he pleases. To our mind this is unjust and can only be sustained where the smaller hotel is really a boarding house or accepts guests only as a convenience.

Then, too, this provision of the law seems to us to defeat in some measure the purpose of the statute. The law was intended to give comfort and safety to travelers and was designed to correct those insanitary conditions which were a menace to the health of guests. In the larger hotels, most of the provisions of the law were being observed at the time the statute was enacted: these hotels kept their premises clean, gave reasonable comforts to their guests and, if they were derelict, were so in a few respects only. But the smaller the hotel, the worse the sanitary conditions and the greater the need for strict supervision. Often the hotel which needs either to be improved or closed, as required by statute, is the one which may have only nine, or eight, or seven guest rooms, and is thus exempt from inspection under the present law. We should regard as a proper amendment one which would define a hotel as a place giving lodging and meals for pay to transient guests. A discriminating inspector would be able to distinguish under such a law the real hotel from the boarding house and would be able to give a much larger measure of protection than at present to the traveling public. The inspection of these small hotels, it must be noted, will add to the cost of the work and will necessitate an appropriation of at least $3,000 should the fees be abolished.

"Scoring" Hotels.

After conference with the Hotel Association our inspector has devised a system of grading or scoring hotels. This is now in use and is operating we think, to give to the hotel which is well within the law that advantage to which it is entitled over the hotel barely within the law. Any hotel which scores 52% on the card devised by our inspector is awarded its certificate. If the hotel score 75 points of a possible hundred, a red seal is attached to its certificate, and if it score more than 90 points of a possible hundred it is awarded a gilt certificate. In this way, the traveler familiar with this usage can tell whether the hotel he patronizes begrudgingly, observes the letter of the law or properly lives up to its spirit. Hotel men advise us that this system is working well and they give it their endorsation.

INSPECTION OF SCHOOLS.

For some time our attention has been more and more directed to the sanitary problem presented by our public schools. Our hookworm inspectors, who are naturally brought into daily contact with the school system, have reported the widespread prevalence of hookworm among the school children and, in many instances have shown that scores of schools are without the slightest sanitary conveniences. In 1910, also, the assistant commissioner made a detailed inspection of the schools of two counties and reported findings that were alarming in the extreme. Conscious, therefore, that here was a very grave sanitary problem, we have heretofore given to it such attention as we could. We prepared and circulated a very large edition of a bulletin on School Hygiene, we distributed two separate pamphlets containing drawings for school privies and we lectured on the subject at the normal schools and colleges of the State.

But in the winter of 1912–13 we felt the need of more accurate information on the subject than we then possessed and we realized that remedial legislation and needed reforms could only be based upon a thorough investigation of actual conditions, specific enough to be really informing and broad enough not to be misleading. An opportunity to this was afforded by the activities of Professor W. H. Heck of the University of Virginia. Professor Heck, working jointly for the University of Virginia, the State Department of Public Instruction and the State Board of Health, was engaged in visiting the schools and in collecting data on existing conditions. It was suggested that he and certain of his colleagues in the university faculty join with us in a complete examination of the school children of a single county. This suggestion was readily accepted and Orange county was chosen for our investigations, as typical and convenient. Upon our representations the Rockefeller Sanitary Commission consented to the detail of two of our hookworm inspectors to assist our director of inspections. The instructors of the University of Virginia were unable to finish that part of the task which they had assumed and thus increased the inspections to be made by our staff. But the importance of the work and its significance to the whole South justified, in our opinion, the completion of the whole.

The tabulated results of this investigation, which are comprehensive and detailed, will be found in the report of our director of inspections, appended thereto. There can be no dispute that the situation disclosed by these results is even more deplorable than our preliminary examinations had led us to believe. Nor can there be dispute that these results show a vast waste in the educational system of the State. We might as well frankly acknowledge the fact that our great need in education to-day is not only for better schools but also for better scholars. We must improve the health of the children who attend the schools if we are to improve our educational system.

But in viewing this problem, cause and effect are mingled. In other words, can we hope to improve the health of the scholars until we have improved the sanitary condition of the schools? Here of course, where definite facts cannot be cited, there will be difference of opinion. For our part, we must express the belief that most of the defects which our inspection has shown to exist among school children are due primarily to the condition of the schools and are aggravated by neglect and carelessness. Inevitably where our schools are poorly lighted, the vision of the pupils will become defective; where no privies are provided, hookworm disease will be spread; where the ventilation is poor, pulmonary and bronchial troubles as well as anaemia, may be expected. Once the child becomes defective in any one of these respects, lack of attention and continuance of the same conditions at school make bad conditions worse.

But what must we do and how must we proceed? Circumstances, of course, and the limitations on the revenue of the Commonwealth and the localities, prescribe and restrict what is of practical application. Theoretically, it would not be too bald a statement to declare that the best thing that could happen to a large percentage of our rural schools would be their destruction by fire, provided better and more sanitary buildings could be erected. But where new schools cannot be built and where the improvements that can be made must be at a small cost, the practical policy is much simpler and less radical. It is only in respect to this that we need offer suggestions at this time.

The most important reform and the one within the reach of practically every school is the erection of two sanitary privies—one for the boys and one for the girls. And we give this priority for very obvious reasons. Hookworm disease, the

scourge of Virginia childhood, is the fruit of soil pollution; soil pollution is inevitable where no sanitary privy is provided. Again, common decency and common morality demand that a chivalrous race like the Virginians give to their daughters and their sons those conveniences which modesty and purity require. We have no right as a people to demand that our little girls remain all day in school, with no opportunity of meeting the calls of nature, unless they hazard their modesty and subject themselves to the insults of prying eyes.

How great is the need in this respect will be apparent from the simple statement of existing conditions—2,369 rural Virginia schools are without privies. To say that a privy should be built is one thing; to offer a practical way of building it is quite another. Indeed, the expense of erecting elaborate sanitary privies is everywhere given, and not without reason, as the excuse for present conditions. A county school board may have the means and be willing to erect a privy at one school, but when the board is called upon to erect such privies at forty schools, it often has a task beyond its means, unless a simple and inexpensive form of privy be proposed. Then again, a school board may make the outlay for privies only to find that a task of keeping them sanitary is as great as that of building them. Very naturally the board asks, how is provision to be made for the cleaning of the privies?

To meet these objections, we have designed in recent months a very simple privy which is suited for any soil save one of limestone formation. This privy can be erected cheaply and can be kept sanitary with very little attention. If it be moved once a year, it will not become obnoxious and will meet all the demands o the average school. We believe that this type of privy, where it can be used, offers the cheapest means of ending the present disgraceful situation and we urge upon the school boards of the Commonwealth the necessity of installing some such privy in every school. It is far better to reduce the school session a few days and to devote the funds to the building of privies than to allow the school to remain without these conveniences. Nothing that we can do will add more to the efficiency of our system; nothing is more demanded for the maintenance of our ideals of morality and decency.

The second method of improving cur rural schools in a practical manner at this time is to give them more light. Few blessings of life are greater than that of good vision; few can be more easily sacrificed or impaired by the straining o the delicate organism of the eye. A child who sits for five hours a day in a poorly-lighted school, poring over badly-printed books, hazards its vision and often endangers its eyesight for life. As matters stand today, no child can attend a school and not subject himself to the dangers of eye strain. For this reason, we must build more windows in our older schools, must make the interior as bright as possible and must see to it that the present laws regarding the window-capacity of new schools are observed to the letter.

Better ventilation is the next most needed practical reform in the better sanitation of our schools. And here we face melancholy facts. The cubic air space of many school rooms, as shown by the Orange inspection, is woefully below the proper minimum. In addition, the overcrowding of the rooms in many schools the absolute absence of any system of ventilation and use of open stoves result in a vitiated and foul atmosphere which makes study impossible and endanger health. In particular these conditions breed and spread tuberculosis, bronchitis and like diseases and result in that anaemic, debilitated physique so often noticed in school children. To permit these conditions to continue where there is any way of remedying them is to sin against childhood.

The most effective method of ventilating the average one-room school is by the use of the well-known jacketed stove. This will give the room a constant flow of fresh air and will not create a draft where the children sit. It is, too, relatively cheap and can be installed by any workman. To our mind, the jacketed stove should be prescribed by statute for every one-room school and no school without such a stove should be allowed to receive pupils. If this seem a radical proposal, let it be remembered that bad air threatens the life of the child who breathes it. Better an ignorant than a diseased child; better no school than one that menaces the life of those who attend it.

The fourth practical reform demanded for the sanitation of our schools is the universal use of the individual drinking cup. Here we are dealing with a subject which has received increasing attention within recent years, but one which is still misunderstood. Many still contend that the demand for the individual drinking-cup is a fad and that it is not essential to good health. To all such we may state the solemn and convincing truths which have come within our observation in recent years: countless outbreaks of diphtheria have been traced directly to the common drinking-cup; thousands of cases of tuberculosis have the same origin; pathetic instances of syphilitic infection are due to the same cause. The menace of the common drinking-cup is a vital and a daily one and its continued use is, to one familiar with the facts, almost beyond comprehension. We will not venture into the company of one suffering from smallpox and we have an inherited fear of the leper, yet not only do we expose ourselves to colds and sore throats, but we touch with our lips the cup which the consumptive, the syphilitic and the diphtheria carrier use. We swallow the camel, in short, and drain out the gnat.

The common drinking-cup is nowhere more dangerous than in the schools, where those who use it are those suffering most from diphtheria and the other communicable diseases of childhood. A single child in whose throat lurk the germs of diphtheria may spread the disease to the entire room and may thus cause suffering and suspense in half-a-hundred homes. Every school should require the pupils to bring or to keep at school their own drinking-cups. Where this cannot be done, the children should be taught to make a drinking-cup from a sheet of paper. Small as seems this reform, it will, in our judgment, mean a great reduction in the amount of sickness among school-children and will thus render their attendance upon school more regular.

The last practical suggestion we would offer at this time for the better sanitation of our schools is the abolition of dry-sweeping and the control of dust in this manner. We are just beginning to realize as a people what a dismal part dust is playing in the spread of disease. We know that the consumptive's spit, dried in the dust and carried by the wind to another, may give him tuberculosis, and we are of opinion that many communicable diseases may be carried in the same way. We know, too, that school children are particularly susceptible to whatever diseases may be dust-borne. They come to school often to find the room closed and filled with the dust raised by the morning sweeping; they often remain in the room while the teacher, in a mistaken idea of cleanliness, has the floor swept; their every movement raises the dust. As a result, they breathe into their lungs the filth of the floor, with whatever disease germs may be in it. When it is remembered that an autopsy some months ago showed the presence within a man's lungs of a quart of soot, the menace of the dust will be obvious. In the circumstances, we think the school authorities of every county should enforce these two regulations: First, that the schools be swept after and never before the school

session, and second, that this sweeping should be with wet saw-dust or wet paper sprinkled or thrown on the floor before the broom is applied. We do not claim for a moment that the five reforms we have enumerated—the sanitary privy, better lighting, the jacketed stove, the individual drinking cup and damp-sweeping—are the only things necessary or desirable to protect the health of our children in the rural schools. These things, we would submit, are rather the fundamentals. When we have achieved this much and have seen the better results which will follow even this degree of school sanitation, we shall be prepared at once to inaugurate and to appreciate the more advanced aspects of school sanitation—open-air schools, medical and dental inspection, physical exercises and the like. The five things we have mentioned are immediately applicable and in every way essential. The rest, however desirable, can wait until the foundation has been laid.

RAILROAD SANITATION.

The last year has witnessed no marked progress in railroad sanitation, with the exception of one thing. This has been the adoption of a Federal regulation prohibiting the common drinking-cup on public carriers, a regulation which, we are glad to report, many of our railroads have applied as well to their intra-state as to their inter-state traffic. In addition, as a part of this reform, the Pullman Company has begun to supply its cars with individual paper drinking cups for the use of its passengers. Of good quality and delivered in separate sealed tissue covers, these cups fulfill the ideal. In installing them when not required by law to do so the Pullman Company has, in our judgment, shown a most commendable spirit and deserves the thanks of sanitary officers. The same company, it may not be improper to remark, is steadily improving the sanitation of its service and is showing itself in hearty sympathy with the application of public health to transportation. The Norfolk and Western and the Chesapeake and Ohio railroads are also furnishing free drinking cups—a substantial contribution to better health.

Promiscuous spitting and the dusting of cars while passengers remain in them are the most obvious if not the most serious defects in railroad sanitation today. The observation of our staff has been that practically no attempt is made to enforce on railroad cars the law prohibiting expectoration. Sometimes we have seen the trainmen themselves guilty; often we have seen them pass by in silence a passenger who was spitting on the floor of the car. So far as dusting is concerned, the regulation which prohibits this is more often violated than observed. As soon as we can find time to take up this matter, we propose a vigorous prosecution of offenders in the hope that this will result in the observance of the regulations. The greatest difficulty in the way of such prosecutions is the fact that under the present law, we are forced to swear out the warrant and to prosecute in the county where the offense is committed, rather than at the terminus.

The question of sewage-disposal on trains is one much discussed at this time, but one regarding which there is a considerable difference of opinion. There can be no doubt that the pollution from a train of a right-of-way which runs along a water-shed may result in the contamination of a water-supply, though the instances where this can occur are probably not frequent. The subject, however, is one of no small importance and one upon which, at a later time, we hope to make specific recommendations.

In this connection, the State is under obligation to the Virginia Antituberculosis Association for its action in distributing "don't spit" cards at every rail-

road station in Virginia. The demand for these cards and the readiness with which station agents and others post them is interesting evidence of the awakened interest in the anti-spitting crusade.

SANITATION OF SMALL TOWNS.

Much of the time of our inspector has been given in recent months to concentrated efforts for the better sanitation of small towns. This policy has been adopted for reasons which seem to us convincing. In the first place, our morbidity statistics show that these towns are, in many instances, particularly susceptible to typhoid fever, to malaria and to other communicable disease. Having none of the conveniences of the cities and unable by individual effort to get that protection which comes to the isolated farmer, the small town has the aggravated problems both of the city and of the country. It has sewage of which it must dispose, though it has no sewer-system; it must provide water for its citizens, though it has no means of protecting its water-supply; it must prevent malaria, though it has open drains in every street. But the splendid results which follow the improvement of sanitation in such places and the excellent object-lesson which the sanitary small town presents make them as inviting as they are important fields of endeavor.

Our policy has been to choose a number of such towns in various parts of the State, to send literature on public health to the citizens and then, when interest is aroused, to send our inspector to the town with directions to remain there until he has stirred the citizens to the enactment of sanitary regulations. This done, the inspector moves on to another town, to return in a few months to see how well the regulations are being enforced. It is a tribute to our people to record that our inspector has been most cordially received and that the results of his work give promise of splendid success. In the appended report of our director of inspections will be found a detailed statement of the towns he has visited and of the improvements made in them.

The inauguration of this policy has placed upon us the responsibility of outlining a general plan for the sanitary improvement of our Virginia towns, to which subject we have given careful thought. We have found that the danger lies in either recommending to the town too much or too little—either in asking them to adopt more ordinances than they shall need or else of requiring less than is necessary. Accordingly we have subjected our "Suggested Ordinances" to a complete revision and have prepared those which we think are necessary for the small town. Including only the essentials and providing for their enforcement in the most inexpensive and expeditious manner, these regulations seem to be meeting with success. As they are to be had by interested persons, it is not necessary to describe here their scope and content.

In dealing with the small towns, we come face to face with the most baffling question in public health administration—that of enforcing the regulations by competent and regular inspection. Another year's study of this subject has, however, only confirmed the conclusions expressed in our annual report for 1912: Where a whole-time health officer cannot be employed, we are of opinion that the best results come from the work of a competent non-professional inspector, working in co-operation with a medical board of health or health officer. If we are able to procure the services of district inspectors, as is suggested in other parts of this report, we shall have available a force of trained sanitarians who can direct and instruct the local inspectors. The result, to our mind, will be a magnificent return upon the investment.

SANITARY ENGINEERING.

Our bureau of sanitary engineering has spent a busy year and has given new evidence of its importance to the localities of the State as well as to the general work of our board. Under existing statutes, Virginia makes little provision for the protection of our waters and imposes no sanitary limitations on the building or arrangement of local system of water-supply and sewage-disposal. Our sanitary engineering is, therefore, altogether advisory in character but it is none the less helpful and important. Our engineer during the past year has completed his survey of the water-supplies of our towns and cities and has acted as expert adviser to the various localities which have been planning improvements in the water and sewerage systems. We have had made demands of the latter character and have felt that in aiding the local authorities, we were doing work of vital importance.

In some instances, we have learned of proposed systems of sewage disposal and of water-supplies where, in our judgment, the arrangement were neither wise, far-seeing nor economical. In such cases we have been frank to advise the local authorities of our findings and to suggest needed changes. We have, however, not been able to do more and have been unable to save these localities from mistakes which, we think, will prove costly in the future. This suggests to us the wisdom of asking the General Assembly for a statute the purpose of which will be to require the approval of the board before specifications for water supply and sewerage systems are carried out. We have no desire to encroach upon the rights of the localities or to enlarge our powers in these respects, but we believe that the enactment of such a law will be of service to the entire Commonwealth and particularly to the communities contemplating improvements. Too often it happens that the locality does not have the benefit of expert advice except from those who may have reasons for the advocacy of a certain plan. To give the locality technical and non-partisan council would, in our opinion, be most helpful.

The detailed work of our engineer and his recommendations for future legislation will be found in his appended report.

ONE YEAR OF VITAL STATISTICS.

On June 14, 1912, there went into effect the vital statistics law, for which we had been asking since the reorganization of the board. Fifteen months having passed since that time, we can now present as the most important single advance of the year, the statistics of recorded births and deaths for twelve months. In so doing, if we are not able to report the result complete registration, we can at the least report extremely promising figures. On this subject we quote directly from the report of the assistant registrar in charge of the Bureau of Vital Statistics:

"At the outset the difficulties to be encountered must be borne in mind. We had, in the first place, the smallest appropriation with which, so far as we have been able to learn, any State has ever attempted the complete registration of births and deaths. This appropriation was five thousand dollars the year, from which sum had to be deducted (through unfortunate wording of the law) the cost of all our vital statistics printing. As this, with necessary equipment, amounted during the two years to about $2,400, it can readily be seen that the expenditure of every dollar of this fund had to be watched with the greatest care. Nothing could be done beyond what was absolutely necessary to carry out the provisions of the act; the most rigid economy had to be applied in every item.

"In the second place, we had to do a vast deal of elementary missionary work. Adequate vital statistics, it must be remembered, had never been collected from about 90 per cent. of our Virginia people prior to the adoption of the new law. In the larger cities, to be sure,—Richmond, Norfolk, Petersburg, Lynchburg, Roanoke and a few others, statistics had been compiled, but elsewhere no man had ever been taught that he should not bury his dead without legal permission; no mother had ever been told that she by law and by duty was required to record the birth of her children. Many had forgotten that prior to 1898 the commissioners of the revenue had gathered this information after a fashion, or, if they remembered, saw no reason why they should be compelled to give facts which the commissioner had gathered as a part of his official duties. Thus to educate the people regarding the importance of the work and incidentally to overcome certain mistaken ideas of personal liberty in matters of this sort was by no means an easy task or one soon completed.

"In the third place, we had to assume the task of training 1200 registrars and an equal number of deputies in the discharge of their duties. The law prescribed that the local registrars should be the justices of the peace, except in those cities and towns where there were paid health officers. This meant that every justice in every county must be coached in the law, must be told the significance of the work, must be taught the technique of registration and must be made a missionary among his own people. And this task was made all the more confusing by the fact that the registars were often badly located: some were too close together, others were too far apart.

"A fourth obstacle in the way was the presence in Virginia of several thousand unregistered and ignorant midwives who, in the aggregate, delivered a very large percentage of the women in child-birth. Many of these were colored women, far removed from the postoffices and seldom in receipt of mail; hundreds were suspicious of the law and fearful that its intent was to drive them from business or to impose a tax upon them; others who practiced in a small way only, could not be located except after weeks of correspondence.

"Fifth, we faced the difficulty of reaching those who acted as undertakers in remote rural communities. In the cities and towns, of course, the undertaker was not a problem. He was known, had a regular place of business and was accustomed to procuring a burial permit before he made an interment. But in rural sections, the situation was altogether different. Here we found that in many instances the coffin was bought by some friend of the family in which the death occurred and that this friend, in no sense a regular undertaker, had charge of the interment. We also found that many scores of merchants sold coffins who did not regularly conduct funerals. To locate all of these and to differentiate between the undertaker and the coffin-dealer was difficult, especially as the law did not impose upon the coffin-dealer the duties which it prescribed for undertakers.

"Sixth, we faced the opposition, tacit or expressed, of a part of the medical profession. The vast majority of physicians, be it said to their credit, expressed their co-operation from the first and did all in their power to help us. But a minority seemed to think that the vital statistics law imposed on a physician duties which he was not properly to be called upon to discharge unless he was given compensation for his services. This sentiment was marked among some, though by no means among all of those who have attempted in recent years to procure the abolition of the State license tax on physicians.

"Finally, we faced the problem of systematizing the work and of bringing it within the control of the limited staff we were able to employ. This of itself was a

serious undertaking. Estimating that we should receive at least 4,000 birth certificates and 2,500 death certificates every month, we had to arrange, tabulate, index and correct these, while keeping the accounts of the 1,300 registrars who forwarded these certificates.

"Some of these difficulities were obvious at the outset; some were not apparent until the law had been in force some months. But now that twelve months of registration are complete and tabulated, we can reasonably say that the bulk of these obstacles have been removed.

"It must be admitted in all frankness that our lack of funds has prevented the full or effective compilation of the statistics. We have not been able to do the publicity work which we regard as necessary; we have not been able to expend the postage necessary to gather full reports from all incomplete certificates; we have not been able to employ a sufficient office force completely to tabulate the certificates we received. We have not, in short, been able to do with $5,000 the year what other States have not attempted to do with less than double that amount. We can only say that we have made the most of our appropriation and believe that by rigid economy we have done well all that we have attempted to do at all.

"Our educational work has progressed as far as our means would permit and has at least sufficed to give the majority of our people some familiarity with the general scope and purpose of the work. From the report of the Bureau of Publicity the details of this educational campaign may be gathered, though that report can not in the nature of things explain all that has been done. Every member of the staff has felt that he had a part in educating the people to appreciate the importance of the law and all of them, as opportunity has afforded, have lectured on the subject, have explained the provisions of the law, and have sought to familiarize the people with our object. In addition, the assistant registrar of vital statistics has made a number of visits into sections where the registration was unsatisfactory, has given information for several prosecutions and has devoted to field work every hour that he could spare from the office. We believe that the foundation of popular sentiment has been well and deeply laid and we think that the continuation of this work, with larger means at our disposal, will make possible the ideal we seek—the registration of every birth and death in the Commonwealth.

"The training of the registrars in the discharge of their duties has been one of the most successful aspects of the work. Ours, it must not be forgotten, was an experiment *in toto*, as no other State had ever attempted to use as registrars the justices of the peace, untrained in matters of the public health and ignorant of medical terminology. But the experiment has been a success. Some of the justices remain indifferent, some have resigned, some have not yet learned the proper form of a certificate; but the vast majority have gone about the mastery of their duties with most commendable care and patience. Many, indeed, are enthusiastic and are rendering service to the Commonwealth far beyond the material return. To them we must extend our hearty congratulations and out sincerest thanks. Without them we could not have achieved the results that will be noted below.

"For the information of those States which will model their law after ours and will utilize the same body of registrars, it may be worth while to explain briefly how we proceeded to acquaint the registrars with the proper scope of their duties. Having appointed them and received their acceptances, our first step was to divide the territory among them. For this purpose we had all the justices of a given district meet together and arrange an equitable distribution of the district, with the understanding that we would approve any arrangement upon which a majority

agreed. We then prepared and issued, along with our popular bulletin on the reasons for the law, a second bulletin containing numbered suggestions for the discharge of each duty prescribed for the registrar by law. Within a few weeks the questions asked by registrars and the mistakes made by them in the certificates they forwarded suggested to us a more extensive series of regulations. These we published in pamphlet form, covering as far as we could every contingency that might arise under the law. This bulletin has remained our general guide for registrars and it has been supplemented in a few respects only. From time to time, as new explanations were deemed necessary, these were embodied in circular letters to the registrars or in published supplements to our regular bulletins. Perhaps the greatest single help toward the correct certification of births and deaths was our publication with the regulations, of two model certificates, complete in every detail and conforming to the precise requirements of the statute. Our registrars, who had clamored for this guide, followed it with most commendable accuracy and thus had constantly before them a proper model. Correspondence with individual registrars also accomplished much. The assistant registrar examined the certificates sent in by the local registrars and as he found a registrar falling into error or failing to grasp any of the regulations, he would write the registrar explaining what was needed. This took time and patience, but it resulted in better returns and in excellent feeling between this office and the local registrars. Many registrars, whose mistakes were corrected, hastened to write that they would gladly follow our suggestions. 'Just let me know what you want and I will do it,' was the usual response. We must express our conviction that in beginning registration, the proper training of the registrars is second only in importance to the education of the public.

"The midwife remains the greatest obstacle in the way of the complete registration of births. The difficulities which she presents, as outlined above, have not yet been obviated. We have tried every method of communicating with her, have given repeated assurances that her neglect rather than her compliance with the law would bring punishment, and we have told her that we had no other object in view than that of carrying out the law. We attribute to the neglect of midwives the unsatisfactory registration of colored births.

"It is a pleasure to report that the difficulties which we anticipated in dealing with the undertakers have practically been removed. From the regular undertakers we have received genuine and hearty co-operation and our representatives, speaking before their conventions, have been given a most cordial welcome. The support of the rural undertaker and of the coffin dealers has also been gained. Realizing that many sold coffins and could thus give us information though they did not come within the law, we prepared and issued to these coffin dealers a form of monthly report. In this they were requested to report to us the names of all persons to whom they sold coffins, thus giving us the means of checking up deaths and noting failures to report. The dealers have done this in the vast majority of cases and have given evidence of a sincere desire to co-operate with us.

"Viewing this aspect of the problem as a whole, we are of opinion that such undertakers as those of Virginia offer perhaps the least obstacle to effective registration. They realize that the requirements of the law are reasonable and that the task imposed upon them by the provisions of the statute is a tribute to their worth and ability. We could wish that all those who deal with the undertakers in the preparation of death certificates were uniformly as careful and as considerate as are the undertakers themselves.

"The opposition of that minority of the medical profession which opposed registration has been dissipated and overwhelmed by the co-operation and support of the great majority. As physicians have seen the importance of this work to the State and to the cause of medicine, they have come to make it a part of their routine until those who oppose the law can now be counted on the fingers of a single hand. Against these we propose to proceed as required by law. We cannot speak in too high terms of our brother physicians in private practice who have co-operated with us. Our only complaint against them is that some physicians are unreasonably slow in their report of births.

"Our work has been systematized as rapidly as possible and our records, we trust, are in satisfactory shape. For the information of those interested in such matters, we subjoin a brief explanation of the essential features.

"As birth and death certificates are forwarded us during a given month, they are filed in a case which is marked with the names and the registration numbers of all the counties and cities. As experience has shown that in every month many certificates of the previous month are forwarded, no certificates are arranged for binding until at least forty days after the conclusion of the month. Sometimes we keep the certificates in the open cases for a still longer time and by so doing have been able to fill in gaps and to include missing records.

"When the time comes to bind certificates for a given month, they are arranged by counties and districts, are put into shape and are then numbered serially, one set of numbers being followed from the very first certificate filed. This done, the certificates are bound in buckram covers, births and deaths in separate classifications and different bindings, and are stamped with the dates covered, the counties included and the serial numbers of the certificates. Thus one volume may contain the certificates of Accomac to Elizabeth City county, inclusive, for the month of July and may cover serial number 31,501 to 32,000. We bind five hundred certificates in a volume, but do not make this inflexible, as we see no reason why we may not bind a few extra certificates in excess of 500 to include the full return for a county. As the serial numbers show us precisely how many certificates we have collected, the exact number in any one volume is not important. Where a volume of certificates is collected for a given month, after the others have been bound, they are separately bound and may include the delayed certificates for the entire State for any one month.

"Corrections to certificates are made both before and after binding. Our custom is to note the missing item of any certificate and, on one side of a return postcard, to address an inquiry to the person to whom the information should be given, with the request that he return the original and the reply-card. As each card is numbered with the serial of the certificate it is thus an easy matter to make corrections and to add new information.

"As the volumes are bound, they are indexed. What form of index to make was a question over which we pondered long. We were doubtful whether it was best to file the cards in a single index for the entire State or to file them by the counties in which the births and deaths occurred. Our final decision was in behalf of the former system for these reasons: (1) experience showed that in the vast majority of all inquiries regarding certificates, the place of birth or death was not specific enough to include the name of the county or city, (2) an index by counties requires a very lengthy search where the name of the county is not known, (3) such an index can be kept up-to-date without great trouble and can be searched more easily than indexes for 100 counties and 20 cities. For in-

stance, if it be known that John Smith died in Halifax county, it is a simple matter to locate Smith, John, in an index for Halifax county; but if the place of death be not known, it is easier to look through the entire roll of 'Smiths,' filed together, than through the 'Smiths' filed in 120 different alphabets.

"Our system of indexing is one of the simplest that could be devised. We have index cards printed in different colors for the different races and sexes, as follows: White, white female; buff, white male; fawn, colored female; salmon, colored male; pink, birth of a child whose sex or race is unknown; green, death of a person whose sex or race is unknown. The birth index cards of the various colors have the word ,birth' printed on them, the death cards are marked accordingly. Still-births are indexed by race and not by sex on cards stamped 'still birth.' In this way it is possible to save on every card the typewriting necessary to designate sex and race. A name typed on a plain white card, for instance, means that the record is of the birth of a white female. While the saving on each card is not great, the aggregate time thus saved is enormous.

"We devoted much time to a system by which we can keep accurately the accounts of each registrar,—a matter of no small consequence in that each of the 1300 registrars is entitled to a correct report of the number of certificates forwarded by him. We have accordingly devised a very simple arrangement: as the monthly report cards of each registrar are received, they are filed in separate envelopes marked with the name and registration district number of the registrar. The enclosed report is compared with the number of certificates sent in month by month and is noted in a proper space on the envelope. At the end of the year it is only necessary to add the totals to have the correct account. No books are necessary for the correct accounting of all certificates and the result can be certified to the local treasurer on a proper blank.

"It might be proper to add in this connection that the preparation of all our forms has been the result of conference and discussion. Knowing that a form once established could be changed only at the risk of confusion and errors, we have felt that we should not have these sent to the press until they had been criticized from every angle and that this outlay of time and thought is well justified by the results. In particular we have been pleased with the new form of birth certificate which we have devised. This contains all the information required by the Federal Census and is arranged compactly and handsomely. We intend to present this certificate at the next conference of registrars as the model for the United States.

"The difficulties in the administration of the law and the methods by which these difficulties have been overcome have been enumerated not because we wish to offer them as an excuse for incomplete returns, but because we believe a discussion of them will both be of value to other States planning like laws and will explain the nature and scope of the statistics to be cited below.

What the Statistics Show.

"A preliminary compilation of our statistics for the report year 1912–13 shows the following return of births:

White male births	17,938	
White female births	17,270	
Total white births		35,208

Colored male births	6,648	
Colored female births	6,672	
Total colored births		13,320
Total births white and colored		48,528*

"Reduced to rates per 100,000 of population, the total reported rate is thus 22.8, the white rate is 24.3 and the colored rate is 19.7. The distribution of these births will be found in the appended general tables.

"A study of these statistics raises a number of interesting questions and justifies a number of conclusions. In the first place, it is probable that the total number of births reported is not much in excess of 80% of those that occurred in the State during the year. This estimate is based on the census returns for 1910 which showed 56,168 children in Virginia under one year of age i, e., 56,168 children who had been born in Virginia during the twelve months preceding the census. Adding for the three years since the census a ten per cent. increase for each year based on the aggregate increase from 1900 to 1910, the estimated number of total births in Virginia in 1912–13 would be 57,302.

"It is apparent, however, that our failure to get reports of the births that occurred in excess of 48,528 was largely due to the occurrence of these births among our colored population. Experience has shown in every State that in rural sections the birth-rate among colored people is considerably in excess of that among the whites, whereas our figures show a higher rate among whites than blacks. In the cities we are not inclined to believe the colored birth rate much if any in excess of the rate among the whites. The conclusion however is inevitable that the midwives who attend most of the colored women in child birth do not fill out the reports required by law.

"An examination of the geographical distribution of these births shows that in the cities the registration of births, particularly among the colored people, is far from complete. In the country, the general registration of births is better, though here also the colored reports are far behind the actual number of births.

"Still births are required by law to be reported both as births and as deaths, so that the following figures should balance, though they show a difference of 108:

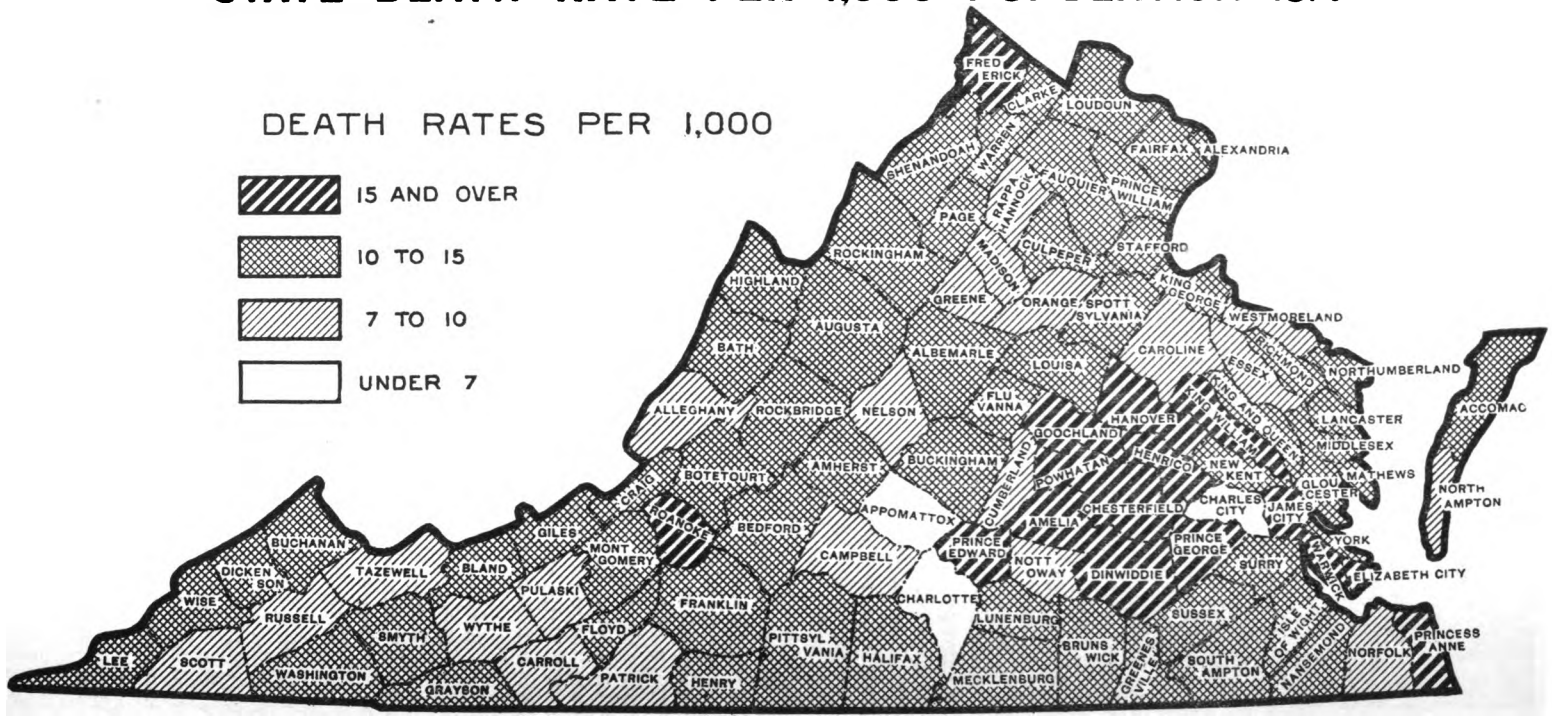
White still births reported as births	1028
Colored still births reported as births	1155
Total still births reported as births	2183
White still births reported as deaths	1198
Colored still births reported as deaths	1093
Total still births reported as deaths	2291

"There is thus observable a very high percentage of still-births among colored people, and as the colored population of the State is not one half that of the whites (674,208 to 1,448,895) the still birth rate among the colored people is thus more than double that of the whites. Viewed in relation to the total number of reported births, the still-birth rate among the colored is positively appalling. While reasons for this cannot positively be stated until thorough investigations

*Additional unclassified birth reports received after the compilation of these statistics would raise the total to 49,155, a rate of 23.

VIRGINIA

STATE DEATH RATE PER 1,000 POPULATION 13.4



have been made, we are inclined to attribute the higher rate to the employment of midwives among the negroes where physicians are more generally employed among the whites. Here, it seems to us, is a splendid field for educational endeavor.

"The statistics for deaths gathered by the local registrars and reported to us are as follows:

Deaths of white persons	16,508.
Rate per 100,000 population	11.4.
Deaths of colored persons	11,983.
Rate per 100,000 population	19.1.

"In the nature of things, we are unable definitely to say how large a percentage of the actual number of deaths has been reported but the rate for the State (per 100,000 of population) is 13.42.

"Comparing this with the showing of other States, it is not unreasonable to estimate that we are now getting reports of almost 90% of the deaths that occur. It is noticeable, in reviewing these figures in their local distribution, that just as births are more generally reported in the country than in the cities, so in the cities the registration of deaths is more comprehensive than in the country. The reasons for this, however, will be obvious upon a moment's reflection, the chief factor being that in the cities practically every burial is in charge of a professional undertaker who is accustomed to procuring a burial permit before he proceeds with the interment. Altogether we regard the showing of deaths for the year as most encouraging and believe that within another twelve months we shall have the reports for at least 95% of the deaths in the State.

"Keeping in mind the fundamental fact that not quite 95% of the deaths are probably being reported, we can gather much of interest from a study of the causes of death in specific instances. But here some difference in the accuracy of the various sets of figures must be reckoned upon. Generally speaking, where death occurs after a long illness from a disease which promises a fatal outcome, the probabilities are much stronger that the death will be recorded than in case of sudden deaths or deaths resulting from a brief illness. In the former case, where the family is expecting dissolution, it will generally make arrangements in advance, which arrangements will include a provision to get the burial permit and to file the certificate. In the latter case, where the death may be sudden, the shock to the family may be so great that the permit may be overlooked. In the same way, it is safe to presume that a larger majority of deaths from violence are reported, in proportion to the whole number, than deaths from disease. Where a violent death occurs the coroner is notified and he promptly furnishes the necessary certificate. Thus we are not willing to admit that our figures for the mortality from typhoid fever and tuberculosis represent less than 90% of the total deaths from these causes, if indeed they are as low as that percentage; nor are we willing to admit that as many as ten per cent. of the homicides, suicides and violent deaths have passed unreported. But in precisely the same way, we would not guarantee that deaths from diphtheria, diarrhoea-enteritis and influenza are fully reported.

"The most striking single set of mortality statistics are those relating to tuberculosis. Here we face a melancholy situation, as is disclosed in the following table:

Total reported deaths from pulmonary tuberculosis	3146.
Deaths of white persons from pulmonary tuberculosis	1426.
Deaths of colored persons from pulmonary tuberculosis	1718.
Deaths from other forms of tuberculosis, total	378.
Deaths of white persons from tuberculosis other than pulmonary	227.
Deaths of colored persons from tuberculosis, other than pulmonary	151.

"It would thus appear that our death-rate among the whites from pulmonary tuberculosis is 98.4 the 100,000 of population, or 39.6 the 100,000 of population less than the rate for the entire district under Federal registration. But whatever rejoicing there may be from this discovery is silenced by the dismal figures of colored mortality from pulmonary tuberculosis—256.0 the 100,000 of population, or almost three times that of the whites. Our State rate would appear to be 148.0 the 100,000 of population, or 10. in excess of the rate for the total registration area.

"The full significance of these depressing figures can only be appreciated from a comparison with the colored death-rate from other causes. Generally speaking our negro population is scarcely less healthy than the white in every other respect, and are noticeably more fecund, but when it comes to phthisis, the negro seems helpless. Surely here is an opportunity for the State to do service to humanity in reducing this fearful toll of death.

Typhoid Fever.

"A marked contrast is afforded by our figures for the mortality from typhoid fever, the summer scourge of Virginia and the South. Here we have unmistakable evidence of a notable reduction in the absolute and the relative mortality. These figures are analyzed in detail in the report of the Bureau of Rural Sanitation, but they are startling enough to deserve mention here. During the year 1912-13 there were reported to us a total of 518 deaths from typhoid fever, or a rate per 100,000 of population of 24.4. The census for 1900 shows 914 deaths from this cause in Virginia with a reporting population of 1,854,184, or a rate of 49.3. In other words, on the face of the statistics there has been a reduction from a rate of 49.3 to a rate of 24.4, or an absolute decrease in deaths of 396. Believing that the evidence shows the vast majority of all deaths from typhoid fever to be duly reported, we regard this as a most satisfactory showing and one that should be the source of general rejoicing in that it presages the conquest of this disease with all the suffering it entails.

Diphtheria.

"Our statistics show 256 deaths during the year from diphtheria and croup, or a mortality of 12.1 the 100,000 of population, compared with an average rate in the registration area of 18.9. Granting that our figures may be at least 10% below the actual number of deaths, our mortality would still be lower than that of the registration area. That such is the case we feel confident and that it should be so we attribute to the general use and distribution of diphtheria antitoxin. What this low rate means can only be appreciated when we remember the dismal ravages of this disease before Behring's great remedy was placed within the reach of the people.

Pellagra—A Growing Menace.

"We have been startled to observe the prevalence of pellagra as shown by the mortality statistics. During the year we received reports of 145 deaths from this cause, or a rate of 6.8 the 100,000 of population. This is more than six times the rate for the registration district as a whole, based on the statistics for 1911. The spread of the disease since that time has doubtless raised the figures for the registration area, but there can be no doubt that our mortality from this cause is extremely high. The disease, in a word, threatens to become a menace and deserves the careful attention of health officers and investigators. Unless we are able to ascertain its cause and to prevent its spread we may ere long expect to find it numbered among our most serious diseases. Even as it is, it claims more than one-fourth as many victims as typhoid fever.

Our Pneumonia Rate.

"Our statistics would seem to indicate that Virginia is not suffering as heavily as some of her sister States from the ravages of pneumonia. From this cause during the year 2,118 deaths were reported, or a mortality of 99.7 the 100,000 as compared with a registration-area rate of 133.7. Assuming, as is likely, that other deaths due to this cause are not reported, we are still probably below the national rate.

Infant Mortality.

"In estimating our infant mortality, we have based the total not upon our reported births, but upon the estimated number as indicated by the 1910 census, with due allowance for increases since that time. This would give us a population under one year of 57,302, of whom 5,469 were reported to have died during the past twelve months. This is a rate of 95.4 per 1,000 of population under one year. Appalling as are these figures they are not excessive compared with those of the registration area, where the rate is 112.9 per 1,000 of population under one year of age. From diarrhoea and enteritis among infants under two years of age our rate per 100,000 of population was 68.3 compared with a registration-area rate of 77.4. Our figures would probably be as high were all the deaths reported, so that here we have no reason to congratulate ourselves. At best the showing is a sorry one and a sad reflection upon our civilization.

Our Homicidal Rate.

"Compilation of our reports show 245 homicides in Virginia during the past twelve months, which number is believed to include practically all that occurred. This gruesome total gives a rate of 11.5 the 100,000 of population, compared with a rate for the registration area of 6.6. In other words, doubtless on account of our large negro population, almost twice as many murders are committed in Virginia, in proportion to the population, as in those States whose registration is accepted by the Census Bureau.

Suicides Are Infrequent.

"But if homicides are numerous, suicides are less frequent than in the registration area. Our reports show but 134 suicides during the year, or a rate of 6.3 the 100,000 of population, compared with 16.2 for the registration district.

"Of accidental deaths, there were reported 1,266, a rate of 59.6 the 100,000 of population, with which no accurate figures for comparison are available.

"Not to burden this report with statistics which show little of interest beyond what has already been noted, we append a statement of the mortality from those causes which we have ascertained and tabulated, with the rate thereon and, for comparison, the rate in the registration area as a whole.

CAUSE OF DEATH	Number of deaths	Rate per 100,000 of population in Virginia	Rate per 100,000 of population, registration area
Tuberculosis of the lungs	3,146	148.0	138
Diphtheria and croup	256	12.0	18.9
Pellagra	145	6.8	1.1
Scarlet fever	38	1.8	8.8
Measles	310	14.6	10.0
Whooping-cough	232	10.9	11.3
Pneumonia	2,118	99.7	133.7
Diarrhoea and enteritis	1,450	68.3	77.4
Influenza	245	11.5	15.7
Puerperal septicaemia	109	5.1	7.4
Cancer	930	43.8	74.3
Homicide	245	11.5	6.6
Suicide	134	6.3	16.2
Accidents	1,266	59.6	-------
Under one year, all causes	5,469	95.4*	112.9*

"In the appendix will be found a table showing the distribution of total births and deaths and of classified deaths from the preventable diseases, arranged by counties and cities. Too much emphasis should not be laid upon the showing of individual localities and in particular deductions should not be drawn from apparently low rates. Generally speaking where the death rate appears to be less than 13. the 100,000 of population, the reason is not the salubrity or healthfulness of the climate but the neglect of the registrars. Nor should too great value be placed upon the birth-rates of individual counties and cities. Wise county, for instance, shows a remarkable birth rate of 42 the 100,000 of population and undoubtedly has a population that is multiplying rapidly. But the explanation for this abnormal rate reported is probably to be found in the fact that practically every birth is reported, since the vast majority of them occur in the families of miners, etc., attended by careful contract surgeons. Buchanan has an even more remarkable rate—almost 49.

"Beyond this point we have not attempted to draw conclusions. We prefer to let the figures stand for what they are worth and to strive by renewed effort to correct errors which are obvious and to fill in gaps that are manifest."

In ending our quotation from the report of the Bureau of Vital Statistics, we wish to call attention to the valuable services which district inspectors could perform in aiding the registration of births and deaths. If a number of such inspectors were stationed in various parts of the State and could visit the localities of their district in order, we could get from the local registrars infinitely more efficient service and could strengthen the personal contact so essential to successful administration.

The results of our registration of births and deaths establish the fact that the new law is a success and that its complete administration is now dependent upon one thing only,—ample funds with which to carry out its provision. At the least

*Per 1,000 of population under one year; total such population, 57,302.

$10,000 the year is needed for this work, every dollar of which, if wisely spent, will yield splendid returns to the citizens of the Commonwealth. As long as the appropriation remains as limited as it now is, we cannot hope to do more than we are doing at present, and we shall despair of getting complete returns of all births and deaths.

THE CATAWBA SANATORIUM.

The past year has witnessed numerous advances in the work of the Catawba Sanatorium, some of which will be plain from the report of the resident physician and from the report of the business manager. Finding as we did in 1912 (see the report for that year) that under the construction placed on the appropriation-bill by the Attorney General we could not build the much-needed reception hospital near Salem, we did the next best thing,—we let the contract for an infirmary on the grounds of the sanatorium at Catawba. Despite aggravating and exasperating delays on the part of the contractor, this building is now complete and will be occupied in the course of a few days (October 30th). It will give us accommodations for 40 additional patients and will enable us to treat in a more scientific and suitable manner many of those cases which do not improve in the open pavilions. The infirmary, we trust, is a model of its kind and has been built in a most economical manner. Provided with a wide open porch which can be used by the patients when their condition justifies it, the building has separate rooms for cases that need isolation and is so located that it can be reached from the dining-room and kitchen without requiring patients, nurses or servants to go into the open air. We predict that the building will hasten the recovery of many who should not remain in the open air during the winter months.

In addition, the electrical arrangements at the sanatorium are now complete and afford us at low cost an abundant supply of light. The current also operates our pumping station and our refrigeration plant and thus enables us to make a daily saving. The new sewerage system is also about complete and will effectively care for all the wastes from the institution.

A glance at the report of the resident physician will show that the better facilities for treatment at Catawba are being reflected in the condition of the patients. In the main, the year has been an excellent one and the patients have improved in the vast majority of all cases. Since October 1, 1912, 240 have been admitted and 340 treated, leaving at the sanitorium on September 30, 117.

Yet the solemn fact stares us in the face that the waiting list on September 30 numbered almost 100,—every one of whom was clamoring for admission. With as many patients waiting admission as are now being cared for, how dare we say that Virginia is doing her full part for her consumptives?

Yet, conscious of the limitations on the revenues of the Commonwealth and appreciating the necessity of rigid economy in the public business, we feel that we should not at this time ask for an appropriation to enlarge the Catawba Sanatorium. This institution now has a capacity for 160 patients and, while it is pitifully small, it can by the application of the six months' rule accomodate more than 300 patients the year. Intended primarily for incipient cases and situated in a locality ideally suited for such cases, though somewhat rigorous for advanced sufferers, Catawba must for the present meet the needs of incipient sufferers as best it may, so great is the need of appropriations for other tuberculosis work.

To our mind, in allowing Catabwa to remain for the present without enlarge ments, we have a solemn responsibility and a great opportunity to meet the needs of another class of sufferers,—those advanced cases of tuberculosis which are not fit subjects for Catawba. These unfortunates have no hope beyond that of arresting the disease and prolonging their life. Cured they cannot be, restored to their work they need not expect to be. Yet if ever men and women needed the protecting care of the Commonwealth these do. Often they are ignorant of the proper method of caring for themselves; often they infect those with whom they live; often they are responsible for the spread of the great White Plague. But there is no place in Virginia to which they can go for temporary treatment or for education. Doubly doomed they have been,—as unhappy outcasts as though they were lepers.

What can be done for these men and women who so sorely need assistance and who are so grave a menace to the health of those about them? To our mind the answer is plain: They should have an institution where they can go to be trained in methods of caring for themselves, an institution where they can be examined and studied, an institution where experts could give them proper suggestions and could send them out with new hope begotten of new knowledge. They need, in short, a hospital to which they can go for a brief stay.

Then, again, there are many consumptives in the State who do not intend to enter the State sanatorium, or, indeed to enter any like institution, but who want expert advice as to the best methods of treatment. Scores of others wish the examination of physicians who make the diagnosis and treatment of tuberculosis their life work. Both of these classes cannot cross the mountains to Catawba, but could and would come to a hospital located near the railroad. The result would be of incalculable value to many hundred of our citizens.

Moreover, there is today a very great need for a reception-hospital to be operated in conjunction with Catawba. We are ideally situated at the sanatorium for the treatment of incipient cases, for whom the sanatorium was originally intended, but experience has shown that physicians will not adhere strictly to our standard of diagnosis and will even classify as "incipient" cases that are really advanced. They send these patients to the sanatorium, and force them to go across the mountains, with results that are often disastrous. A hospital near the railroad could act as a clearing-house and could care for all applicants until examination would show whether or not they are fit subjects for admission to Catawba.

Needing, then, an institution where advanced cases can come for examination and advice, where all cases can be accurately diagnosed and where applicants for Catawba can be classified, we can meet this triple need and can render an inestimable service to the cause of public health by building a reception hospital on property now owned by the Commonwealth. This property was purchased by the board in 1912 when we hoped to erect there such a hospital as has been described above. The board purchased this property for $3,250 and paid for it out of the funds appropriated for the Catawba Sanatorium. When the Attorney General ruled that the appropriation bill did not permit us to purchase from the funds designated for Catawba property elsewhere than at Catawba, we repaid the amount expended from the general funds of the board, regarding the disposition of which there could be no question. This incident, which was explained at length in our report for 1912, has left in our hands the unused property near Salem—a spot ideally suited for the construction of a reception hospital. We shall ask the General Assembly to make appropriation for the erection of such a hospital and we believe it will prove to be one of the most valuable additions to the State's equipment for

the campaign against preventable disease. To our mind such a hospital will meet the greatest need in tuberculosis work among our white citizens and will ultimately lead to a reduction in that dismal death rate of which we have written in another section of this report.

Provision for the Colored Tuberculous.

The time has come when Virginia must do something for the colored tuberculous. As conditions are today, they disgrace us as a merciful people. The colored man is rendered much more susceptible to tuberculosis than is the white by living in insanitary, crowded quarters among those whose ignorance and carelessness make easy the spread of disease. Everything combines to render him a ready victim of the White Plague, but when he is stricken there is not an institution of any sort in Virginia to which he can go. Indeed, it is a travesty on government to state the simple truth: The only colored citizens who can be treated in Virginia for tuberculosis are the lunatic and the criminal.

Our neglect in this matter is more than inhumanity. It is the poorest of economy and the most short-sighted administration. It would be barbarous enough, to be sure, to allow the negro to perish of preventable disease, but it is equally unjust to permit the advanced tuberculous negro to live where he can infect his colored neighbors and any white person with whom he comes in contact. Our colored population, be it remembered, does not live apart from us: they are the servant race, they nurse our children, they cook our meals, they wash our dishes, they launder our clothes. Their diseases must inevitably be our diseases and their suffering will be our distress. We have not the least hesitation in saying that the reduction of the white death rate from tuberculosis is not less dependent on a reduction of the colored rate than on our public education and our care of white consumptives.

A Commonwealth with financial obligations as heavy as those of Virginia and with a colored population as large as is ours need not at present hope to care for all the colored consumptives or to give treatment to a very large percentage of them. This humane work must wait for a more prosperous day in our history. But can we not do something to remove from crowded homes and to care for those who are the foci of infection, the means of spreading the disease to white and black alike? Can we not, in short, establish an institution where we may care in a simple fashion for 100 or 200 advanced colored tuberculous? We are not overstating the case when we say that without some such institutions, the problem of tuberculosis will grow greater rather than less. With the death rate of at least 256 the 100,000 of population, what can we expect as our negroes continue to herd and to live in insanitary, unhealthy communities? Nothing less than the increased infection of the entire population, the hazarding of our very existence.

In view of these conditions, we shall ask the next General Assembly to make provision for the erection and maintenance of an institution for the colored tuberculous and we shall endeavor to present a plan which will enable the State to make this provision at small cost. The Mother of States cannot fail to do her duty by even the humblest of her citizens.

Tuberculosis Board Needed.

The development of Catawba and the probability that to that institution will be added a reception-hospital and a sanatorium for advanced colored cases make imperative the creation of a separate board for the control of these institutions.

As we understand the law, it was never intended that the Catawba Sanatorium should remain permanently under the direction of the board of health. It was rather the purpose of those who drafted this law to use the expert judgment of the board and of its proposed officers in the selection of suitable sites for experimental sanatoria. This we have done and now that the success of the experiment has been assured, we think the work should be taken from the board and its employees and entrusted to others specially designated for the work. Ours is not the task of treating but of preventing disease and our work in the latter field will be the more effective, we believe, if the tuberculosis sanatorium and others that may be established, are separately managed. We tender this suggestion not from any improper desire to rid ourselves of duties prescribed by law, but in the honest belief that the suggested change will be to the advantage both of the tuberculosis work and of our other activities. As we see it, the proper course would be to establish a separate board for the sanatorium, and to vest in such a board the same powers now exercised by this board, in its control of Catawba, with such added powers as the experience of other State hospitals has shown to be necessary.

In closing this section of the report, we wish again to bear testimony to the co-operation and assistance afforded us in our tuberculosis work by the Virginia Anti-tuberculosis Association, whose executive secretary has assisted us in every way possible.

MORBIDITY STATISTICS.

Along with the new vital statistics which we have been enabled to collect under the present law, we have as heretofore continued to send out the monthly report blanks to physicians for the return of the cases occurring in their practices. While by no means all physicians have returned these cards, a majority have done so and on this basis we have estimated the cases of communicable disease that have occurred in the Commonwealth during the past twelve months.

Before commenting on these figures in detail, we wish to express our conviction that our estimate of the number of cases is too high, for a reason which will now be explained. In case six physicians in a county report twelve cases of diphtheria during a month and there are a total of twelve physicians in the county, we estimate two cases to each physician and thus charge the county with a total of twenty-four cases. This seems the only fair way to be safe in our estimates, yet is it not more than likely that the physician who does not report is the one who has no cases of communicable disease in his practice? Other things being equal, is not the physician who has cases to report more apt to fill out the card and mail it than the physician who has nothing to report? Then, too, we carry on our list and send report cards to many physicians who are in practice in name only. A physician, for instance, may practically have retired from the practice of his profession on account of age or disability and may not answer other than emergency calls. Yet such physicians—and there are several hundred of them in the State—are credited with the same number of cases that the busy, active practitioner reports. While we are not able to establish our contention and, in consequence, prefer to cite figures regarding which there can be no dispute, we are of opinion, to repeat, that our estimated number of cases certainly errs in that it is too conservative. Our personal belief is that at least 500 cases of typhoid and a proportionate number of cases of the other communicable diseases may be deducted from our estimates and the result be nearer the accurate state of affairs.

Diphtheria Declining.

The most significant feature of the morbidity statistics, as appended hereto, is the striking decline in the number of cases of diphtheria. This disease, it will be recalled, is one that varies with the years in a manner not yet fully understood. Our own experience in Virginia has been somewhat mystifying. In the report year 1908-09, for example, 5,818 cases were reported. The next year, despite the fact that diphtheria antitoxin was made available at low rates, the number of cases increased to 6,279 and, in 1910-11 mounted still higher, 6,812. Last year (1911-12) there was a slight decline and this year has marked a new low record with but 4,757 cases. We cannot, of course, promise that this decline will continue, but we feel sure that just as the use of antitoxin has reduced the mortality from this cause, so, in time, if wisely administered, the same remedy will lower still further the number of cases. Altogether the outlook in dealing with diphtheria is most hopeful.

Slight Decrease in Tuberculosis.

There is, too, a slight decrease in the number of new cases of tuberculosis, a decrease which is in line with the previous experience of the State. In 1908-09, to illustrate, we received reports of 6,816 cases and estimated the total number to 12,127. Except for the year 1911-12, when there was an apparent increase of 30 cases, the estimated number has declined until during the fiscal year 1912-13 we estimate but 8,274. If this indicates a real decline in the number of cases it is most encouraging, though the conquest of this disease, it must be remembered, is extremely slow and progress is only in proportion to the general betterment of the standard of living. As long as a very large part of our colored population live in crowded quarters, amid conditions extremely insanitary, we can never hope for any revolutionary drop in the number of cases. We must fight on, bit by bit and step by step.

Typhoid Fever.

As indicated elsewhere in this report, and as emphasised in the report of the bureau of rural sanitation, there has been an increase in the estimated number of cases of typhoid fever. But this increase is in some measure offset by the very interesting fact that the mortality from this disease is relatively low. We may hope, by aggressive sanitary work, especially in rural districts and in the small towns, to reduce still further the ravages of this disease.

Other Communicable Diseases.

Our morbidity statistics show that the other communicable disease remained in about the same relative place as last year. The diseases of childhood and infants' maladies still reap a heavy toll; pneumonia is equally a menace, though the death-rate is not as high in Virginia as in other States. Pellagra alone, in addition to the diseases we have named, has assumed serious proportions in the last year. To meet this, we must unite with the health workers of other States and strive to find the cause. This done, we may hope to learn something of prevention.

Malaria.

No development in the health situation during the past twelve months has given us more concern than the steady advance of malaria. From localities where malaria was never known before have come reports of its appearance and with insidious tread this disease seems to be stalking across the State. It is difficult to give a single explanation for this apparent increase in malaria. Some of it, to be sure, may merely mean the better report of infection that has long existed, much of it is doubtless due to the growing number of dams along our water courses; much of it is attributable to neglect which, slowly but surely, carries the mosquitoes from one community to another.

There are few diseases regarding the transmission of which we have more definite and complete information, and there are few the prevention of which is plainer. In addition we have for malaria a definite specific in quinine. But the application of this remedy and of these methods of prevention to the eradication of the disease is by no means easy or economical. Beyond a certain point, quinine given to prevent the appearance of the symptoms, reacts disastrously on the nervous system of the patient; draining one man's farm will not prevent the coming of mosquitoes from nearby swamps.

In a word, the eradication of malaria presents a problem of serious proportions and one for which half-way measures will not suffice. Our chief hope for relief, certainly in badly-infected, marshy area, lies in the formation of drainage districts in accordance with the provisions of the drainage law as passed by the Assembly of 1912 (See Acts of Assembly, 1912, p. 333, chapt. 159). Where such districts cannot be established, immunizing each individual offers the best promise of relief. In districts where the swamps are small or local, and in communities where the mosquito is bred on every farm through neglect, drainage and oiling offer much relief. Were our staff enlarged by the addition of a man whose whole time could be devoted to malarial prevention, we could do much more than at present in stamping out this distressing disease.

Pellagra.

As is pointed out in the report of the Bureau of Vital Statistics, the mortality returns for the last year show an unexpected death-rate from pellagra. This is all the more distressing in that thus far neither the cause nor the treatment for this disease has been found. Many experiments have been made and many theories advanced, but we are really as much in the dark as we were when this disease first made its appearance in America. We have continued our policy of gathering detailed information regarding every case that is reported to us, but we have not yet been able to utilize this data in any practical way. It is most fervently to be hoped that the investigations of this disease now being made will result in the discovery of some effective means by which it may be controlled.

The Distribution of Supplies.

There remains but to report the distribution of supplies during the past fiscal year and to mention certain diseases in connection with which our supplies are used. We have continued as heretofore to distribute diphtheria antitoxin according to our standing arrangement with Messrs. H. M. Alexander & Co. We also distribute, by a similar arrangement, typhoid vaccine prepared by the Lederle Laboratories and we continue to sell at cost smallpox vaccine.

Our present arrangements for the distribution of diphtheria antitoxin are probably as satisfactory as they can be made unless we establish antitoxin stations in various parts of the State. These arrangements have resulted in a marked reduction in the retail prices of antitoxin and have doubtless made it much more accessible to those who need it. We have found, however, that the prices charged by druggists vary much and we recently found an instance where a Richmond druggist wanted to charge $20.50 for 13,000 units, our price being $5.36. This leads us to believe that despite our efforts to acquaint all the people with the fact that the State dispenses the highest grade of antitoxin at the lowest rates, some of our citizens must be ignorant of the arrangement. Otherwise it would be impossible for druggists to make such charges. Such extortion is all the more inexcusable in view of the fact that the great body of druggists in the State, adjusting themselves to the lower prices, sell antitoxin at a reasonable increase over our rates. The few who overcharge thus lead the victims to believe that all druggists are in the same class. We shall continue our present arrangements and we hope they will suffice until the finances of the Commonwealth permit an appropriation sufficient to furnish antitoxin free of cost to all who need it. Until this be done, we cannot hope to achieve what is a possible goal,—the complete eradication of diphtheria from the State.

SMALLPOX AND SMALLPOX VACCINE.

Unable to make an arrangement for the distribution of smallpox vaccine similar to that by which we are able to furnish antitoxin to those who need it, we have continued our custom of purchasing smallpox vaccine and selling it at cost to all who ask for it. In this way we are able to furnish a package of 10 capillary tubes for 65 cents, far less than the retail price. This vaccine has, as usual, been much in demand and has been sent in varying quantities to those localities where small-pox has appeared.

The smallpox situation itself remains unchanged. Viewed in one light the disease is scarcely deserving of mention in a general report, for there were from this cause but three deaths during the past year. But viewed in its economic bearings, smallpox is one of the most troublesome of diseases. People remain careless until it appears and then, with what must be an inherited dread of the disease, they will go to any expense to be rid of it. Counties which will not appropriate a dollar for preventive general vaccination will spend hundreds of dollars in compulsory vaccination during epidemics, in quarantine and in doctors' fees. Then, too, when the disease appears in a family, there is immediate and continued heavy expense and the added cost of all infected property destroyed. Here, if anywhere, prevention is infinitely cheaper than cure.

Some of the States have solved the smallpox problem by abandoning all efforts to quarantine the sick. They allow them to walk the streets and merely tell those who fear the disease that they may protect themselves by vaccination. This policy is perhaps the simplest solution of the question in the end, but it always means a very high morbidity for some time and it really transfers the problem to the adjoining States. We are not yet convinced that this offers the only sure means of procuring general vac ination, but we recognize fully that the present neglect means a steadily decreasing immunity. Smallpox is a monster that may reawaken at any time.

RECOMMENDATIONS.

To summarize the various recommendations made in different sections of this report, we feel that the health situation in Virginia at this time shows the need of:

(1) District health inspectors, under the supervision of this board, to co-operate with local health authorities and to direct the sanitation of adjacent counties and towns.

(2) A reception hospital near the Catawba Sanatorium for the examination of suspects and applicants to the sanitorium and for the temporary treatment and instruction of advanced cases.

(3) A State sanatorium for colored people, to care for the advanced and hopeless cases who are now spreading the infection everywhere.

(4) A more liberal appropriation for the enforcement of the vital statistics law.

(5) The abolition of the fees now exacted for the inspection of hotels (with a corresponding increase in the funds of the board) and the extension of the law to include all hotels that regularly receive transient guests.

(6) The control of Catawba and of any other sanatorium hereafter to be built by a separate board and the removal of all treatment work from the control of this board.

(7) Better school sanitation, particularly in respect to (*a*) sanitary privies, (*b*) better light, (*c*) jacketed stoves or other systems of ventilation, (*d*) individual drinking-cups, and (*e*) the control of dust.

Other needs there are, but these are the most pressing; these are they which demand legislation at this time.

ACKNOWLEDGMENTS.

It is a pleasure to report the constant and enthusiastic co-operation of every member and of every employee of the board during the past year. We have worked most harmoniously together and have felt our work made more effective by the good fellowship prevailing. In addition, his excellency, Governor Mann, has been our constant friend and adviser while the other departments of government, and particularly the departments of Agriculture and of Public Instruction have given splendid evidence of their desire to co-operate in what is after all the same work. To the members of the board of health, the commissioner owes a constant debt of gratitude for patriotic and self-forgetting service.

The year has been a happy one, not less in achievement than in promise of future good to be done.

Respectfully,
ENNION G. WILLIAMS,
Health Commissioner.

Appendices.

APPENDIX ONE.

Report of the Bureau of Rural Sanitation.

A. W. FREEMAN, M. D.,
Assistant Commissioner in Charge.

Hookworm Disease.

GENERAL STATEMENT.

The work of the Bureau of Rural Sanitation during the year has been directed principally against typhoid fever and hookworm disease. The experience gained in past years has been utilized to make the work of the bureau more direct, and in many ways more efficient than has been possible in the past. The hookworm campaign, conducted with funds supplied by the Rockefeller Sanitary Commission, has been successful beyond our most sanguine expectations. The campaign against typhoid fever has been conducted along the same general lines as in the past, and the results of the work of the past five years have become increasingly evident.

CHANGES IN STAFF.

Several changes in the staff were made during the year. Drs. K. E. Miller and W. A. Brumfield have continued at work in the field. Dr. A. C. Fisher, who had been connected with the work from its beginning, was relieved from active field duty on January 1st, 1913, and has since that time been stationed at his home in Richmond county, giving only part of his time to the work. Dr. H. R. Lickle, who was appointed to fill the vacancy made by the retirement of Dr. Fisher, resigned on July 1st, 1913, to enter private practice. Dr. G. A. L. Kolmer, of Salem, Virginia, a graduate of the John Hopkins Medical School, entered the work on that day. A. J. Chenery, who had served for more than a year as microscopist, resigned on September 15th to take up the study of medicine. During the summer months W. O. Poindexter, H. G. Harper and H. E. Miller were employed as microscopists.

The members of the staff of the bureau have, without exception, served with energy, zeal and effectiveness. The best measure of their work is to be found in the tables published herewith.

DISPENSARY WORK.

The marked success which attended the dispensaries held during the latter part of the summer of 1912, was made the basis of the principal effort during the summer of 1913. As soon as the weather permitted, dispensary work was begun and has been continued up to the time of this report.

As, during the fall of 1912, Roanoke, Appomattox, Wise, Lee, Dickenson and Buchanan counties had made appropriations of $100.00 each to aid in the work,

work was begun in these counties. Later on the counties of Hanover, Surry, Prince Edward, Sussex, Amelia, Buckingham, and Cumberland made appropriations and the work was carried on without interruption up to the time of closing this report.

The following table gives the details of the county dispensaries held during the year:

Records of the Hookworm Dispensary October 1, 1912, September 30, 1913.

COUNTY	Inspector in Charge	Days Open	County Appropriation	Total Number Examined	Number found Infected and Treated	Percentage of Infection
Caroline	Miller	28	$100.00	4854	1044	21.5
Appomattox	Miller	24	100.00	3304	638	19.3
Roanoke	Lickle	24	100.00	410	19	4.6
Dickenson	Brumfield	24	100.00	1981	627	31.6
Hanover	Miller	30	100.00	1993	717	35.9
Wise	Brumfield	24	100.00	2051	923	45.0
Lee	Brumfield	24	100.00	9013	2332	25.8
Surry	Kolmer	24	100.00	1403	146	10.4
Prince Edward	Miller	30	100.00	3158	497	15.7
Tazewell	Brumfield	24	100.00	785	12	1.5
Sussex*	Kolmer	18	100.00	1227	184	15 0
Amelia*	Miller	12	100.00	295	35	11.8
	Totals	286	$1200.00	30,474	7,174	

*Incomplete report. Work still in progress at the end of the year.

NOTES ON COUNTY DISPENSARIES.

Caroline County.

The Caroline dispensary was opened, after two weeks of preliminary advertising, on November 15th and continued until December 17th, 1912. Dr. K. E. Miller was in charge, assisted by A. J. Chenery and W. R. Hursey. The dispensary received the practically unanimous support of the people of the county and during the six weeks, 29% of the total population was examined.

Appomattox County.

The Appomattox county dispensary was in operation from April 28 to May 24, 1913. Dr. K. E. Miller was in charge, assisted by A. J. Chenery. Thirty-seven per cent. (37%) of the population of the county were examined.

Roanoke County.

The Roanoke county dispensary was in operation from May 19th to June 16th, 1913. Dr. H. R. Lickle was in charge of the dispensary. The percentage of infection as found by microscopic examination was only five and it was impossible to arouse the interest of the people.

Dickenson County.

The dispensary in this county was in operation from April 30 to May 30, 1913. The isolation and lack of railroad communication made work difficult, but in spite

of these factors, the people of the county took great interest in the work. Dr. W. A. Brumfield was in charge, assisted by Miss Thelma Brumfield and W. O. Poindexter.

Hanover County.

Work in Hanover was begun on June 9th and was continued until July 15th. It was extremely difficult to arouse the interest of the people in the work in spite of the fact that infection was heavy. The dispensary was not as successful as it should have been. Dr. K. E. Miller was assisted in the work by H. E. Miller and A. J. Chenery.

Wise County.

The Wise county dispensary was in operation from June 9th to July 7th. Ats though the population of the minimg towns displayed but slight interest in the dispensaries, those which were located in the mountains were well attended and the number of examinations for the county very satisfactory. Dr. W. A. Brumfield in charge, was assisted by W. O. Poindexter.

Lee County.

The dispensary conducted in Lee county from July 7th to August 2nd, 1913, was the most successful ever held in the State. In number of persons examined it surpasses any record as yet made in the hookworm campaign in the South. Dr. Brumfield, who conducted the dispensary, is due the highest praise for the manner in which the work was done. From the first day the people of Lee county displayed the greatest interest in the work. In the first week it became necessary to send a second assistant and later a third. These assistants, W. O. Poindexter, E. G. Harper and A. J. Chenery, labored day and night to complete the examination of the thousands of specimens submitted to them. At the conclusion of the four weeks, the staff left the county with the good wishes of the whole population. One citizen of the county referred to them in a letter to the department as "angels of mercy."

Surry County.

The dispensary in Surry county was operated from July 28th to August 23rd. In view of the small white population of the county the results obtained must be regarded as highly satisfactory. The people of the county manifested great interest in the work and in spite of a low percentage of infection (10.4%) a satisfactory attendance was had at all the dispensary points. Dr. G. A. L. Kolmer conducted the dispensary without assistance.

Prince Edward County.

Operated from July 29th to September 1st, the Prince Edward county dispensary was highly successful. The people of the county, while apathetic at first, later manifested great interest in the work. The percentage of infection was low (15%). Dr. K. E. Miller was in charge, assisted by H. E. Miller and A. J. Chenery.

Sussex and Amelia Counties.

In these counties work is in progress at the time of this report.

Buckingham and Cumberland Counties.

In these counties appropriations have been made and work will be begun as soon as the dispensaries at present in operation are completed.

SCHOOL WORK.

During the winter months, when dispensaries were impracticable on account of weather conditions, work was taken up in the schools along the same general lines as in the previous year. The increased interest of the people at large in the subject of hookworm disease made this work at once much easier and more successful than in previous years.

During the year more than eight thousand school children were examined in this work and all those found infected were given treatment, free of cost. Work was done in the following counties:

Augusta,	Louisa,	Rockingham,
Albemarle,	Nelson,	Stafford,
Amherst,	Orange,	Spottsylvania,
Fairfax	Prince William,	Washington.
Hanover,	Rockbridge,	

Infection of School Children.

Up to September 30, 1913, thirty-five counties had been surveyed in the work of determining the degree of infection of the school children with hookworm disease The results are given in the following table:

Percentage of Infection of School Children.

COUNTY	Number Examined	Number Infected	Per cent Infected
Albemarle	330	83	25.1
Appomattox	1,303	393	30.1
Augusta	451	82	18.2
Bedford	251	57	22.7
Brunswick	361	176	48.7
Campbell	425	84	19.7
Caroline	1,848	645	34.9
Dickenson	840	391	46.5
Essex	280	155	55.4
Franklin	883	378	42.8
Greensville	326	212	66.5
Halifax	252	94	37.3
Hanover	201	87	43.8
Henry	1,287	635	49.3
Lee	1,969	759	38.5
Lunenburg	478	172	35.9
Mecklenburg	947	334	35.2
Middlesex	252	65	25.7
Nelson	218	45	26.4
Northumberland	219	31	14.1
Orange	1,029	210	20.4
Patrick	954	636	66.6
Pittsylvania	343	128	37.3
Prince Edward	1,250	316	25.2
Richmond	516	182	35.2
Rockbridge	989	188	19.0
Rockingham	951	97	11.9
Southampton	286	124	43.3
Spottsylvania	589	59	10.0
Surry	490	89	18.1
Tazewell	340	5	1.4
Washington	220	21	9.5
Westmoreland	223	124	55.6
Wise	815	396	48.6
Totals for 35 counties	22,116	7,453	33.7%

MICROSCOPIC EXAMINATION.

The policy adopted at the beginning of hookworm work in Virginia of advising or administering treatment for the disease only after infection has been demonstrated microscopically has been rigidly adhered to during the year. It is a pleasure to record the fact, shown in the following table, that the number of examinations this year shows an increase of 100% over the previous year, and exceeds by 15% the total number examined in the whole course of the work up to the beginning of the present year.

Number Specimens Examined Microscopically for Hookworm Disease.

QUARTER	Number Examined in Laboratory	Number Examined in Field	Total Number Examined
1912			
October-December	647	6,954	7,601
1913			
January-March	4,080	------	4,080
April-June	2,432	8,206	10,638
July-September	744	17,414	18,158
	7,903	32,574	40,477

Total examined report year 1912-1913 40477
Total examined report year 1911-1912 20197

LABORATORY EXAMINATIONS.

The laboratory report appended herewith shows satisfactory increase over the preceding year. The number of specimens received from physicians and individuals shows steady growth from year to year, while the number of specimens submitted by the district inspectors in connection with work in the schools also was larger.

Specimens Examined for Animal Parasites.

QUARTER	Total Specimens Examined	Number Showing Hookworm	Number Showing Round-worm	Number Showing Pinworm	Number Showing Whip-worm	Number Showing Tapeworm
1912						
October-December	647	107	119	2	7	7
1913						
January-March	4,080	834	988	10	144	11
April-June	2,432	273	354	3	54	4
July-September	744	144	74	--	12	5
Totals	7,903	1,358	1,535	15	217	27
Percentages		17.18	19.42	0.2	2.7	0.3

Total specimens examined in laboratory, 1912-'13 7903
Total specimens examined in laboratory, 1911-'12 6722

TREATMENT OF CASES.

While every effort has been made to secure the treatment of cases by private practitioners, the insidious character of the disease and the consequent reluctance of the sufferer to seek treatment at the hands of his family physician, renders it necessary that the fervor of a county campaign be utilized to bring about the treatment of any large number of cases. This has been done as far as possible and the following results are reported.

Cases Treated.

By dispensaries	7,174
By school work	1,855
Other field methods and central office	1,335
	10,364

SANITARY SURVEY.

In order to determine exactly what sanitary conditions are to be found in every county, a sanitary survey of the State was begun in 1910. For this purpose an inspector of the bureau visits each county and inspects not less than 100 homes. These homes are taken from different localities throughout the county in order that an estimate of actual conditions may be made. The results of this inspection are tabulated in accordance with a scale devised by Dr. C. W. Stiles, of the United States Public Health Service. This scale is as follows:

Table of Sanitary Surveys.

Class	DESCRIPTION	Value
A	Sewered or "marine hospital" barrel	100
B	Sanitary privy, fly proof, having water-tight receptacle	75
C	Same as B, except not rigidly fly proof	50
D	Surface privy closed in back	25
E	Surface privy open in back	10
F	No privy	0

From the results of the inspection of a county a sanitary index for that county is computed according to this table by assigning to each home inspected the proper value for the class in which it falls and dividing the total arrived at in this manner by the number of homes inspected. The number thus obtained is the sanitary index.

Up to the end of the fiscal year, surveys had been completed in 69 counties, with the results given in the appended table.

Table of Sanitary Surveys.

COUNTY	Type of Privy							Sanitary Index
	A	B	C	D	E	F	Total	
Albemarle	3			28	160	18	209	12.4
Amelia					138	67	205	6.7
Amherst				4	90	107	201	5.0
Appomattox				2	98	107	207	5.0
Bedford					19	132	151	1.2
Brunswick	1				50	52	103	5.8
Buchanan				5	87	174	266	3.7
Buckingham				4	76	123	203	4.2
Campbell	1				51	176	228	2.7
Caroline	1			27	117	58	203	9.6
Charles City				10	115	89	214	6.0
Charlotte				4	106	93	203	5.7
Chesterfield	1			39	152	15	207	12.5
Culpeper	6			40	140	19	205	14.6
Cumberland				1	93	110	204	4.6
Dickenson				15	43	146	204	3.9
Dinwiddie		1		12	145	50	208	8.8
Essex				6	101	95	202	5.7
Fairfax	3	2		51	139	14	209	14.9
Fauquier	3			43	156	14	216	13.6
Fluvanna		1		3	105	96	205	5.8
Franklin		1		4	122	80	207	6.8
Gloucester	5				113	82	200	8.1
Goochland				3	78	127	208	4.1
Greene	1			5	166	56	228	8.3
Greensville					112	96	208	5.4
Halifax					43	107	150	2.8
Hanover		6		3	147	58	214	9.3
Henry				3	86	122	211	4.4
Isle of Wight	2			5	126	76	209	7.6
James City	1			26	106	71	204	8.8
King and Queen					164	75	139	6.8
King George					103	101	204	5.0
Lancaster					73	81	154	4.7
Loudoun	4			49	150	8	211	14.8
Louisa	1			8	155	40	204	9.0
Lunenburg	1	1			60	88	150	5.1
Madison	1			10	172	31	214	9.7
Mathews					78	60	138	5.7
Mecklenburg	1	1			52	158	212	3.3
Middlesex					137	38	175	7.8
Nansemond				10	130	61	201	7.7
Nelson				5	100	97	202	5.5
New Kent				6	122	78	206	6.6
Norfolk	1			38	145	27	211	11.8
Northumberland					79	67	146	5.4
Nottoway	1			3	127	70	201	7.1
Orange	5			7	151	28	201	10.8
Patrick					53	152	205	2.6
Pittsylvania					32	192	224	1.4
Powhatan	2			4	101	94	201	6.5
Prince Edward				1	115	90	206	5.7
Prince George				6	149	46	201	8.1
Prince William				31	144	37	212	10.4
Princess Anne				29	148	42	219	10.0
Rappahannock	3			15	172	32	222	10.7
Richmond					104	166	270	3.8
Roanoke	2			14	167	20	203	10.9
Southampton				33	80	69	182	8.9
Spottsylvania	1			14	130	67	212	8.2
Stafford					98	102	200	4.9
Surry				6	125	78	209	6.7
Sussex				5	126	81	212	6.5
Warwick				22	123	66	211	8.4
Westmoreland					54	61	115	4.7
Wise				8	124	95	227	6.3
York	2	1		16	127	67	213	9.1

PUBLICITY CAMPAIGN.

The campaign of education regarding the nature, prevention and cure of hookworm disease has been carried on along the same general lines as in previous years. The largely increased attendance at the dispensaries has been utilized for effective education and many public lectures have been delivered independently. During the year about 700 public lectures have been given to nearly 70,000 persons. The bulletin was largely circulated during the year and the publicity bureau sent out numerous press notices of the progress of the work.

The effect of the continued campaign of publicity is very evident in the reception given the district inspectors in the various counties and in the mail received at the central office.

SUMMARY.

Summing up the work of the year against hookworm disease, the results cannot but be regarded as exceedingly gratifying. In examinations, treatments, county co-operation, general interest and improved sanitation, the year marks a great advance over any previous one. With the work so firmly established, another year should exhibit even more marked success.

ACKNOWLEDGMENT.

The bureau in closing the report of work on hookworm disease, desires to acknowledge its deep and sincere appreciation of the support rendered by the Rockefeller Sanitary Commission. Of the total cost of the campaign, $17,000.00 for the year, more than $15,000.00 was contributed by the Commission, the balance being supplied from county and State funds.

Without the aid of the Commission only a small part of the work actually accomplished could have been done, and every citizen of the State should acknowledge with gratitude the benefits derived from the great gift.

Typhoid Fever.

GENERAL STATEMENT.

Along with its work against hookworm disease, this bureau has been employed during the past year in a continuation of our campaign for the eradication of typhoid fever. This disease is, and probably has been for generations, the worst scourge of the warm months in this climate. Essentially a disease of filth, and spread by everything that scatters filth, typhoid needs only warm weather and the breeding of flies to cause it to appear in practically every part of the State. To conquer it, we must change fundamentally and universally our careless habits in the disposal of human excrement.

TYPHOID FEVER.

The attention of the bureau in the campaign against typhoid fever has been centered largely on the rural districts. The cities of the State, possessing for the most part health officers of modern viewpoint and efficiency, have themselves affected such great reductions in their death rates from typhoid fever as to make further efforts in their behalf unnecessary.

A comparison of the typhoid death rates of the registration cities of Virginia for 1908 and 1912 may be of interest as illustrating this point.

Typhoid Fever Death Rates per 100,000 Population. Registration Cities of Virginia, 1908 and 1912.

CITIES	Rate 1908	Rate 1912
Danville	65.1	25.5
Lynchburg	69.3	29.3
Norfolk	62.7	17.6
Petersburg	50.4	44.6
Richmond	52.9	16.3
Roanoke	*	31.7
Average	60.1	27.5

*-No record.

Typhoid Fever Death Rate for Virginia.

For the first time in the history of Virginia since colonial times, it is possible to publish a typhoid fever death rate for the State based on carefully collected and compiled vital statistics. The registration law, which went into effect in June, 1913, has become increasingly effective and the statistics furnished by it for the year July 1912-1913 are available for study and compilation. During the year July 1, 1912, to June 30, 1913, there were recorded in the office of the State registrar 518 deaths from typhoid fever, giving for the State a typhoid fever death rate ot 24.4 per 100,000. While it is evident that the registration of deaths is not absolutely complete throughout the State, there is no doubt whatever that these figures are very close to complete.

The only basis of comparison is furnished by the United States census of 1900 where the enumerators collected and compiled deaths and causes of death. The following tables show the comparative results given by that method and by our present system of registration.

Table.

	Population	Total Deaths All Causes	Death Rate per 1,000 All Causes	Typhoid Deaths	Percentage Typhoid Deaths to Total Deaths	Typhoid Death Rate per 100,000
Census 1900	1,854,184	25,252	13.6	914	3.6	49.3
Registration 1912-13	2,123,840	28,491	13.4	518	1.8	24.4

From this table it will be seen that while the general mortality from all causes has declined very little from the approximate figures for 1900 as given by the census, the death rate from typhoid fever has, on the same basis, declined 50%. In

other words, assuming the figures to be approximately correct, 529 persons who under the conditions prevailing in 1900 would have died from typhoid fever remained well in 1912-13 or recovered from the disease.

The average value of a human life as given by economists is $5,000. On this basis, the reduction of typhoid fever mortality for the year 1912-13 as compared with the year 1900 amounts to a saving of $2,645,000.

Morbidity Reports.

There were reported by physicians during the year 5,839 cases of typhoid fever, as against 4608 for the previous year. The number of cases occurring in the State, estimating from the ratio of the number of physicians reporting to the total number, was thus 10,571, as against 8,740 for the previous year. While this increase in cases over the record for the previous year is of course unfortunate, we do not feel that the figures are as discouraging as they seem on their face, since 1911-12 was an exceptionally favorable year. An exceedingly cold winter, 1911–12, was followed by a very mild summer and the resulting typhoid was by far the lowest on record. The winter of 1912-13, on the contrary, was unusually warm, flies were found throughout the year, the spring was early and warm and the summer above normal. Under these conditions, assuming progress in the campaign against typhoid fever, the number of cases should show a decrease from the number for the preceding normal year, and a consequent increase over the preceding abnormally low year. This is the situation disclosed by the following table:

Estimated Number of Cases of Typhoid.

Year.	
1908–09	14,398
1909–10	11,843
1910–11	11,803
1911–12	8,740
1912–13	10,571

The estimated number of cases by months since the beginning of the work, together with mean temperatures by months are given in the following tables:

Estimated Number of Cases Typhoid Fever Reported Each Month, October, 1908, October, 1913.

	January	February	March	April	May	June	July	August	September	October	November	December
1908										2,133	1,086	766
1909	348	387	299	290	509	1,450	3,185	1,844	1,768	1,303	824	561
1910	435	332	377	401	427	796	1,968	2,325	2,064	1,352	839	486
1911	317	250	200	260	406	1,118	2,545	2,264	1,766	1,500	1,110	604
1912	451	245	206	240	360	515	854	1,325	1,070	936	609	404
1913	277	477	224	241	455	1,351	2,231	2,034	1,332	------	------	------

Monthly Mean Temperatures, Richmond, Va., 1909-1913, from Reports United States Weather Bureau.

	January	February	March	April	May	June	July	August	September	October	November	December
1909	42	47	46	58	66	76	77	74	67	55	53	36
1910	39	39	54	58	64	70	78	75	73	61	42	34
1911	42	41	45	52	70	75	80	78	78	59	45	43
1912	29	35	45	60	67	72	78	76	73	60	48	43
1913	47	40	52	58	67	74	79	75	69	------	------	------

EPIDEMICS.

It is our misfortune to be compelled to report the occurrence of epidemics of typhoid fever in two of the towns of the State. In both cases the causes leading to the epidemic were preventable and in one case the cause had been brought to the attention of the local authorities and published, as a source of danger, in the annual report for 1911.

Front Royal.

On February 20, 1913, a letter from a citizen of Front Royal was received at the office of the board stating that seven or eight cases of typhoid had appeared in the town of Front Royal and asking for the examination of a sample of water from the town supply. The occurrence of so many cases during the winter months in a town of the size of Front Royal suggested serious trouble and the sanitary engineer, Mr. Messer, was dispatched at once to the scene. The chances being in favor of water as the cause of the outbreak, the emergency hypochlorite plant of the board was also shipped on the same day.

Upon arriving at Front Royal that evening—the same day on which the first information regarding the epidemic had been received—Mr. Messer discovered the presence of at least thirty cases in the town. Preliminary investigation showed the probability that the town water was responsible for the outbreak and early the next morning notices to boil the water before drinking it were posted in the town. The hypochlorite plant arrived at noon and at six P. M. was in operation at the intake of the water plant.

On February 24, the director of inspections, Dr. Flannagan, was also dispatched to the scene to aid Mr. Messer and on the night of February 25th, a public meeting was held and the people of the town were acquainted with the facts.

The Cause of the Outbreak.

The investigation of all reported cases revealed evidence proving conclusively that the public water supply was responsible for the outbreak. All the cases had used the water regularly. There was no evidence whatever that milk could have caused the disease, since the cases were regularly distributed among the various milk dealers of the town and many patients used milk from private supplies. The milk supply of the Randolph-Macon Academy was entirely different from that of the town, yet the students of that institution suffered in common with the citizens of Front Royal. All other foods could be excluded beyond a reasonable doubt, as could also flies and contact.

The Water Supply.

The water works system was first installed in 1891 by a private company and was taken over by the town about ten years ago. The water is derived by gravity from the headwaters of Happy Creek. The system includes a water-shed area of 3.3 square miles, a storage reservoir with a capacity of 600,000 gallons and an 8-inch cast-iron main to town. A 6-inch main extends to Riverton. The intake and reservoir are situated about three miles southeast of the town.

The inspection of the watershed showed that the water reaching the intake was at all times subject to dangerous pollution from both animal and human sources, as follows:

1. Public Road. Running parallel with the creek and at some points not more than 100 feet distant is the public road which was rebuilt and macadamized last autumn. During the time these improvements were going on, sanitary closets were not provided for the workmen, and practically no inspection made of conditions by officials having charge of the waterworks. As a result, the section of the water-shed along the two miles of road above the intake must have been heavily polluted with human excreta.

2. United States Government Remount Station. During the past year the United States Government has established a remount station, about 1000 acres of which is located on the watershed and immediately above the reservoir. The inspection of the property showed that the government officials had made absolutely no provision for preventing the pollution of the stream running into the reservoir with the single exception of the ditch which collects the drainage from the vicinity of the veterinary hospital. At the time of the outbreak, about twenty government employees were working on the watershed for whom not a single sanitary closet had been provided. A house located within fifty feet of the stream and not more than a quarter of a mile above the reservoir had no closet of any kind on the day of inspection. This house served as the headquarters for about a dozen employees. Another habitation owned by the government and used by employees maintained an open-back privy not more than fifteen feet from the stream. It was evident that this last closet had not been cleaned for several weeks.

3. Between the government boundaries and Chester Gap there are six houses and one store. On the day of the inspection only one of these had made any provision for preventing pollution of the creek with human excreta. The others maintained insanitary closets some of which were located very near the creek or tributary branches.

Remedial Measures.

The cause of the epidemic being definitely determined, the disinfection of the water with hypochlorite of lime was continued. The plant temporarily installed in a tent was housed in a more permanent structure and a care-taker was put in charge. This plant has been continuously in operation since its installation.

The grossly insanitary conditions revealed by inspection of the watershed were next attacked. The government authorities responded promptly when their attention was called to the situation and they immediately installed sanitary privies at all houses occupied by their employees on the watershed. The private houses were also provided with sanitary privies and all known sources of pollution were in this way removed.

The End of Epidemic.

As will be seen from the accompanying chart, the measures adopted were completely effective and only a few scattering cases occurred after the expiration of the twelve-day incubation period.

Permanent Measures.

The conditions revealed by the investigation following the outbreak indicated a need for radical changes in the water supply of the town. These changes are now being made. Plans have been drawn for a mechanical filtration plant and it is under construction at the time of this report. This will forever put an end to the possibility of a recurrence of the unfortunate experience through which Front Royal has passed this year.

The Lesson of the Outbreak.

The lesson of the outbreak is plain. The conditions leading to it were well known. In the report of the sanitary engineer of the State Board of Health, published in the annual report for 1911, a copy of which had at that time been forwarded to the town council, the following statements were made:

> "On the watershed above the reservoir there are about six habitations. A large portion of the land is used for grazing and some for cultivation. These habitations have been kept under more or less observations and several cases of typhoid have been discovered among the families at different times. In spite of these facts, the water used by the town has always been of good quality and no cases of typhoid have been traced to its use. Nevertheless, there is always some danger of pollution where people live on such a small watershed and near the stream which supplies the reservoir. If there is no way by which the town can control its whole watershed, regular and frequent inspections should be carried on, regulations enforced regarding the disposal of wastes and excreta, especially where there are cases of typhoid, in order to protect the people who drink the water. Numerous examples of epidemics might be cited which have been traced to one case of typhoid infecting the source of a water supply. The fact that Front Royal has never had an epidemic is no argument why there may not be one in the future."*

There are in Virginia at the present time several towns the condition of whose water-supply renders them liable to the same catastrophe as that which befell Front Royal. Every effort has been made by this board to secure an improvement of these conditions. Must every town experience an epidemic before it can learn the lesson?

WINCHESTER.

The second epidemic of typhoid occurred in Winchester during the month of July. Early that month the large number of cases of typhoid reported to the city health officer, Dr. P. W. Boyd, led to an investigation by him. This investigation disclosed the fact that the cases were all among customers of a single small

*Annual Report, 1911, pp. 90-91.

dairyman. The sale of the milk of this dairyman was immediately stopped and the State board was notified. Investigation by the epidemiologist, made July 12, disclosed the existence of twelve cases of typhoid, all but one of which were among customers of the dairyman in question. Inspection of the dairy was made and a case of typhoid fever was found on the farm in the person of the daughter-in-law of the owner of the dairy, living not more than fifty yards from the milk house. Cases continued to develop for ten days after the milk supply was shut off. From that time the cases declined sharply, though secondary cases continued to develop for several weeks. In all, sixty cases developed in the six weeks of the outbreak, of which number fifty were among the customers of the dairyman.

The prompt action of the health officer in shutting off the sale of the infected milk the very day suspicion was drawn to it, undoubtedly prevented many more cases. The dairyman was subsequently found to be selling butter made from the prohibited milk and was promptly arrested and fined. Appeal to the circuit court was pending at the time this report closed.

The occurrence of this epidemic brings sharply to the attention of authorities of the small towns the necessity of more accurate supervision of their milk supplies. The existence of this case of typhoid on a dairy farm supplying milk to several hundred citizens of Winchester was discovered by the health officer only after the outbreak was well under way. The attending physician took no steps to prevent the sale of the milk, and upon his shoulders, therefore, rests some of the responsibility for the appearance of the outbreak.

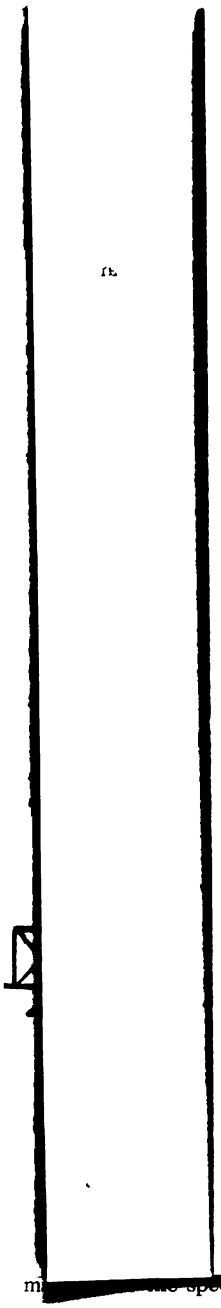
RICHMOND'S WATER OUTBREAK.

Early in June the number of cases of typhoid in Richmond began to show an increase over the usually low figures for that month. At the request of the chief health officer of Richmond, Dr. E. C. Levy, the epidemiologist of the board made with Dr. Levy, an investigation of the situation. From this investigation it was concluded that an infection of the city-water was in all probability responsible for the outbreak and the investigators therefore recommended to the administrative board of the city the installation of a hypochlorite of lime plant at the settling basins of the city water works. After considerable discussion, this recommendation was adopted and the plant installed. It has been continuously in operation since that time with excellent results. Examination of the reports of the director of the settling basins showed that at the time the infection was supposed to have taken place, the basins were being cleaned and that water, high in bacterial count and only partially purified, had been supplied to the city. Only about fifty cases were reported in Richmond as a result of this infection and the prompt measure taken prevented further trouble.

JEFFERSON HOSPITAL.

On March 20, request was received from the authorities of Jefferson Hospital, Roanoke, for an investigation of a fever then prevailing there. In company with Dr. L. L. Lumsden, surgeon U. S. P. H. S., who was detailed for the purpose by Surgeon General Blue, and Dr. W. B. Foster, health officer of Roanoke, a detailed and exhaustive study was made. The results of this were published in the *United States Public Health Reports*, Vol. xxviii, No. 22. The investigation disclosed the fact that the disease was caused by Bacillus Paratyphosus-beta and was spread by contact. It was promptly controlled and no further cases developed.

THE PROBLEMS OF RURAL TYPHOID FEVER.



mi[illegible] the specific vehicle for the transfer of the infection. Oth

dairyman. The sale of the milk of this dairyman was immediately stopped and

It was promptly controlled and no further cases developed.

THE PROBLEMS OF RURAL TYPHOID FEVER.

The investigation of the causes and means and prevention of typhoid fever in the rural districts of the State, begun in 1911 and continued through the summer of 1912, was carried to completion in the summer of 1913. As in the two previous years Dr. L. L. Lumsden, surgeon in the United States Public Health Service was detailed by Surgeon General Blue of that service to co-operate in the investigation as was also P. A. Surgeon Hugh deValin. Dr. J. A.Waddell, who has been with the department during the summer months for the past four years, was also secured to aid in the investigation. A field laboratory was established in Roanoke,Va., through the courtesy of the Roanoke health department, and field and laboratory studies were made both at that point and from the Richmond laboratory of the board.

The purpose of this extensive investigation has been to determine, as far as possible, the exact causes of typhoid fever in rural districts and to outline the measures necessary for its prevention. The complete report of the investigation will be published by the Federal Public Health Service as a government document, but it may not be amiss at this time to outline broadly the conclusions reached as a result of the investigation and the measures which the investigators have concluded are necessary for the prevention of typhoid fever in rural districts.

THE CAUSES OF RURAL TYPHOID FEVER.

The causes of rural typhoid fever as revealed by a study of numerous outbreaks great and small, occurring in the rural districts of Virginia during the past four years are almost as numerous as the outbreaks themselves. In no two outbreaks of the many studied, were the conditions exactly the same. In one case, for instance, the infection of a school well gave rise to a dozen or more cases of typhoid. In another the sale of milk from an infected homestead was followed by the development of a number of cases among the users of the milk. In one village the coming of a case of typhoid fever, contracted outside the village, and the prevalent unsanitary privies gave an opportunity for flies to spread the infection. In others, the disease was apparently conveyed by direct contact among the children who were the first to suffer. In several cases the disease has prevailed among the colored population of the neighborhood without attracting attention to enforce preventive measures. Where cases appeared among the white population, however, the whole situation was laid bare.

The causes of rural typhoid fever therefore may be grouped under three general heads, and the measures necessary for its control likewise fall into the same general classification.

Contact with Cases of Typhoid.

There is no doubt whatever, that a considerable percentage of all cases of typhoid fever occurring in the rural districts of Virginia, are contracted from previous cases of the disease by direct contact.

This contact is frequently with cases which are properly diagnosed and known to be cases of typhoid. In such cases the disease may be contracted by those nursing the patient. This is almost always due to ignorance regarding the infectious agent. Hands soiled with the infectious agent and not properly disinfected are in many cases the specific vehicle for the transfer of the infection. Others in the

family are also frequently infected by the nurse who, entering the kitchen to prepare food for the sick, or even, as is frequently the case, actually preparing food for the well, infects with her soiled hands one or several articles of food to be afterwards consumed by others.

Failure properly to disinfect the bed and body-linen soiled with the discharges of the patient also frequently gives rise to other cases, since the person washing the infected linen may either personally contract the disease or with the infection on his or her hands, infect others.

Failure properly to disinfect excreta is, of course, an important factor in these cases, since the infected excreta deposited in an open privy or thrown on the ground may be brought back to the house by flies, chickens, dogs, hogs and other coprophagic animals, or may be by the same means carried to the adjoining premises.

Contact with Unrecognized Cases.

The factors operating to spread typhoid fever from recognized cases of the disease also operate extensively to spread the disease from mild and undiagnosed cases. Many of these are never seen by a physician, or, if seen, are not sufficiently characteristic to justify a clinical diagnosis of typhoid, though bacteriological methods may now show conclusively that the infectious agent in such cases in the bacillus of Eberth.

It is not uncommon, in the investigation of an outbreak of typhoid fever, to find that, prior to the appearance of cases among adults, the children of the community have suffered from a mild fever, clinically not resembling typhoid but giving on bacteriological examination indisputable evidences of the presence of the typhoid bacillus. More rarely, a mild fever in adults, sometimes lasting only a few days, is found bacteriologically to be typhoid, as fully capable of giving rise to other cases as the most virulent case of clinical typhoid.

The Prevention of Contact Typhoid.

The prevention of the typhoid resulting from contacts such as that described in the preceding paragraphs is not an easy matter. It involves the education of every person who is brought into contact with a case of typhoid in the simple but important facts regarding the infectiousness of the excreta and the necessity for disinfecting them and for washing and disinfecting the hands after they have been soiled with the excreta or after handling anything about the patient. This education cannot be accomplished without the co-operation of the practicing physician.

A second factor, equally as important, is the more accurate diagnosis of cases of the disease. It is manifestly impossible to control the infection when numerous cases, bacteriologically typhoid, are never diagnosed as such, and as a result, no precautions are taken. For the purposes of more accurate diagnosis it is desirable that the laboratory aids to diagnosis be used as much as possible by the practitioners of the State, with a better knowledge of their value and their limitations. In the investigations the workers have found the blood culture to be of inestimable value in the diagnosis of doubtful cases, but so far no means of popularizing this method has been devised.

A third necessity in the campaign of prevention is the use of proper and efficient disinfectants. All too frequently a visit to an infected house will show that no disinfectant is being used, and frequently also that the one in use is of little value, or entirely useless. There are on the market at the present time a number of pro-

prietary disinfectants which are almost absolutely devoid of actual germicidal power. There are also a number of disinfectants in common use, such as air-slacked lime copperas, bichloride of mercury and copper sulphate, which are practically worthless when used for disinfecting stools. The superiority of coal-tar disinfectants in the sterilization of typhoid excreta is so marked as to render their use almost obligatory. Unfortunately the best of this class are sold under trade names and cannot be specifically mentioned. Some means of furnishing physicians and citizens with reliable and satisfactory disinfectants at a reasonable price must be devised to meet this need.

Typhoid Fever Resulting from General Fecal Dissemination.

While in many outbreaks of typhoid, the course of the infection can be definitely traced through a train of contacts with actual cases of the disease, in others no such evidence is to be found and the cause of the outbreak must be sought in other ways. The widespread dissemination of human feces in rural and village communities is undoubtedly responsible for much of the typhoid of these communities.

On a majority of Virginia farms, there is either no privy at all, or, what is almost as bad, a privy of the old open-in-back surface type. The excreta of the inhabitants of these homes is deposited in the open back privy, exposed to the chickens, dogs, hogs and other domestic animals and is by them scattered all over the place. The paper from such a privy, soiled with feces, is blown by the winds sometimes for long distances. Flies breeding and feeding in such a privy, carry the contents directly to the dining room and kitchen.

Where there is no privy, the soil about the barn and other buildings reeks with pollution. The excrement deposited on the ground is also exposed to domestic animals and flies, and in addition gets on the shoes and is carried to the house, well top and dairy.

Under these circumstances, the bacteria normally found in human excreta are to be found scattered over the whole place. Everything eaten or drunk by the inhabitants of such a farm is apt to be contaminated with fecal bacteria. Given a case of typhoid contracted elsewhwere and coming to such a home for treatment, or to a community with such sanitation, other cases follow inevitably. A carrier case, and there are thousands of carriers in Virginia at the present time, may deposit a single infected stool, and the dissemination of infection from such a stool, by the means already described will be followed by the development of actual cases of the disease. Where the bacteria of the normal intestine are carried the typhoid bacillus may and will go. The infection of a well or spring under such circumstances is easy and of frequent occurrence.

The Prevention of Typhoid Resulting from General Fecal Dissemination.

The prevention of the typhoid resulting from general fecal dissemination is briefly the prevention of such dissemination. This, of course, involves merely the observance of the oldest known sanitary ordinance, the proper care of human excreta. The children of Israel were admonished to dig a hole and bury each stool. In modern days sanitary privies have been devised in which the material is kept in a water-tight receptacle, screened against flies and domestic animals until re-

moved and properly disposed of. Various forms of sanitary privy have been devised and a good and efficient one can be built for a few dollars. Until every farm and village home in Virginia is provided with a proper sanitary privy, typhoid may be expected and will occur.

Typhoid Caused by the Distribution of Water, Milk and Other Foods.

In a great many of the cases of typhoid investigated in the course of this work, water, milk and other food infected with the typhoid organism has been found to be the cause of the disease. The means by which a well or spring becomes infected and causes typhoid are so well known as to need no further discussion. It should be noted, however, that the infection of a well or spring is usually but an incident in the widespread dissemination of human filth, some of which, by chance, happens to contain typhoid bacilli.

Milk is also a great carrier of typhoid infection in rural districts. The sale of milk from premises on which there is a case of typhoid fever has been repeatedly found to be the source of outbreaks of typhoid. Other foods taken from the sick room may occasionally cause the development of one or more cases.

The absolute prevention of the sale of milk or other foods from infected premises in rural districts is a most important factor in the prevention of typhoid fever. Under present conditions it is not possible to secure this regulation as a matter of routine and we must depend on the individual physician in charge of the case to bring about the result.

Summary

The prevention of typhoid fever in rural districts, while difficult in the extreme, rests upon the following simple elements:

1. The prompt diagnosis and isolation of all cases with instruction of the family and vaccination of those exposed whenever possible.
2. The proper disinfection of excreta and bed linen from all cases and the disinfection of the hands of the nurse.
3. The construction and proper care of a sanitary privy at every home and a total abolition of soil pollution.
4. Rigid supervision of the sale of milk and foods from infected premises.
5. General popular education regarding the cause and means of spread and prevention of typhoid fever.

LOCAL INVESTIGATIONS.

Local investigations were made by officers of the bureau during the year as follows:

Blackstone, Roanoke, Front Royal, Clifton Forge, Harrisonburg, Laurel, Drake's Branch, Beach, Richmond, South Norfolk, Virginia Beach, Bremo, Arvonia, Winchester, Clinchport, Pennington Gap, Suffolk, Centralia, Emporia, Gordonsville, Newmarket, Fairfax, Manassas, Highland Park, Bristol, Millwood, Green Dale, Abingdon, Groseclose, Rural Retreat, Speedwell, Chilhowie, North Holston, Markham, Putnam, Galax, Swords Creek, Castlewood, Gardner, Cleveland, Frick, Dante, St. Paul, Coeburn, Tom's Creek, Honaker, Hansonville, Salem.

APPENDIX TWO.

Report of the Laboratory.

MEADE FERGUSON, PH. D.,

Director in Charge.

The laboratory is able to report a successful year of unbroken progress in its work. With better facilities for the examination of specimens and with an assistant, Dr. J. O. Fitzgerald, devoting his whole time to the work, the director has been able promptly to handle the increasing number of specimens sent in by the physicians of the Commonwealth.

The removal of the laboratory from the lower, dark rooms in which it has been previously housed to the commodious rooms on the second floor of the office, has made work much easier and more effective. We have abundant room for present needs at least and can administer anti-rabic treatment without difficulty.

The appended statistical tables will show the number of specimens handled during the past year, the counties from which they came and like information. It appears that a total of 17,628 specimens of all classes have been received and examined during the year, as compared with 13,770 in 1911–12, and that of these the number of water specimens for analysis has increased from 402 to 882. This is evidence of the new interest of physicians in laboratory methods of diagnosis and is undoubtedly indicative of improved practice.

The treatment of persons exposed to rabies has been continued with satisfactory results throughout the year. Of 120 persons given the full treatment, none has suffered inconvenience or serious discomfort. Yet the fact that three persons who did not receive treatment died of the disease during the fiscal year shows that rabies is not lessening in the Commonwealth.

TABLE I.

BACTERIOLOGICAL REPORT.

Specimens Examined for Various Diseases, and Water Examined During the Fiscal Year, October 1, 1912-September 30, 1913.

	Tuberculosis	Diphtheria	Typhoid	Hookworm	Miscellaneous	Total Bacteriological	Water	Total
1912								
October	151	219	154	175	12	711	42	753
November	135	211	100	180	2	628	44	672
December	136	127	63	428	15	769	27	806
1913								
January	193	97	45	673	6	1,014	24	1,038
February	186	61	55	555	13	870	17	887
March	226	97	52	2,243	4	2,622	33	2,655
April	204	111	49	2,934	10	3,308	44	3,352
May	161	44	79	353	17	654	65	719
June	161	39	208	211	17	636	96	732
July	195	25	355	195	30	800	152	952
August	176	81	317	233	22	829	201	1,030
September	186	184	291	186	18	865	137	1,002
Total	2,110	1,296	1,768	8,366	166	13,706	882	14,598
Other determinations—Oysters, clams, milk, etc.								2,030
								16,628

TABLE II.

Statement Showing Counties and Cities from which Specimens have been Received with the Number of Each Class Thereof.

COUNTY	Tuberculosis			Diphtheria			Typhoid Fever			Hookworm			Miscellaneous	Total
	Pos.	Neg.	Asyp	Pos.	Neg.	Asyp	Pos.	Neg.	Asyp	Pos.	Neg.	Other parasites		
Accomac	4	13	------	3	6	2	7	17	7	------	2	1	7	6
Albemarle	7	35	------	3	3	1	8	22	8	84	273	55	1	50
Alexandria	14	25	1	6	8	2	6	22	5	------	3	------	------	9
Alleghany	7	20	------	17	10	1	4	9	1	------	8	------	------	7
Amelia	1	5	1	------	2	------	------	7	1	------	6	------	------	2
Amherst	6	20	------	------	2	1	1	2	------	34	162	52	------	28
Appomattox	------	7	------	------	1	1	1	3	4	------	8	------	------	2
Augusta	8	39	1	7	15	3	13	34	14	88	446	103	1	77
Bath	5	15	------	4	11	1	3	7	------	------	1	------	------	4
Bedford	8	20	------	4	6	1	2	12	4	4	19	7	------	8
Bland	1	8	------	------	2	1	5	5	------	------	1	1	------	2
Botetourt	8	18	------	3	3	1	------	3	1	------	9	------	------	4
Brunswick	5	5	------	------	------	------	1	6	3	7	23	1	------	5
Buchanan	------	4	------	------	------	------	------	------	------	------	7	1	------	1
Buckingham	1	5	1	2	5	1	3	1	------	------	------	------	2	2
Campbell	2	22	------	------	4	1	7	25	13	7	43	4	3	13
Caroline	13	46	------	2	10	------	7	19	4	132	513	125	1	87
Carroll	4	24	2	1	2	------	2	8	1	------	4	4	------	5
Charles City	------	------	------	------	1	------	------	------	------	1	13	------	------	1
Charlotte	2	5	------	1	------	------	7	22	3	15	3	8	------	9
Chesterfield	12	32	------	13	22	4	11	28	12	------	14	1	18	16
Clarke	2	2	------	7	11	1	------	3	------	------	------	------	------	2
Craig	2	------	------	------	------	------	------	2	------	------	------	------	------	1
Culpeper	3	6	1	------	------	------	1	4	2	1	12	3	------	3
Cumberland	6	10	------	------	1	------	------	2	------	1	4	------	2	2
Dickenson	------	------	------	------	------	------	------	------	------	8	------	6	------	1
Dinwiddie	19	75	------	32	58	7	24	79	22	2	9	------	3	33
Elizabeth City	------	3	------	8	19	------	1	3	1	1	1	------	------	3
Essex	1	7	------	3	3	------	------	3	------	7	6	------	------	3
Fairfax	------	5	------	4	1	------	------	1	------	27	52	38	------	12

TABLE II—CONTINUED.

COUNTY	TUBERCULOSIS			DIPHTHERIA			TYPHOID FEVER			HOOKWORM			Miscellaneous	Total
	Pos.	Neg.	Atyh.	Pos.	Neg.	Atyh.	Pos.	Neg.	Atyh.	Pos.	Neg.	Other parasites		
uquier	6	24			20	2	11	36	9		18	5	3	134
oyd	8	15		2	3	1	3	9	5		3	2		51
uvanna	1	8			7		7	13	4	1	8	2		51
anklin	5	13						1		21	31	6		77
ederick	3	27		1	5	1	12	15	6		1			71
les	4	23						2			9	4		42
oucester	1	2		2	1			4	1	5	19	6	1	42
ochland	2	2								1	12		1	18
ayson	9	24					2	8	2		2			47
eene	3	2		1	1									7
eensville		3		3	7		5	11	1	1	12		4	47
alifax	16	39		7	7		2	15	4	2	18	1		111
anover	4	28	1	52	141	10	6	27	7	109	220	67	23	695
enrico	11	69		29	47	6	11	53	10	10	96	5	34	381
enry	6	18		1	4			3		4	24	3	2	65
ighland	1	4					1				10	2		18
le of Wight	1	11		1	1		6	4	5	1	7	1		38
mes City	9	22	2	15	35	5	6	33	12	4	19	1	11	174
ing and Queen	3	3		2	5	1	2	3	1	13	12	1		46
ing George											3			3
ing William	4	9		2	2	2	3	11	1	8	24	3	1	70
ancaster	1	2		3	1	2	3	4	5	1	1			23
e	6	10		4	3		3	9	2	33	49	49	1	169
udoun	6	26			1		4	18	3		7		1	66
uisa	3	11		2	4		2	15	9	12	129	35		222
nenburg	2	14		4	3	1	3	10	2	3	12	2	4	60
adison	2	8			1		1			1	1	1	5	20
athews											3			3
ecklenburg	7	11	1	18	28	1	6	15	6	11	24	5	1	134
iddlesex	4	22		3	2		4	3	1		5			44
ontgomery	2	20			2	1	6	10			1	1	1	44
ansemond	5	10		4	13		7	17	9		4	1		70
elson	5	24		3	6	1	2	8	4	63	180	42		338
ew Kent	1	2		1	2		1	1	1	8	22	1		40
orfolk	5	15		9	13	1	3	12	2		23	2		85
orthampton		21		2	12	1		6	1		2			45
orthumberland	3	2		2	4			1			1			13
ottoway	2	4		4	5		1	6	2		3		1	28
ange	6	22		4	16		3	20	5	211	854	337	3	1,481
ge	1	3		1	4	1	1	13	2		2			28
trick	4	10								3	8	2	1	28
ttsylvania	20	63		2	10	1	7	15	3	4	18	3		146
whatan	1	6		5	4			1	1	1	5	1		25
ince Edward	7	17		3	8		3	9	4	4	19	1		75
ince George	1	8		3	2	1	1	4	3		2		3	28
incess Anne		2		7				1		2	14			26
ince William	2	15			1		2	14	2	18	31	17		102
laski	3	7		2	1		2	0	4		5	1	2	27
ppahannock		7			1	1		2			3			14
chmond	0	4		0			1	2					2	9
anoke	5	47		2	10		4	31	5	1	40	4	9	158
ckbridge	4	24		3	7		4	7	3	189	887	443		1,571
ckingham	19	77		6	21	2	12	51	20	103	900	181	1	1,393
ssell	1	12				1		2		3	5	7		31
ott	6	21	1	4	4	1	2	3	1	12	11	11	1	78
enandoah	4	12		2	2		1	15	5	1	9	1		52
yth	2	14		2	2	1	8	10	4		3	1		47
uthampton	4	13	1	25	25	1	9	16	11	2	19	1		127
otsylvania	5	13			3	1	24	26	7	60	547	129	1	816
afford		2			1		2	1	1	35	132	40		214
rry	2	9		10	9			1						31
ssex	3	10		3	3		5	10	5		4			43
zewell	4	13		2	10		4	20	2	1	18	11	2	87
rren	1	5			7		9	11	6		15	7	1	62
rwick	35	99		11	52	5	6	12	7	2	9		1	239
shington	11	23			1			16	1	21	212	33	1	319
stmoreland		9			1		2	1			1			14
se	5	14		9	11	2	9	19	4	4	9	10		96
rthe	5	26						8	3		3		0	45
rk		4		1				3			1			9
scellaneous	3	6			3		1	2	1	13	9	3	6	47
Total	456	1,641	13	404	809	83	359	1,078	331	1,421	6,482	1,902	166	15,145
		2,110			1,296			1,768						

TABLE III.

Statement Showing the Number of Persons Given Anti-Rabic Treatment, Their Age, Sex, Race and Residence With the Nature of the Wound, the Means of Suspected Infection and the Date of Initial Treatment.

DATE	Sex	Age	Color	Location of Injury	By what Animal	Residence
1912						
October 3d	F.	8	C.	Leg	Exposed to Supposedly Rabid Human Being	Lunenburg county.
October 3d	M.	40	C.	Leg and hand		Lunenburg county.
October 3d	F.	39	C.	Arm		Lunenburg county.
October 3d	F.	13	C.	Leg		Lunenburg county.
October 3d	M.	11	C.	Leg		Lunenburg county.
October 3d	F.	7	C.	Hand		Lunenburg county.
October 6th	M.	18	W.	Fingers	Dog	Pittsylvania county.
October 12th	F.	7	C.	Leg	Cat	Richmond.
October 12th	F.	5	C.	Hand and leg	Cat	Richmond.
October 14th	F.	14	W.	Leg	Dog	Nelson county.
October 14th	M.	7	C.	Leg and ankle	Cat	Richmond.
October 20th	M.	10	W.	Hand	Dog	Pittsylvania county.
October 21st	M.	20	W.	Hand	Dog	Fredericksburg.
October 21st	F.	16	W.	Hand	Dog	Fredericksburg.
October 24th	F.	13	W.	Foot	Dog	South Richmond.
November 5th	M.	6	W.	Face and hand	Dog	Greensville county.
November 5th	M.	3	W.	Face and hand	Dog	Greensville county.
November 6th	M.	11	C.	Leg, hand and face	Dog	Surry county.
November 6th	M.	15	W.	Waist	Dog	Henrico county.
November 11th	M.	26	W.	Penis	Dog	Pittsylvania.
November 15th	M.	34	W.	Hand	Dog	South Richmond.
November 20th	M.	40	W.	Hand	Dog	Rocky Mount.
November 23d	M.	------	W.	Arm	Dog	Middlesex county.
December 5th	F.	3	W.	Leg	Cat	Essex county.
December 5th	F.	5	W.	Leg	Cat	Essex county.
December 6th	M.	40	W.	Leg	Dog	Richmond.
December 16th	F.	5	W.	Dorsum hand	Dog	Nottoway county.
December 18th	M.	15	W.	Hand	Dog	Botetourt county.
December 20th	M.	7	W.	Hand	Dog	Richmond.
December 20th	M.	38	W.	Hand	Dog	Richmond.
December 21st	M.	6	W.	Leg	Dog	Richmond.
December 24th	M.	20	W.	Wrist	Dog	Mecklenburg county.
December 26th	M.	10	C.	Hand and wrist	Dog	King and Queen county.
1913						
January 6th	F.	7	W.	Leg	Dog	Hanover county.
January 6th	M.	10	W.	Wrist	Dog	Hanover county.
January 8th	M.	15	C.	Lip	Dog	Patrick county.
January 18th	M.	73	W.	Leg and hand	Dog	Franklin county.
January 18th	M.	46	W.	Finger	Cat	Goochland county.
January 18th	M.	26	W.	Hand	Dog	Southampton county.
January 26th	F.	7	W.	Cheek	Dog	Appomattox county.
January 29th	M.	23	W.	Forefinger	Dog	Richmond.
February 2d	M.	74	W.	Leg	Dog	Prince George county.
February 4th	F.	16	C.	Thigh	Dog	Prince George county.
February 6th	M.	7	W.	Leg	Dog	Salem.
February 9th	F.	11	W.	Leg	Dog	Henry county.
February 9th	M.	12	W.	Dorsum hand	Dog	Henry county.
February 10th	M.	10	W.	Hand	Dog	Richmond.
February 10th	M.	12	W.	Hand	Dog	Richmond.
February 10th	F.	5	W.	Leg	Dog	Richmond.
February 20th	M.	19	W.	Thumb	Dog	Carroll county.
March 8th	M.	23	W.	Finger	Dog	Franklin county.
March 7th	M.	13	W.	Arm	Dog	Montgomery county.
March 12th	M.	24	W.	Finger	Dog	Hanover county.
March 13th	M.	9	C.	Eyelid and cheek	Dog	Petersburg.
March 17th	M.	60	W.	Hand	Dog	Nottoway county.
March 19th	M.	9	W.	Ankle	Dog	Caroline county.
March 26th	M.	33	W.	Hand	Dog	Campbell county.
April 3d	M.	30	W.	Chin and throat	Dog	Pittsylvania county
April 3d	M.	60	W.	Thigh	Dog	Dinwiddie county.
April 17th	M.	------	W.	Dorsum hand	Dog	Richmond.
April 17th	M.	9	W.	Finger	Dog	Essex county.
April 25th	F.	3	W.	Lip	Dog	Henrico county.
April 28th	F.	17	W.	(Wound in mouth, used milk from rabid cow.)		Carroll county.
April 29th	F.	15	W.			Carroll county.
April 30th	M.	17	W.	Sore throat, used milk from rabid cow		Carroll county.
April 30th	F.	11	W.	Foot	Dog	Mecklenburg.
May 3d	M.	16	W.	Sore throat, used milk from rabid cow		Floyd county

TABLE III—CONTINUED.

DATE	Sex	Age	Color	Location of Injury	By what Animal	Residence
May 4th	M.	47	W.	Hand	Dog	Southampton county.
May 14th	M.	8	W.	Ear and leg	Dog	Richmond.
May 17th	F.	48	W.	Wrist	Dog	Middlesex county.
May 17th	M.	23	W.	Dorsum hand	Dog	Middlesex county.
May 18th	F.	57	W.	Thigh	Dog	Roanoke county.
May 20th	M.	57	W.	Hand	Dog	Prince George county
May 22d	M.	12	W.	Arm and chest	Dog	Hanover county.
May 22d	M.	19	W.	Hand	Dog	Hanover county.
May 23d	M.	33	W.	Cheek and chin	Dog	Richmond.
May 24th	F.	20	W.	Foot	Dog	Richmond.
May 24th	M.	4	C.	Cheek	Dog	Roanoke county.
May 24th	F.	19	C.	Finger	Dog	Roanoke county.
May 26th	M.	7	W.	Foot	Dog	Richmond.
June 12th	F.	6	W.	Leg	Dog	Richmond.
June 5th	M.	9	W.	Thigh	Dog	Richmond.
June 9th	M.	5	W.	Buttock	Dog	Danville.
June 18th	M.	59	W.	Hand	Dog	South Richmond.
June 21st	M.	26	W	Wrist	Dog	Staunton.
June 26th	F.	12	W.	Leg	Dog	Lunenburg county.
June 30th	M.	36	W.	Hand	Dog	South Richmond.
July 5th	M.	57	W.	Hand	Dog	Richmond.
July 5th	F.	6	W.	Knee	Dog	Richmond.
July 5th	M.	13	W.	Forearm	Dog	Henrico county.
July 5th	F.	42	W.	Finger	Dog	Richmond.
July 6th	M.	4	W.	Knee	Dog	Richmond.
July 6th	M.	8	W.	Knee	Dog	Richmond.
July 6th	M.	13	W.	Thumb	Dog	Richmond.
July 7th	M.	4	W.	Knee	Dog	Richmond.
July 20th	M.	11	C.	Dorsum hand	Dog	Richmond.
July 21st	F.	5	W.	Head	Dog	South Richmond.
July 17th	M.	65	W.	Hand	Dog	Goochland county.
July 19th	M.	56	W.	Hand	Dog	South Richmond.
July 19th	M.	31	W.	Leg	Dog	South Richmond.
July 20th	M.	33	W.	Wrist	Dog	Richmond.
July 22d	M.	19	W.	Arm	Dog	Richmond.
July 23d	M.	24	C.	Cheek	Dog	South Richmond.
August 3d	M.	41	C.	Hand and arm	Dog	Mecklenburg county.
August 5th	F.	76	W.	Finger	Dog	Hanover county.
August 9th	M.	52	W.	Finger	Dog	Powhatan county.
August 10th	F.	35	W.	Hand	Dog	Stafford county.
August 20th	F.	4	W.	Dorsum hand	Dog	Petersburg.
August 20th	M.	4	W.	Popliteal space	Dog	Petersburg.
August 28th	F.	17	W.	Leg	Dog	Powhatan county.
August 30th	F.	5	W.	Leg	Cat	Greensville county.
August 30th	M.	6	W.	Leg	Cat	Greensville county.
September 4th	M.	12	W.	Finger	Dog	Halifax county.
September 8th	M.	17	W.	Hand	Dog	Henrico county.
September 9th	M.	35	W.	Hand	Dog	Henrico county.
September 9th	M.	9	W.	Hand	Dog	Henrico county.
September 11th	M.	37	W.	Calf of leg	Dog	Danville.
September 11th	M.	14	W.	Throat	Dog	Charlotte county.
September 11th	F.	7	W.	Thigh	Dog	Charlotte county.
September 17th	M.	41	C.	Hand	Dog	Essex county.

APPENDIX THREE.

Report of the Bureau of Publicity.

DOUGLAS S. FREEMAN, PH. D.,
Director in Charge.

Another year's campaign in the endless war against disease has found us relying as heretofore upon popular education as the most effective means of conquest. Experience has shown that victories over disease are in direct ratio to the information of the people, and our five years' work in Virginia has given us proofs innumerable of this truth. With limited forces and scanty means, we could not force the people to take sanitary precautions, if we so desired; but if this board had an appropriation ten times as great, we should not abate the activity of our educational work. With all the conviction of experience, we believe that the only way to improve the health of the people is to teach them to apply the truths of sanitation and personal hygiene. And doubly is this true of a population like that of Virginia, where, among the whites, intelligence is keen and appreciation prompt.

In the circumstances, the work of this bureau during the last fiscal year has been a reiteration of previous efforts at public education. New methods have been introduced, special campaigns of publicity have been conducted, our field of endeavor has been somewhat broadened, but our general purpose has remained the same and our weapons are unchanged.

THE HEALTH BULLETIN.

During the last fiscal year eleven regular and five extra numbers of the Virginia Health Bulletin have been issued. These have been under the subjoined names with the editions as noted.

Volume and Number	Month of Issue	SUBJECT	Edition in number of copies
		REGULAR NUMBERS	
	1912		
Vol. IV.—No. 10	October	Diphtheria	30,000
No. 11	November	Carrying the Truth to the People (List of Lectures)	3,000
No. 12	December	Smallpox—A Monster Awakening	20,000
	1913		
Vol. V.—Nos. 1-2	January-February	Virginia Health Almanac	30,000
Nos. 1-2	January-February	Virginia Health Almanac (2nd edition)	5,000
No. 3	March	A Catechism of Public Health	40,000
No. 4	April	Malaria	25,000
No. 5	May	A Catechism of Public Health (3rd edition)	20,000
No. 6	June	Good Health in Summer	25,000
No. 7	July	The Mother and Child	15,000
No. 8	August	A Call to Arms against Typhoid	30,000
No. 8	August	Supplement (two color poster)	30,000
No. 9	September	Register of Physicians, Health Officers and Registrars of Vital Statistics	10,000
		EXTRA NUMBERS	
Vol. IV.—No. 4	December	Sanitary Privy	20,000
Vol. V.—No. 1	February	The Tuberculosis Catechism (4th edition)	20,000
No. 2	March	Health Handbook for Colored People	25,000
No. 3	March	A Catechism of Public Health (2nd edition)	30,000
No. 4	June	Smallpox—A Monster Awakening (Revised edition)	20,000
Total number of bulletins issued during the fiscal year			398,000

While the titles describe the contents of each number with more or less accuracy, a few words of explanation and comment might be added.

Our Almanac this year was brought our after careful preparation. Frankly, the assistant commissioner and the director of this bureau, who have always prepared the almanac together, were in some doubt as to what form this annual publication should take. In our first Almanac, that for 1911, we had given a succinct discussion of some prevalent disease opposite the calendar for the month. As this plan was copied by others in 1912, we determined to change and improve the form of our second Almanac (1912). Accordingly, we resurrected the "family almanac" with its array of fables and sought, in successive sketches, to drive home some health lessons applicable to each month. For 1913, after much discussion, we decided to supply a new series of sketches, in the form of brief health monologues, and to append in the briefest possible compass, the elementary truths regarding the diseases mentioned. We determined, too, to append a few pages of light matter, to include a description of the sanitary privy and to emphasize on separate pages the fundamentals of farm sanitation. As a final feature we devoted a page to a brief directory of the State departments and their work,—something the State had long needed. We were advised by one or two friends to include in the Almanac brief suggestions for the home treatment of familiar diseases, but we rejected this suggestion as contrary to the principle on which the work of this board has always been conducted: ours is the field of prevention, treatment belongs to the physician.

The finished Almanac, issued in a first edition of 30,000 with a second edition of 5,000 had one final feature that has helped its circulation much. This was the heavy blue paper cover employed in place of the simple white book-paper cover. We were led to this innovation by the obvious fact that the old cover soon became frayed with use and often rendered the Almanac useless before the end of the year. The new cover, strong enough to resist wear, and attractive in itself, added much to the effectiveness of the publication. It might be noted in passing that our Almanac, the first of its kind ever issued, no longer has the field to itself. Five State boards of health have adopted the idea and now issue such annual publications.

The Health Hand-Book for Colored People was another addition made this year to our regular bulletins. The Negro Organization Society of Virginia, through its executive secretary, J. M. Gandy, a professor in the Colored Normal School in Petersburg, informed us early in the spring that he planned a special clean-up day among the colored citizens of the Commonwealth. He asked if the board could and would co-operate in this undertaking and whether we would publish and circulate a small pamphlet on domestic sanitation which he had prepared. Feeling that the board had a duty to discharge in caring for the health of the colored people, we gladly consented and ourselves prepared, with suggestions from Professor Gandy, the Health Handbook. This was sent out to addresses furnished by the Negro Organization Society and it reached thousands of negroes. The report forwarded us by the society convinced us that the small outlay for this bulletin brought a tremendous return in the better information of our colored people, The society, and Professor Gandy in particular, showed a most commendable spirit in the whole undertaking and gave us evidence of their sincere devotion to the work of the public health. We contemplate further co-operation in the future.

Another addition to our bulletins, and one that will be kept permanently in print, is the Catechism of Public Health. This was the outgrowth of our tuberculosis catechism, of which about 130,000 copies have now been issued. We felt that

if the catechism on tuberculosis was doing the good with which many critics credited it, a like catechism on the broader theme of the public health would be valuable. We prepared it accordingly and were forced to issue three editions before the immediate demand for it ceased. In distributing this bulletin, we availed ourselves of the "Health Day" devised as a part of the work of the school leagues under the direction of the Co-operative Education Association. In this work we were much aided by J. M. Binford, executive secretary, and Mrs. L. R. Dashiell, director of leagues.

In July was issued a new and somewhat briefer edition of the bulletin on the Care of Infants, styled "The Mother and Child." This was printed not only to meet the normal needs of the season but to be sent those mothers whose babies were listed in the vital statistics of the board. We felt that the mothers would appreciate a bulletin directed primarily to the "registered babies" and we sent this pamphlet to the parent of every child whose birth had been reported to July 1.

The Malaria bulletin, the first we have devoted exclusively to the prevention and treatment of this disease, was prepared in April. The spread of malaria and its appearance during the year in localities where it had not previously been found showed us the necessity of prompt educational work. This bulletin will be followed by others along the same line.

Our special bulletin on summer complaints, flies, etc., was this year styled "Good Health in Summer" and was, we thought, an improvement over the "Summer Troubles" number issued last year. Containing in brief compass directions for the care of infants, for the protection of wells and springs, for the prevention of typhoid and for the abatement of the fly nuisance, this bulletin is probably second only to our Almanac in its general educational value.

To supplement our bulletin on Typhoid Fever, which is still in print, we issued during August a novelty entitled "A Call to Arms Against Typhoid Fever." This was a brief four page folder, containing the fundamental truths regarding the prevention of this disease and with it was sent our a four page supplement in two colors, printed in poster-form, urging precautions to prevent the spread of typhoid. It has been a pleasure to note that his little folder has found its way to many a cross-roads store and to many a rude bulletin-board in the remote sections of the Commonwealth.

The Cost of the Bulletin.

Beginning with the November issue, 1912, the publication of the bulletin has been by general State contract and has been handled by the Public Printer. The latter makes the contracts, buys the paper, measures the work, gives advice as to the make-up and certifies the accounts. We read the proof as heretofore and have general supervision of the make-up. It is but justice to note the courtesy and prompt co-operation of the Public Printer in all matters affecting this branch of our work.

As some question has been raised regarding the economy of this system, the director wishes to append the comparative figures for cost prior to and since the enactment of the new statute. This table will show the cost of bulletins issued since November, 1912, and the cost of bulletins of the same relative dimensions and type, printed under the board's contract, prior to that time. In every case the work is identical, except that the pages of bulletins handled by the Public Printer contain about 200 ems more of type than in the old make-up.

Title of bulletin handled by Public Printer.	Title of like bulletin printed under contract for Board of Health. (If different in any way, marked by * and noted under "Remarks.")	Number of copies	Number of pages	Size of type	Total new cost	Total old cost	Cost per m., new law	Cost per m., old law	REMARKS
Almanac 1913	Almanac 1912*	30m.	32*	6-8-10	365.16	381.00	12.17	12.70	*1913 edition had 32 pages and 4 page heavy cover.
San. Privy (v. iv, ex. No. 4)	The same	20m.	4	8-10	27.00	51.25	1.35	2.56	
Smallpox	March, 1912	20m.	8	8-10	62.20	68.75	3.11	3.43	
Health Ca.	Extra No. 1, 1911	40m.	8	8	123.50	133.75	3.08	3.36	
Tb. Ca.	Cancer, 1911	20m*	8	10	63.27	52.50*	3.16	3.36	*Cancer was 15m
Handbook	Ex. No. 1, 1911	25m*	8	8*	80.50	133.75	3.22	3.36	*Extra No. 1 was 40 m. Handbook contained some 10 pt. type.
San. privy	August, 1911	20m.	4	8	33.88	51.25	1.69	2.56	
Malaria	Ex. No. 1, 1912	25m*	16	10	126.89	145.50	5.08	4.83	*1912 issue was 30 m.
G. H. in Sum.	June, 1912	25m*	16	8	134.22	157.50	5.36	5.25	*1912 issue was 30 m.
Call to Arms	August, 1911	30m.	4	8	40.30	51.25	1.34	2.56	

It thus appears that on 16 page bulletins the previous prices were lower than those under the printing law for 1912-13, while the contrary was the case with 4 and 8 page bulletins. The result, in the judgment of the director, should be satisfactory to all parties concerned. No comparisons for job work can be made as the difference in the classification is too great to make relative statements of cost valuable.

Total Cost of Printing.

Printing remains one of the heavy items of expense of the board and, during the year, cost as follows:

Book composition	$ 314.89
Press work	402.60
Job composition	51.66
Job press work	251.69
Paper stock	1159.66
Ruling	4.20
Cutting	1.50
Binding	396.60
Engraving and lithographing	45.21
Total cost	$ 2630.01

Of this sum, the bulletins cost $1,739.81, exclusive of the issue for October, 1912, printed under the old contract. This made the cost for each bulletin, 4.8 mills ($.0048). This leaves $890.20 as the total cost of all printing, including the many thousand letter heads, about 200,000 bulletin-envelopes and all the miscellaneous job-work done for the Bureau of Vital Statistics.

THE WEEKLY PRESS SERVICE.

The following digest will give the contents of the weekly press service during the last year:

Digest of the Press Service of the State Board of Health for the Fiscal Year October 1, 1912-September 30, 1913.

RELEASE DATE	SUBJECT OF PRESS ARTICLES
October 3, 1912	Increase in registration of births and deaths, with arguments for enforcement of vital statistics law.
	Diphtheria literature announced for distribution.
October 17, 1912	Report of naturalized citizen who was able to establish title to an estate by procuring proper birth certificate.
	Award of prize to the Board's exhibit at the International Congress of Hygiene and Demography.
October 24, 1912	Arrest of parent suspected of infanticide, evidence procured from death certificate.
October 31, 1912	Twelve thousand persons examined and four thousand treated for hookworm disease in four counties.
November 14, 1912	Decline in mortality from diphtheria with reasons therefor.
	Importance of destroying flies in winter.
November 21, 1912	Economy of health work, as shown by tabulation of morbidity statistics.
	Admissions to Catawba temporarily limited to incipients.
November 28, 1912	Reasons for public Thanksgiving at the triumphs won for better health.
	Details of the hookworm campaign.
December 12, 1912	Methods by which colds may be avoided.
	Enforcement of vital statistics law compulsory.
December 19, 1912	Reported improvements in rural schools of Virginia.
December 26, 1912	New record for hookworm dispensaries established in Caroline county.
	Inspection of vital statistics by agent of census bureau.
January 2, 1913	Board to co-operate in study of stream pollution.
January 9, 1913	Improvements reported and needed in sanitation of hotels.
	Hookworm inspectors visiting schools.
January 16, 1913	Twenty-five counties making satisfactory returns of births and deaths.
January 23, 1913	Prevention of pneumonia—importance of fresh air.
	New plans for enlargement of hookworm work.
February 6, 1913	Importance of early precautions against the breeding of flies.
	Health almanac announced.
	Appointment of Dr. H. R. Lickle as hookworm inspector.
February 13, 1913	Medical inspection of Orange county schools.
	Observance of health day in rural schools.
February 20, 1913	Warning against the prevalence of rabies and suggestions as to methods of prevention.
	Board's representation on farmers' trains.
	Progress of inspection in Orange county.
February 27, 1913	Smallpox warning and the necessity of vaccination.
March 6, 1913	Typhoid in Front Royal—danger of like epidemics where water-supplies are not protected.
	Publication of new edition of the Health Catechism.
March 13, 1913	Further notes on the school inspection of Orange county.
	Warning that the warm winter subjects the State to grave danger of widespread typhoid.
March 20, 1913	Hookworm among school-children—progress of the investigation in numerous counties.
	Preparations for colored health-day.
March 27, 1913	The Friedmann treatment for tuberculosis.
	Plans for the control of typhoid fever.
April 3, 1913	Hookworm dispensaries to be opened—opportunities for treatment.
	Conclusion of the Orange county inspection.
April 17, 1913	Commendation of sanitary standard set by Colonial Beach.
	Further warning against flies.
April 24, 1913	Final announcement of plans to combat typhoid fever—the necessity of precautions.
	Opening of hookworm dispensaries.
May 1, 1913	Details of study of endemic typhoid---warning against the disease.
	Praise for Scottsville's sewerage plans.
May 8, 1913	Infant mortality—special literature—the registration of children's births.
	Increased danger of rabies.
May 15, 1913	Hookworm dispensaries—advantages of examination for the disease.
	Malaria—literature to be issued.
May 22, 1913	Progress of hookworm work in Appomattox county.
	Inspection of summer hotels.

THE WEEKLY PRESS SERVICE—CONTINUED.

RELEASE DATE	SUBJECT OF PRESS ARTICLES
May 29, 1913	Typhoid fever increasing—necessity of added precautions for the summer. Record of Appomattox dispensary.
June 5, 1913	Approaching anniversary of vital statistics law—the results accomplished. Announcement of special summer literature.
June 12, 1913	Warning against the neglect of early cases of typhoid fever. Directions for killing flies.
June 19, 1913	Commendation of Chase City's new sewerage system and water-supply. Directions for comfort in hot weather.
June 26, 1913	Typhoid vaccine recommended—what it has done in lowering the morbidity-rate of the disease. Directions for the diagnosis of rabies.
July 3, 1913	Comparison of the accidental deaths from fireworks in celebration of "the Fourth" with deaths at Gettysburg.
July 10, 1913	Progress of the typhoid fever campaign—repeated directions for the prevention of the disease.
July 17, 1913	The week's investigations of typhoid—the imperative need of better methods of sewage disposal.
July 24, 1913	Favorable change in the typhoid situation—people must be careful. Additional literature on typhoid fever.
July 31, 1913	Remarkable success of hookworm dispensaries—public urged to visit them. Directions for sending specimens of water for examination.
August 7, 1913	Details of the record-breaking hookworm dispensary in Lee county. Further typhoid investigations.
August 21, 1913	Warnings against the expected appearance of diphtheria.
August 28, 1913	Announcement of findings in Orange county inspection. The State's arrangements for the sale of antitoxin.
August 29, 1913	Report of investigation of typhoid attributed to typhoid vaccine—this not the cause—details.
September 4, 1913	Literature on diphtheria—the prevention of the disease. Admissions to the Catawba Sanatorium.
September 11, 1913	Six thousand persons given hookworm treatment in eight months—significance of this. Health exhibit at rural fairs.
September 18, 1913	Arrangements for the sale of diphtheria antitoxin—its great value in treating the disease. "Don't spit" cards distributed by the State Antituberculosis Association.
September 25, 1913	Low hookworm infection in Tazewell county—comparisons. Red Cross seals to be sold.

This service, it is a pleasure to report, has grown rather than declined in popularity and is now a regular part of the news of the vast majority of the papers in the State. Upon it the board lays great stress not only because this is the channel we use in announcing news of general interest, but because it is one of the most effective methods of popular education we have yet devised.

SPECIAL PUBLICITY CAMPAIGNS.

During the year a number of special publicity campaigns have been carried on. As heretofore noted, bulletins on the care of infants were sent to mothers all whose children had been registered in the birth certificates and an extensive campaign of education was carried on among the negroes of the State. In addition, the following special publicity has been given.

HOOKWORM DISEASE.

For some time we have felt that the magnificent work being done in the eradication of hookworm disease was not receiving the publicity it should, and in consequence, as a glance at our press service will show, we have given much attention to it during the last year. We have noted the progress of the dispensaries, the success of the treatment and the general economic aspects of the work. Moreover, during

the summer we availed ourselves for the first time of the splendid list of names contained in the reports of the hookworm dispensaries. We found that here were literally thousands of persons, fit subjects for popular education—men, women and children who had come to the dispensaries seeking treatment. Accordingly, to them was sent a selection of bulletins, including those on the sanitary privy and on typhoid fever. We propose to utilize this list in the future and believe that this method of following up the persons treated or examined in the dispensaries will be of permanent value to the work.

COMMUNICABLE DISEASES.

As heretofore, when an undue prevalence of any communicable disease has been reported from a locality we have followed it with literature. This has been especially true of communities where typhoid fever, diphtheria and smallpox were reported. While our mailing list for such purposes is not altogether satisfactory, we think this intensive method of publicity valuable.

VITAL STATISTICS.

From the inception of the registration of births and deaths, the commissioner has insisted that the co-operation of this bureau was as necessary to the success of the new law as was the work of the Bureau of Vital Statistics. Accordingly, during the last year we have pushed the general educational campaign along the lines mentioned in the report for 1912 and have assisted in every way possible the Bureau of Vital Statistics. A more extensive campaign is being projected at the time this report goes to press.

The other bureaus have been assisted from time to time as their needs required.

PUBLICATIONS AND LECTURES.

Members of the staff have continued their lecture work during the past year with new enthusiasm. While detailed figures are not available, the total number of lectures given by the various officers and employees of the board is probably in excess of 1,000. The inspectors and director of the bureau of rural sanitation alone have delivered more than 700 of this number, while the commissioner, the director of inspections, the assistant registrar of vital statistics and the director of publicity have each delivered many. And these, it is well to note, have been not to city audiences in the main, but to the people of rural Virginia—the people who have need of the messages brought and who can apply them in their own homes and communities.

It is, finally, a pleasure to note that the members of the staff have made their usual contributions to the proceedings of the scientific bodies of the country and have appeared at most of the important conventions.

APPENDIX FOUR.

Report of the Bureau of Inspection.

ROY K. FLANNAGAN, M. D.,
Director in Charge.

The scope of the work of this bureau, which since its formation three years ago has been steadily enlarging, reached this year such proportions that it was deemed advisable to furnish an assistant. C. W. Holland, of Accomac, was accordingly named temporarily and for the three months of summer actively assisted in the inspection of hotels and summer resorts. The service rendered by him has enabled the director to give more attention to the increasing demands upon him from communities requiring help with their sanitary problems.

Two hundred and sixty-five days during the past year have been spent by the director in field work, and eighty of the one hundred counties in the State have been reached in some way by the work of the Bureau of Inspections.

The following is a condensed summary of the work accomplished.

SUMMARY.

Medical inspections of school children	1793
Inspections of school buildings	95
Hotel inspections	308
Municipal inspections	25
Typhoid inspections	15
Smallpox inspections	9
Scarlet fever and diphtheria inspections	3
State institutions inspected	4
Addresses delivered	56

SCHOOL MEDICAL INSPECTIONS.

The survey of the schools of Orange county must take precedence in this report of the year's work, not only because of its greater relative importance, but by reason of its scope and character of the work done in these schools.

Alliance between the State Board of Health, the State Board of Education and the University of Virginia made practicable an intensive survey of the schools and school children of Orange county, and the Bureau of Inspections was charged with carrying it into effect. With the aid of two field workers attached to the Bureau or Rural Sanitation and volunteers enlisted by the school of education of the University, the examination of forty-nine schools (white and colored) and the medical inspection of 1793 children was accomplished. A short paper read before the International Congress on School Hygiene in Buffalo gives a resume of the results of the survey and is appended.

Other School Inspections.

In addition to the work in Orange county, forty-six other schools have come in for inspection, notably nineteen in Henrico county. In the latter inspection the director accompanied the district superintendent, Mr. A. D. Wright, in his rounds

throughout the county. One district of ten schools in Chesterfield, as well as five schools in Goochland, were also visited, while scattered schools in other parts of the State received attention.

It is gratifying to note the tremendous strides which are being made in better school sanitation and architecture, but notwithstanding improved conditions generally, some districts examined seem to have failed to apprehend that they hav ea duty in preserving the health of the school children.

SURVEY OF THE SCHOOLS OF ORANGE COUNTY.

The larger cities of Virginia, notably Richmond, Norfolk and Lynchburg, have a very thoroughly organized service for the medical inspection of schools, and are achieving the most satisfactory results in better child-health in these larger centers of population. But the fact that the great bulk of the people in the country districts were not alive to the need for the inspection of their children threw the responsibility upon the State Board of Health to demonstrate that need if need there was. The Virginia Board of Health, therefore, in co-operation with the State Department of Public Instruction and the school of education of the University of Virginia planned a comprehensive survey of the whole school situation in one of the rural school districts. A representative county was selected and a complete inspection made of the children in the forty-nine schools within its borders.

However far from the ideal the school situation in Virginia may appear to those whose first knowledge of it is gained by this report, it is due our people to say that notwithstanding appearances the tremendous handicaps to public instruction in the South are being splendidly overcome by Virginia. A very far-reaching and liberal school policy has been adopted and a free hand given by our law makers in its development. Changes for the better are rapidly becoming apparent in every corner of the State. As gloomy as this report appears, the fact should not be overlooked that it shows that nearly three-fourths (70%) of the white school children of the county examined are now housed in buildings of a good type, properly equipped. It is hoped that the publication of this report will hasten the day when the remoter districts of all our counties will be furnished with equally sanitary and serviceable buildings as those which the more populous portions now have.

Scene of Inspection.

The county of Orange, chosen as the scene of this survey, is typical of Virginia. It lies partly in the foothills of the Blue Ridge and partly in the rolling country sloping toward the Rappahannock river and is not far from the geographical center of the State. It has practically no foreign-born persons in a population about equally divided between whites and negroes. Neither the extremes of poverty nor wealth are present, and the people are almost wholly given to rural pursuits. Conditions then as to schools and school children should be neither better nor worse in this county than elsewhere in the Commonwealth.

Time and Scope of Inspection.

The work of inspecting all of the schools of a county covering a territory thirty-eight miles long and about twelve miles wide only partly provided with decent roads is not a matter to be lightly regarded especially as the winter months

are practically the only school months in rural Virginia. A division of the work was therefore effected, the State Board of Health undertaking the more difficult task of visiting the widely scattered one room schools, forty-two in number and volunteers from the University of Virginia under the direction of Dr. W. H. Heck, of the school of education, visiting the more accessible consolidated graded schools, of which there were seven.

The volunteer corps of inspectors, consisting as it did of busy professors, physicians and dentists who could not give continuous service failed at certain points to get data covered by the State Board of Health's inquiry, and so, as regards the larger schools the record is somewhat faulty. The comparative study of figures, however, obtained brings out some very interesting facts.

School Population, Enrollment and Attendance.

The school population of Orange county is recorded as 4,008 and upon this basis State school funds are apportioned to it, but the figures furnished the inspectors by the teachers indicate that only 2,609 children answer the roll call when all are present. On the face of the returns it would seem, therefore, that 1,399 children in this county do not avail themselves of their school privileges. Of those enrolled only 70% of the white children and 60% of the colored were present on the day of examination. That this discrepancy is not due to poor facilities furnished the colored people can be easily verified, and if the one-room white school has any advantage over the negro school in respect to building and equipment it was not apparent to the inspectors.

Eyes, Ears and Throats.

The percentage of eye defects is much lower in the village schools with their better arranged windows than in the purely rural rectangular box schools with their cross lights, being 14¼% in them against 27% in white and 23% in colored one-room schools. In the white graded schools, however, the serious eye defects are more predominant, being 7% of the total examined, while the serious eye defects in rural white and colored were only 4% in each.

Hearing defects are more frequent in the village schools, 12½% there while the rural schools show only 14½% for both races.

Enlarged tonsils according to our figures are more frequent among the colored than among the whites, being found in nearly 40% while 30% and 31% respectively is the record for the rural and village schools.

Aenoids are much less apparent in the graded white schools than in the purely rural, being only 26% against 40% in the one-room white and 37½% in the colored schools.

Teeth and Glands.

Examination of the teeth revealed a really serious state of affairs, for those children to whom it would seem that dentists were most accessible, namely those living in proximity to the villages, showed 86% with defective teeth, 63% of this number having permanent teeth decaying. The rural white schools showed 47% defective with a little over half of these having permanents involved. The colored child was in better condition, recording only 28% defective, though 58% of these

had permanent teeth showing cavities. Examination of the purely rural white and colored children with respect to the glands of the neck brought out the fact that the colored child is more than twice as frequently affected with glandular enlargement as the white, the percentage being 25 as against 12.

Nutrition and Anaemia.

It was particularly startling to note the large percentage of poorly nourished children in this part of the country which for climatic and other advantages naturally should be as healthful as any locality on the globe. Here 25% of the whites and 37½% of the blacks were below par in this respect.

As regards the color in the cheeks of the children there was 30% of plainly visible anaemia in white and 5% in the colored. It is worthy of note that there were twice as many anaemic boys as girls.

Vaccination and Previous Sickness.

Sixty-nine per cent. of the children of this county were vaccinated. Considering the fact that there has been no outbreak of smallpox in Orange for years, the high percentage of vaccinated children is very gratifying.

The children were questioned as to what sickness they had formerly suffered from, and it developed that 14% of the whites and 28% of the negroes had never been sick at all.

Whooping cough took the biggest toll with 57% while ***measles*** had spread itself over 42% of them, 2% only had had diphtheria and 1½% typhoid fever. A rather interesting discrepancy between whites and negroes was noted as to pneumonia. 30% of the white children had suffered from this disease and only 5% of the colored and yet active lung disease was found present in only 2% of whites though 5% of the colored children were thus affected. Mumps were reported by 16%. Heart disease was a negligible quantity, 6.10% only in white and 1.10% in colored.

Intestinal Parasites.

The examination for intestinal parasites which was conducted as a part of this investigation throws a broad and altogether significant light upon the rather alarming percentage of poorly nourished and anaemic children observed.

Only fifteen white rural schools furnished specimens for examination and by no means a full quota of the scholars, and yet 25½% of those examined were found to be infected with hookworm, of those from ten colored schools examined the percentage was found to be nineteen. The village schools, as was to be expected, showed a lower per cent., fourteen and a half.

A division of these positive cases (white and negro) according to years shows that approximately—

23½% occur in those under eight years.
33½% occur in those between nine and eleven years.
42% occur in those over twelve years of age.

Comparison of the heights and weights of anaemic children with heights and weights of normal children gave the following interesting result:

The average height of normal boys 4 ft. 5 in., normal girls 4 ft. 6 in.
Average height of anaemic boys 4 ft. 6 in., anaemic girls 4 ft. 7 in.
Average weight of normal boys 88.6 lbs., normal girls 90.6 lbs.
Average weight of anaemic boys 66.4 lbs., anaemic girls 62.3 lbs.
A difference as to weight of 22 lbs. in boys and 28 lbs. in girls.

The Rural School Building Itself.

As to the school buildings and the general surroundings amid which the foregoing children are being taught, one need not consider the "consolidated" village schools which in general represent modern ideas of construction and equipment. These without exception have taken the place of from three to six of the little buildings about to be described.

It will be seen that all of these rural schools are either of the one-room "old field" variety or old abandoned tenant houses, churches or store rooms, and, with the exception of two of the whole forty, are entirely innocent of paint.

Location.

For the most part these schools were located in the midst of woods, remote from dwellings of any kind. At only one was there any attempt to cultivate the aesthetic by rendering the grounds or the interior attractive. Only four of them had shades to the windows. These were colored schools. This seemed, however, rather problematical advantage since the average light space per school was only 48 square feet or .06 of average floor space.

Cubic Air Space.

The cubic air space was less than 4,000 cubic feet per school of 255 cubic feet per pupil for forty schools. Two schools were in old churches which were sufficiently airy on the January day which found the investigators there.

Desks.

A few white schools had very good, fairly modern varnished desks, but on the whole the traditional ante-bellum, knife-whittled, unpainted, board desk did duty as of yore. Several schools had no semblance of desks and scarcely enough seats to serve.

Water Supply and Waste Disposal.

The water supply of these schools furnished a very serious ground for criticism since in no case was the well or spring used properly guarded against surface contamination, and eighteen of these sources of supply were more than 200 yards away from the building. It was gratifying to note that thirty of the schools were using individual cups for drinking purposes.

The facilities for the disposal of excreta at the schools were comparatively good on the whole, but nine schools failed to provide but one closet and six were absolutely devoid of any.

Conclusion.

Until a systematic thorough going rural health organization is an accomplished fact in Virginia and throughout the South, the money which is being expended for schools and teachers in these sections will continue as now to be 25% wasted. A bloodless brain cannot properly respond to intellectual stimuli and the money spent in attempting to cram knowledge into the heads of children whose blood is im-

poverished to the extent shown, is doing only three-fourths duty. Bad as the old school houses are, poor as is their equipment, the director would affirm that the great need in the rural districts of Virginia is not more schools nor better nor even better teachers, great as these needs are, but better school children. Children with rosy cheeks and bright eyes instead of a large proportion of pale faces and vacant stares, children with rounded plump arms and legs instead of thin and bloodless ones, children whose brains are fed by a rich red flow of healthy blood instead of a watery stream poisoned by a leech-like, filth-born parasite.

The problem of a better child will not be solved nor better health organization created in the country districts until the educational forces wake up to the necessity of actively and earnestly entering the health campaign. Indeed the problem is one of the conservation of the raw material which furnishes the grist to the educational mill. Good school buildings, good text books, modern curriculum and methods, properly equipped teachers are all needs, but first and foremost a live, lively, happy and responsive animal, ready with abounding health and mental alertness to absorb like a sponge the everlasting truth in whatsoever guise presented.

Statistical Data.

	Rural White One-Room Schools	Rural Colored Schools	Consolidated Graded Schools	Total
Number of schools examined	22	20	7	49
Number of teachers	22	24	31	77
Length of session	6mos	5mos	9mos	
School population of county	4008			4008
Enrollment	464	1149	996	2609
Present	327	669	797	1793
Percentage of attendance	.70	.60	.80	.70
Age				
Average age boys	11.8	11.3	11.1	11.4
Average age girls	11.4	11.5	12.7	11.8
Average age	11.6	11.4	11.9	11.6
Height				
Average height boys	4ft.7in.	4ft.5in.	4ft.6in.	4ft.6in.
Averga height girls	4ft.5in.	4ft.6in.	4ft.6½in.	4ft.6in.
Average height	4ft.6in.	4ft.5½in.	4ft.6½in.	4ft.6in.
Weight				
Average weight boys	73 lbs	84.81lbs	92 lbs	83.3lbs
Average weight girls	87.11bs	81 lbs	87.11bs	85.5lbs
Average weight	80.5lbs	82.9 lbs	89.5lbs	84.4lbs
Eyes				
Number pupils examined	315	615	659	1625
Pupils eyes normal	230	504	564	1298
Pupils eyes defective	85	147	95	327
Pupils eyes less than 20-40	74	121	64	259
Pupils eyes seriously defective	11	26	49	86
Percentage eyes normal	.73	.77	.83	77.7
Percentage eyes defective	.27	.23	.145	.215
Percentage seriously defective	.04	.04	.075	.051
Ears				
Number pupils examined	315	681	659	1655
Pupils hearing normal	301	644	577	1522
Pupils hearing defective	14	37	82	133
Percentage hearing normal	.955	.955	.875	.928
Percentage hearing defective	.045	.045	.125	.075
Throat				
Pupils examined	315	671	515	1501
Tonsils normal	218	413	355	1086
Tonsils enlarged	97	258	160	515
Percentage enlarged	.305	.385	.31	.333
Adenoids normal	189	419	380	988
Adenoids enlarged	126	252	137	515
Percentage enlarged	.40	.375	.265	.347
Nose				
Pupils examined	315	671	517	1503
Pupils nose normal	172	498	303	973
Deviated septum	143	173	114	430
Percentage with deviation	.45	.26	.22	.31
Teeth				
Pupils examined	319	672	554	1545
Number with perfect teeth	167	483	76	728
Number with defective teeth	150	187	478	817
Number with permanents defective	79	109	303	491
Number with temporaries defective	71	80	175	326
Percentage with defective	.47	.28	.86	.537
Per cent with permanents defect	.53	.58	.63	.58
Per cent with temporaries defect	.47	.42	.37	.42
Glands				
Number with enlarged cervical	25	56		81
Number with enlarged tonsillar	13	115		128
Total with enlarged glands	38	171		209
Per cent with enlarged glands	.12	.25		.185
Nutrition				
Number examined	316	663		779
Number well nourished	237	422		657
Number poorly nourished	79	251		330
Per cent with poor nutrition	.25	.375		.312
Anaemia				
Number pupils anaemic	94	34		128
Anaemic boys	63			
Anaemic girls	31			
Percentage anaemic	.30	.05		.175
Percentage boys anaemic	.67			
Percentage girls anaemic	.33			

	Rural White One-Room Schools	Rural Colored Schools	Consolidated Graded Schools	Total
Eruption				
Number with acne	6	1	10	17
Number with scabies	0	16		16
Number with other eruptions	0	0	10	10
Per cent with eruption	.002	.03	.04	.0114
Vaccination				
Number examined	326	675		1001
Number vaccinated	207	503		710
Percentage vaccinated	.63	.745		.687
Previous Sickness				
Pupils questioned	326	675		1001
Number reporting none	46-14%	191-28%		237-21%
Whooping cough	198	362		560
Per cent	.61	.535		.572
Measles	143	266		409
Per cent	.44	.395		.417
Chicken pox	108	153		261
Per cent	.33	.23		.28
Mumps	59	98		157
Per cent	.18	.145		.162
Pneumonia	30	5		35
Per cent	.09	.007		.048
Diphtheria	12	14		26
Per cent	.04	.02		.03
Typhoid fever	6	12		18
Per cent	.02	.017		.018
Scarlet fever	6	0		6
Per cent	.02	0		.01
Organic Disease				
Lungs	6	32		38
Percentage	.02	.055		.037
Heart disease	2	1		3
Percentage	.006	.001		.0035
Hookworm and Data in Relation Thereto				
Average number pupils per school	15	16		
Number schools examined	15	10	4	29
Number pupils examined	262	447	270	979
Number boys tested	142	217	128	487
Number girls tested	120	230	142	492
Number boys infected	35	51	14	100
Number girls infected	32	33	25	90
Total infected	67	84	39	190
Percentage boys infected	.246	.235	.11	.197
Percentage girls infected	.266	.143	.18	.196
Percentage pupils infected	.256	.195	.145	.1965
Boys up to 8 years infected	8	13	4	25
Girls up to 8 years infected	7	6	5	18
Total	15	19	9	43
Per cent	.225	.226	.23	.227
Boys from 9 to 11 infected	15	11	4	30
Girls from 9 to 11 infected	8	10	13	31
Total	23	21	17	61
Per cent	.343	.25	.435	.321
Boys 12 and over infected	12	27	6	45
Girls 12 and over infected	17	14	7	38
Total	29	41	13	83
Per cent	.43	.488	.33	.435
Total pupils marked anaemia	94	34		128
Average age anaemic boys	10.9	9.5		10.2
Average age anaemic girls	10.7	9.8		10.25
Average age anaemic	10.8	9.65		10.2
Average age normal boys	12	11.4		11.7
Average age normal girls	11.1	11.6		11.35
Average age normal	11.5	11.5		11.5
Average height anaemic boys	4ft.6in.	4ft.4½in.		4ft.5½in.
Average height anaemic girls	4ft.7in.	4ft.5in.		4ft.5½in.
Average height anaemic	4ft.6½in.	4ft.5in.		4ft.6in.
Average height normal boys	4ft.5in.	4ft.4½in.		4ft.4½in.
Average height normal girls	4ft.6in.	4ft.5½in.		4ft.6in.
Average height normal	4ft.5½in.	4ft.5in.		4ft.5½in.
Average weight anaemic boys	66.4lbs	67.7lbs		67lbs
Average weight anaemic girls	62.3lbs	68.5lbs		65.4lbs
Average weight anaemic	65lbs	68lbs		66.5lbs
Average weight normal boys	88.5lbs	86lbs		87½lbs

	Rural White One-Room Schools	Rural Colored Schools	Consolidated Graded Schools	Total
Average weight normal girls	90.61lbs	86.11lbs		88⅛lbs
Average weight normal	89½lbs	86lbs		87¼lbs
Nutrition and Hookworm				
Anaemic cases nutrition good	16			
Anaemic cases nutrition poor	21			
Per cent anaemic nutrition good	.43			
Good color cases nutrition good	23			
Good color cases nutrition poor	7			
Percentage good nutrition and color	.76			
Roundworm				
Total number tested	262			
Anaemic cases nutrition good	21			
Anaemic cases nutrition poor	20			
Good color cases nutrition good	30			
Good color cases nutrition poor	8			
Percentage A. cases nutrition good	.51			
Percentage good nutrition color	80.			
School Buildings and Grounds				
Number buildings	22	20	7	49
Number pupils (average per school)	15	16		
Unpainted	20	20	1	41
Grounds more than 1 acre	15	12	6	33
Grounds 1 acre or less	7	8	1	16
Attempts towards beautifying	1	0	1	2
Cubic air space in 20 schools	4114cu. ft.	3778cu. ft.		3943cu. ft.
Average cu. air space per pupil	274¼	235¾		
Square feet of light per school	52	45		
Window shades	0	4		4
Schools with adequate number desks	17	12	6	35
Schools with inadequate number desks	5	8	1	14
Schools with modern desks	10	0	7	17
Schools with crude desks	12	20	0	32
Painted or whitewashed walls	4	0	5	9
Dingy undecorated walls	18	20	2	40
Water supply within 200 yards	17	7	7	31
Water supply beyond 200 yards	5	13	0	18
Water supply safe	0	0	7	7
Water supply doubtful	9	6	0	15
Water supply dangerous	13	14	0	27
Water delivery				
Cooler or sanitary fountain	8	3	7	18
Open bucket	14	17	0	31
Individual cups	18	12	7	37
Common cup	4	8	0	12
Sewage Disposal				
Schools with 2 sanitary privies	4	11	6	21
Schools with 1 sanitary privy	4	0	0	4
Schools with 2 insanitary privies	4	6	1	11
Schools with 1 insanitary privy	5	2	0	7
Schools with no privy	5	1	0	6

HOTEL INSPECTION.

The inspection of hotels and summer resorts has been conducted this year with increased efficiency.

The revised score card system by which hotels are credited with their improved facilities seems to give general satisfaction. There have been a surprising number of hotels acquiring gold seal certificates. The red seal, however, judging by the number issued, is as yet the most popular. It is hoped that as this scoring plan becomes better understood no hotel will fail to secure the decoration which will mean a rating of at least 75%.

Attention must here be called to the just grounds of complaint which the proprietors have against the hotel law. The fee for inspection which is required of them cannot be defended on any equitable basis. The public is the beneficiary of the results of the inspection, and the requirements of the inspector already constitute a not inconsiderable tax. To require them to pay twenty-five cents per room additional for the inspection is to the director's mind entirely unjustifiable. The law should be changed so as to provide by special appropriation for this very necessary supervision.

It has long been apparent to this bureau that inspection once yearly of those hotels alone which have eleven and more bed rooms does not fully meet the demands of adequate hotel inspection. The health of the general public is the central idea behind hotel inspection, yet only the larger hotels in Virginia come in for examination. These inspected hotels for the past two years, by cooperation with this bureau, now represent, generally speaking, the most up-to-date sanitary ideas in their respective localities, while many smaller places under no restriction whatever constitute by reason of insanitation real menaces to the traveling public. An amendment to the existing law, removing the fee and enlarging the scope of it so as to include inspection of all hotels, would at once correct an injustice and materially improve conditions.

Appended is a full list of hotels with their present standing.

Hotel List.

NAME	PLACE	Fee	Fee Paid	Certificate Issued	Class of Certificate	REMARKS
Augusta	Staunton	$10.00	Yes.	Yes.	Red.	
Algonquin	Norfolk					Closed.
Alleghany	Covington	6.00	Yes.	No.		
Arlington	Norton	7.50	Yes.	Yes.	Gilt.	
Abingdon	Abingdon	9.00	Yes.	Yes.	Gilt.	
Afton House	Afton	10.00	Yes.	No.		
Atlantic	Norfolk	10.00	Yes.	Yes.	Gilt.	
Arlington	Virginia Beach	10.00	Yes.	Yes.	Gilt.	
Arlington Inn	Cape Charles	8.00	Yes.	Yes.	Red.	
Augusta	Hampton	10.00	Yes.	Yes.	Ted.	
Anderson Cottage	Ocean View	4.50	Yes.	No.		
Alleghany Springs	Alleghany Springs	10..0	Yes.	Yes.	Gilt.	
Allen	Onancock	4.75	Yes.	No.		
Atkinson	Richmond	10.00	Yes.	Yes.	Red.	
Afton Inn	Front Royal	6.25	Yes.	Yes.	Gilt.	
Atlantic	Chincoteague	8.50	Yes.	Yes.	Red.	
Burton	Danville	10.00	Yes.	No.	Gilt.	
Brame	Floyd	5.00	Yes.	Yes.	Gilt.	
Blackstone	Blackstone	5.75	Yes.	No.		
Bath Tavern	Hot Springs	7.50	Yes.	Yes	Gilt.	
Bennett	Chatham	6.75	Yes.	Yes.	Red.	
Botetourt	Buchanan	4.50	Yes.	Yes.	Plain.	
Belmont	Basic City	7.25	Yes.	Yes.	Red.	
Battle Town Inn	Berryville	5.75	Yes.	Yes.	Red.	
Blue Sulphur Inn	St. Paul	10.00	Yes.	Yes.		
Boatright	Gate City	4.50	Yes.	Yes.	Red.	
*Buckroe Beach	Buckroe Beach	10.00	Yes.	Yes.	Gilt.	
Brame	Floyd	5.25	Yes.	Yes.	Gilt.	
*Buffalo Lithia	Buffalo Lithia Springs	10.00	Yes.	Yes.	Gilt.	
*Bel Air	Newcastle	10.00	Yes.	Yes.	Red.	
*Brandon	Basic	10.00	Yes.			
*Brunswick	Waynesboro	7.00	Yes.	Yes.	Gilt.	
*Bon Air Inn	Bon Air	6.50	Yes.	Yes.	Gilt.	
*Blue Ridge Springs	Blue Ridge Springs	10.00	Yes.	Yes.	Gilt.	
Bristol	Bristol	10.00	Yes.	Yes.	Gilt.	
*Bay Shore	Buckroe Beach	6.25	Yes.	Yes.	Red.	
*Buffalo Ridge	Agee	7.00	Yes.	Yes.		Not inspected.
*Breakers	Colonial Beach	4.00	No.	No.		
*Byrd	Colonial Beach	5.00	Yes.	No.		
Belmont	Abingdon	10.00	Yes.	Yes.	Gilt.	
Blacksburg	Blacksburg	4.50	Yes.	Yes.	Red.	
Burbank Cottage	Virginia Beach	5.00	No.	No.		
Colonial Inn	Williamsburg	6.00	Yes.	Yes.	Red.	
Central	Lexington	6.40	Yes.	Yes.	Gilt.	
Central	Buchanan	5.00	Yes.	Yes.	Red.	
Commonwealth	Altavista	10.00	Yes.	Yes.	Gilt.	
Christiansburg	Christiansburg	5.50	Yes.	Yes.	Red.	
*Colonial Beach	Colonial Beach	10.00	Yes.	No.	No.	
*Craig Healing	Vista	10.00	Yes.	Yes.	Gilt.	
Central	Galax	4.00	Yes.	Yes.	Plain.	
*Crockett Springs	Crockett Springs	10.00	Yes.	Yes.	Gilt.	
Chalybeate Spring	Strasburg	5.00	Yes.	Yes.	Gilt.	
Chatham	Chatham	4.50	Yes.			
Central	Marion	4.50	Yes.	Yes.		Changed management.
Clinchview	Lebanon	4.50	Yes.	No.		Not inspected.
Clifton	Norfolk	10.00	No.	No.		
Central	Newcastle	4.50	Yes.	Yes.	Plain.	
*Castle Hill	Lexington	8.00	Yes.	No.		
Colonial	Charlottesville	10.00	Yes.	Yes.	Gilt.	
Clermont	Charlottesville	8.50	Yes.	No.		
Carter House	Charlottesville	4.00	Yes.	Yes.	Red.	
Coleman	Orange	7.00	Yes.	Yes.	Gilt.	
Comfort	Norfolk					Not inspected.
Colonial	Danville	7.50	Yes.	Yes.	Plain.	
Commercial	Richmond					Undergoing repairs
Chesterfield	Petersburg	9.00	Yes.	Yes.	Gilt.	
Carroll	Lynchburg	10.00	Yes.	Yes.	Gilt.	
Commercial	Lynchburg	4.75	Yes.	Yes.	Red.	
Charlotte	Keysville	5.75	Yes.	Yes.	Red.	
Colonial	South Boston	4.00	Yes.	Yes.	Plain.	

NAME	PLACE	Fee	Fee Paid	Certificate Issued	Class of Certificate	REMARKS
Clinchfield	Dante	$10.00	Yes.	Yes.	Red.	
Colonial	Wise	6.00	Yes.	No.		
Collins	Covington	10.00	Yes.	Yes.	Gilt.	
Cambria	Cambria	5.50	Yes.	Yes.	Red.	
Crow House	Glade Spring	5.00	Yes.	Yes.	Plain.	
*Cason Cottage	Ocean View	7.00	Yes.	Yes.	Red.	
Commercial	Newport News	6.75	Yes.	Yes.	Red.	
Claiborne	Lawrenceville	7.00	Yes.	Yes.	Gilt.	
Central	Lawrenceville	4.50	Yes.	Yes.	Plain.	
*Caldwell Springs	New Castle					Not inspected.
Central	Pearisburg	4.00	Yes.	No.		
*Crown Castle	Colonial Beach	5.00	Yes.	No.		
Central	Independence					Not inspected.
Culpeper	Culpeper	5.00	Yes.	Yes.	Plain.	
Connell and Miller	Richmond	9.50	Yes	Yes.	Gilt.	
Cox	Roanoke	4.75	Yes.	Yes.	Red.	
Chesterfield House	Norfolk	3.50	Yes.	No.		
Cape View	Buckroe Beach	8.50	Yes.	Yes.	Red.	
Cedar Island	Wachaprague	5.50	Yes.	Yes.	Red.	
Davis	Richmond	10.00	Yes.	No.		Rebuilding.
Delmont	Newport News	6.00	Yes.	Yes.	Plain.	
Driftwood College	Virginia Beach	4.75	Yes.	Yes.	Red.	
Doughty	Accomac C. H	6.25	Yes.	Yes.	Red.	
Eagle	Shenandoah	6.25	Yes.	Yes.	Red.	
Edinburg	Edinburg	4.50	Yes.	Yes.	Gilt.	
Evans	Winchester	10.00	Yes.	Yes.	Gilt.	
Exchange	Newport News	5.00	Yes.	Yes.	Red.	
East End	East Radford	4.25	Yes.	No.		
Eubank	Kilmarnock	5.75	Yes.	No.		
*Elkton	Elkton	10.00	Yes.	Yes.	Red.	
*Edge Hill	Montvale	5.00	Yes.	Yes.	Gilt.	
Exchange	Boydton	6.00	Yes.	Yes.	Plain.	
*Emviga	Colonial Beach	6.00	Yes.	Yes.	Gilt.	
Ellinghans	Roanoke	4.25	Yes.	Yes.	Red.	
East End House	Norfolk	4.00	Yes.	Yes.	Plain.	
Emporia Cottage	Virginia Beach	4.50	No.	No.		
Edgemere Cottage	Virginia Beach	5.00	No.	No.		
Exmore	Exmore	5.00	Yes.	Yes.	Red	
Eggleston Springs	Eggleston	6.00	Yes.	Yes.	Red.	
Fourth Avenue	Wytheville	10.00	Yes.	Yes.	Red.	
*Ferebee	Virginia Beach	10.00	Yes.	Yes.	Gilt.	
Fuller's	Phoebus	5.75	Yes.	Yes.	Red.	
Fairfax	Winchester	6.00	Yes.	Yes.	Red.	
Fairfax	Norfolk	10.00	Yes.	Yes.	Gilt.	
Francione's	Richmond	5.25	Yes.	Yes.	Red.	
Frederick	Fredericksburg	8.00	Yes.	No.		Changed management.
Franklin	Ocean View	3.50	Yes.	Yes.	Red.	
Fitzhugh College	Virginia Beach	4.75	Yes.	Yes.	Plain	
Francis College	Colonial Beach	4.50	No.	No.		
Gilberts	Richmond	10.00	Yes.	Yes.	Red.	
Gladys Inn	Clifton Forge	10.00	Yes.	Yes.	Gilt.	
Granby Inn	Norfolk	6.50	No.	No.		
Grace	Clarksville	5.00	Yes.	No.	Plain.	
Garland	South Boston	10.00	Yes.	No.	None.	
Graham	Graham	5.25	Yes.	Yes.	Gilt.	
Guerrant	Richmond	10.00	No.	No.		Closed.
Henry Clay Inn	Ashland	10.00	Yes.	Yes.	Red.	
Holtzman	Woodstock	6.00	Yes.	Yes.	Red.	
Homestead	Hot Springs	10.00	Yes.	Yes.	Gilt.	
Hamilton	Martinsville	6.75	Yes.	Yes.	Red.	
*Hygiea	Cape Henry	5.50	Yes.	Yes.	Red.	
Hamilton	Bristol	10.00	Yes.	Yes.	Red.	
Halifax Inn	Houston	5.00	Yes.	Yes.	Red.	
Hayths	Fincastle	5.00	Yes.	Yes.	Red.	
*Healing Springs	Healing Springs	10.00	Yes.	Yes.	Gilt.	
Hallwood	Hallwood	4.00	Yes.	Yes.	Red.	
Heelan's	Norfolk	5.75	Yes.	Yes.	Red.	
Hayne's Cottage	Ocean View	6.00	Yes.	No.		
Hanover Cottage	Virginia Beach	10.00	Yes.	No.		
*Irvington Beach	Irvington	8.50	Yes.	None.		
Jefferson	Richmond	10.00	Yes.	Yes.	Gilt.	
*Jordan Springs	Winchester	10.00	No.	No.		

NAME	PLACE	Fee	Fee Paid	Certificate Issued	Class of Certificate	REMARKS
Jeffersonville	Tazewell	$ 6.50	Yes.	Yes.	Red.	
Jamestown	Smithfield	5.00	Yes.	Yes.	Gilt.	
Jefferson Cottage	Ocean View	4.50	Yes.	No.		
Johnson House	Colonial Beach	5.00	Yes.	No.		
Kavanaugh	Harrisonburg	10.00	Yes.	Yes.	Gilt.	
Keysville	Keysville	3.50	Yes.	Yes.	----------	Not inspected.
Keokee	Keokee	5.00	Yes.	Yes.		
Karl	Roanoke	10.00	Yes.	Yes.	Red.	
*King George	Colonial Beach	5.00	No.	No.		
Laurence	Luray	6.75	Yes.	Yes.	Red.	
Little Mecklenburg	Chase City	5.50	Yes.	No.		
Louisa	Louisa	6.50	Yes.	Yes.	----------	Not inspected.
Lexington	Lexington	10.00	Yes.	Yes.	Gilt.	
Lawn	Bowling Green	5.00	Yes.	Yes.	Red.	
*Linwood	Colonial Beach	10.00	No.	No.		
*Loudoun	Bluemont	8.75	Yes.	Yes.	Red.	
Lorraine	Norfolk	10.00	Yes.	Yes.	Gilt.	
Lynnhaven	Norfolk	10.00	Yes.	Yes.	Gilt.	
Lexington	Newport News	7.00	Yes.	Yes.	Red.	
Lexington	Richmond	10.00	Yes.	Yes.	Gilt.	
Lawrence	Richmond	8.00	Yes.	Yes.		
*Lowe Cottage	Ocean View	7.50	Yes.	Yes.	Red.	
Leesburg Inn	Leesburg	10.00	Yes.	Yes.	Red.	
Lafayette	Portsmouth	8.00	Yes.	Yes.	Red.	
Mansion Inn	Luray	10.00	Yes.	Yes.	Gilt.	
Maple Shade Inn	Pulaski	10.00	Yes.	Yes.		
Marlbrooke	Buena Vista	5.75	Yes.	Yes.	Red.	
Monte Vista	Big Stone Gap	10.00	Yes.	Yes.	Red.	
Mount Vernon	Norfolk	6.00	Yes.	Yes.	Red.	
Morgan	Danville	10.00	Yes.	Yes.	Gilt.	
*Mountain Lake	Mountain Lake	10.00	Yes.	No.		
*Massanetta Springs	Harrisonburg	10.00	Yes.	Yes.	Gilt.	
*Millboro	Millboro	10.00	Yes.	Yes.	Gilt.	
*Mount Elliott Springs	Mount Elliott	10.00	Yes.	No.		
*Midway Inn	Hot Springs	8.75	Yes.	Yes.	Gilt.	
*Millboro Springs	Millboro	10.00	Yes.	Yes.	Gilt.	
Monticello	Norfolk	10.00	Yes.	Yes.	Gilt.	
Monroe	Portsmouth	10.00	Yes.	Yes.	Gilt.	
Murphys	Richmond	10.00	Yes.	Yes.	Gilt.	
Monticello	Lynchburg	6.00	Yes.	Yes.		
Miller's	Richmond	10.00	Yes.	No.		
*Monte Vista Springs	Vista	8.00	Yes.	Yes.	Gilt.	
McClintic	Hot Springs	6.00	Yes.	Yes.	Red.	
McDonalds Stag	Norfolk	5.00	Yes.	Yes.	Plain.	
Magnolia	Norfolk	10.00	No.	No.		
Melfa	Melfa	5.00	No.	No.		
Mount Rose House	Colonial Beach	4.00	Yes.	Yes.	Plain.	
Mount Rose	Montvale	4.00	Yes.	Yes.	Red.	
New Rammel	Alexandria	8.00	Yes.	Yes.	Red.	
New Gladstone	Norfolk	10.00	Yes.	Yes.	Red.	
Neddo	Norfolk	10.00	Yes.	Yes.	Gilt.	
Newport	Newport News	10.00	Yes.	Yes.	Gilt.	
Nansemond	Suffolk	10.00	Yes.	Yes.	Red.	
New Hotel Gleason	Charlottesville	10.00	Yes.	Yes.	Gilt.	
National	Harrisonburg	10.00	Yes.	Yes.	Gilt.	
Narrows	Narrows	4.50	Yes.	Yes.	Red.	
New Prince William	Manassas	7.50	Yes.	No.		
Neese	Waynesboro	7.00	Yes.	Yes.	Red.	
*Natural Bridge	Natural Bridge	10.00	Yes.	Yes.	Gilt.	
*Nimrod Hall	Nimrod Hall	9.00	Yes.	Yes.	Red.	
O'Connor	West Point	5.00	Yes.	No.		
Oliver	Crewe	6.50	Yes.	No.		
*Ocean View	Ocean View	10.00	Yes.	Yes.	Gilt.	
*Orkney Springs	Orkney Springs	10.00	Yes.	Yes.	Red.	
New Virginia	Norfolk	7.00	Yes.	Yes.	Red.	
Norfolk	Norfolk	10.00	Yes.	Yes.	Gilt.	
Nansemond College	Ocean View	7.00	Yes.	Yes.	Gilt.	
New Atlanta	Cclonial Beach	6.00	Yes.	Yes.	Gilt.	
Nelson	Urbanna	10.00	Yes.	No.	Gilt.	
Ponce de Leon	Roanoke	10.00	Yes.	Yes.	Gilt.	
Princess	Norfolk	10.00	Yes.			
Pocahontas	Newport News	10.00	Yes.	Yes.	Gilt.	
Prince Edward	Farmville	8.00	Yes.	Yes.	Gilt.	

NAME	PLACE	Fee	Fee Paid	Certificate Issued	Kind of Certificate	REMARKS
Personia	Boykins	$ 4.50	Yes.	No.		
*Princess Anne Cottage	Virginia Beach	5.00	Yes.	Yes.	Gilt.	
*Patrick Springs	Patrick Springs	9.50	Yes.	Yes.		Not inspected.
*Pulaski Alum Springs	Pulaski	10.00	Yes.	Yes.	Gilt.	
Palace	Bedford City	6.75	Yes.	Yes.	Red.	
Pulaski	Pulaski	10.00	Yes.	Yes.	Red.	
Pocahontas Inn	Pocahontas	10.00	No.	No.		Closed.
Pennington	Pennington Gap	8.00	Yes.	Yes.	Red.	
Pearson	Portsmouth	4.75	Yes.	No.		
Payne Cottage	Virginia Beach	4.75	Yes.	Yes.	Red.	
Pocahontas Cottage	Virginia Beach	5.25	Yes.	No.		
Rollins House	Colonial Beach	4.75	Yes.	Yes.	Red.	
Ruth Cottage	Ocean View	7.00	Yes.	No.		
Raleigh	Roanoke	7.50	Yes.	Yes.	Red.	
*Rocky Mount	Rocky Mount	8.25	Yes.	Yes.	Gilt.	
Ross House	Urbanna	5.00	Yes.	Yes.	Red.	
*Rawley Springs	Rawley Springs	10.00	Yes.	Yes.	Red.	
*Rockbridge Inn	Goshen	5.00	Yes.	Yes.	Gilt.	
*Rockbridge Baths	Rockbridge Baths	10.00	Yes.	Yes.	Gilt.	
*Rockbridge Alum	Rockbridge Alum Spgs	10.00	Yes.	No.		
Rueger	Richmond					Not open yet.
Roanoke	Roanoke	10.00	Yes.	Yes.	Gilt.	
Roby	Lynchburg	10.00	Yes.	Yes.	Red.	
Randolph	Roanoke	10.00	Yes.	Yes.	Red.	
Royal	Norfolk	6.75	Yes.	Yes.	Plain.	
Richmond House	Norfolk	3.75	Yes.	Yes.	Plain.	
*Rustic Cottage	Ocean View	6.00	Yes.	No.		
Richmond	Richmond	10.00	Yes.	Yes.	Gilt.	
St. John	Gordonsville	6.25	Yes.	No.		
Stratford	Roanoke					Closed.
Stumpf's	Richmond	10.00	Yes.	Yes.	Gilt.	
Stratford	Petersburg	10.00	Yes.	Yes.	Gilt.	
Shenandoah	Roanoke	10.00	Yes.	Yes.	Gilt.	
Southern	Roanoke	5.00	Yes.	No.		Changed management.
St. James	Roanoke	10.00	Yes.	Yes.	Red.	
St. Strickler	Front Royal	6.00	Yes.	Yes.	Red.	
Stonewall Inn	Franklin	7.50	Yes.	Yes.	Gilt.	
Stonega House	Stonega	5.00	Yes.	Yes.	Red.	
St. James	Appalachia	6.00	Yes.	Yes.	Red.	
*Stribling Springs	Mt. Solon	6.00	Yes.	Yes.		Not inspected.
*Skyland	Skyland	10.00	Yes.	Yes.	Gilt.	
St. Charles	Norton	10.00	Yes.	Yes.	Gilt.	
St. Paul Place	Norfolk	7.25	Yes.	Yes.	Plain.	
Salem	Salem	10.00	Yes.	Yes.	Gilt.	
Saltville	Saltville	5.00	Yes.	Yes.	Red.	
Sprinkle	Rural Retreat	4.00	Yes.	Yes.		Not inspected.
Spottswood Arms	Virginia Beach	10.00	Yes.	Yes.	Gilt.	
St. Lawrence	Bristol	10.00	Yes.	No.		
*Sea Breeze	Cape Henry	4.50	Yes.	Yes.	Red.	
Savoy	Pearisburg	5.00	Yes.	Yes.	Gilt.	
St. Charles	Mt. Jackson	10.00	No.	No.		Changed management. Not inspected.
*Sweet Chalybeate	Sweet Chalybeate	10.00	Yes.	Yes.	Gilt.	
Tutwiler	Blacksburg	4.50	Yes.	Yes.	Red.	
Twin City	Bristol	3.50	Yes.	No.		
Taylor House	Eastville	4.75	Yes.	Yes.	Red.	
Union	Norfolk	10.00	Yes.	Yes.	Red.	
Virginian	Lynchburg	10.00	Yes.	Yes.	Gilt.	
Virginia	Staunton	10.00	Yes.	Yes.	Gilt.	
Victoria	Norfolk	10.00	Yes.	Yes.	Gilt.	
Virginia	Emporia	10.00	Yes.	Yes.	Red.	
Virginian	Franklin	6.75	Yes.	Yes.	Red.	
*Virginia Mineral Spgs	New Castle	10.00	Yes.	Yes.	Gilt.	
Virginia	Elkton	5.00	Yes.	Yes.	Red.	
Valley Hotel	Marion	6.00	Yes.	Yes.	Gilt.	
Virginia	Cape Charles	6.25	Yes.	Yes.	Red.	
Virgilina	Virgilina	4.00	Yes.	Yes.	Plain.	
*Virginia Bay	Ocean View	10.00	Yes.	Yes.	Gilt.	
*Virginia Beach	Virginia Beach	10.00	Yes.	No.		
Valley House	Winchester	4.00	Yes.	Yes.		
Virginian	Burkeville	5.00	Yes.	Yes.	Gilt.	

NAME	PLACE	Fee	Fee paid	Certificate Issued	Kind of Certificate	REMARKS
*Winchester Inn	Winchester	$10.00	Yes.	Yes.	Gilt.	
Wayside Inn	Middletown	6.00	Yes.	Yes.	Gilt.	
West End	Radford	7.50	Yes.	Yes.	Red.	
Willson	Burkeville	6.00	Yes.	Yes.	Gilt.	
*Wachapreague	Wachapreague	10.00	Yes.	Yes.	Gilt.	
*Waverly	Virginia Beach	8.75	Yes.	Yes.	Gilt.	
Waugh	Galax	4.75	Yes.	No.		
Windsor	Appalachia	4.50	Yes.	Yes.	Red.	
Walcott	Colonial Beach	9.50	Yes.	No.		
*Willoughby Beach	Willoughby Beach	10.00	No.	No.		
*Waterlick White Sulphur	Waterlick	10.00	Yes.	Yes.		Not inspected.
*Wilson Springs	Rockbridge Baths	4.00	Yes.	No.		
*Warm Springs	Warm Springs	10.00	Yes.	Yes.	Red.	
Warren Green	Warrenton	10.00	Yes.	Yes.	Gilt.	
Waverly	Culpeper	8.50	Yes.	Yes.	Red.	
Warwick	Newport News	10.00	Yes.	Yes.	Gilt.	
Westover	Farmville	4.50	Yes.	Yes.	Red.	
*Willoughby Club	Willoughby Beach	6.00	No.	No.		
*Washington Springs	Glade Spring	10.00	Yes.	No.		
Washington	Fries					Not inspected.
Water View Cottage	Ocean View	8.75	Yes.	Yes.	Red.	
Willoughby Cottage	Ocean View	10.00	No.	No.		
We-Us	Newport News	5.75	Yes.	Yes.	Red.	
Westbrook	Waverly	5.50	Yes.	Yes.	Gilt.	

MUNICIPAL INSPECTIONS.

From many points of view the director believes that the aid rendered by this bureau to the small towns and villages of the State is the most effective work done by it.

The very loosely hung machinery of government possessed by these communities, the usual emptiness of the treasury, and the absence of sanitary standards oftentimes makes it very difficult to accomplish anything permanent in the way of sanitation.

An epidemic or the prospect of one is most frequently the point of contact that enables us to be of service. Rarely indeed are we called to a town or village except after trouble has already begun.

Our plan of operation is usually to get in touch with the mayor or a member of the board of health and inspect the streets, alleys and back premises of the place. After determining the greatest sanitary needs, it has been our practice to ask for a meeting of the town council, at which the whole situation is discussed and the existing elements of danger clearly outlined. Ordinances dealing with these crucial points are suggested, and, when they are adopted and enforced, usually relieve the situation.

Most of the insanitation of towns of from two to five hundred people may be corrected by the application of sanitary laws with proper penalties covering the following points, the laws being enforced with the co-operation of the town sergeant in the work of sanitary inspection:

First—Protection of water supply.
Second—Soil pollution.
Third—Sanitary privy.
Fourth—Care of stables, hog-pens, etc.
Fifth—Care of drains.

There has been a notable development in the existing health departments of most of the cities in the State and in one marked instance, Danville, the employment of a trained man for his whole time as health officer has put that city in line with modern progress in sanitation.

The following cities and towns have come in for detail work by this bureau: Danville, Bristol, Charlottesville, Newport News, Clifton Forge, Williamsburg, Front Royal, Martinsville, Crewe, Basic, Scottsville, Pearisburg, Bluff City, Tazewell, Berryville, Norton, Middleburg, Standardsville, East Stone Gap, Millboro, Amelia, The Plains, New Market, Eagle Rock and Edinburg.

TYPHOID INSPECTION.

The limited force at the command of the State Board of Health has compelled the employment of the director of inspections in the investigation of a number of typhoid outbreaks during the past year. These are briefly noted.

Chesterfield.—In the camps of the Lea Lumber Company in December, 1912, a number of cases of typhoid fever broke out among negro hands. The cause being insanitary surroundings and contact from patient to patient, conditions were corrected and the situation relieved.

Front Royal, Warren county, February 23rd-25th.—The director of inspections was called upon in the Front Royal epidemic mainly as diagnostician, Mr. Messer, the sanitary engineer, having a thorough grasp of the situation.

Bluff City, Giles county, June 14th, was reported as having an undue prevalence of typhoid. Investigation showed that a spring used as a common water supply was subject to serious contamination by overflow and that opportunities for spread of disease existed at all of the houses affected. Radical changes were at once made, which resulted in absolute control of the situation.

Eagle Rock, Botetourt county.—On June 26th the inspector examined a situation that promised trouble. One or two scattered cases of typhoid existed in the neighborhood. Definite recommendations were made regarding privy construction and control, and no further cases were called to our attention.

Williamsburg, The Eastern State Hospital for the Insane.—On July 31st an outbreak was reported among a few of the nurses, male and female. A close investigation revealed nothing absolutely definite, but elimination of all other possible sources pointed to a recently employed nurse as the carrier of the trouble. The nurse, who had been ailing previously, left the hospital in a very few days with a well marked case of typhoid. The threatened epidemic then stopped as suddenly as it appeared. The hospital building, grounds and appurtenances came in for a rigid inspection, the result of which is reported under institutional inspection.

Near Craigsville, Augusta county, August 2nd.—In a settlement known as New Town, between Craigsville and Fordwick, occupied mainly by operatives of the Fordwick Cement Works, a number of typhoid cases occurred about the middle of June. No new sickness was reported in the neighborhood for a month after that time and then an increased number of people, mainly children, came down with the disease. Investigation revealed a great deal of insanitation in the shape of open privies and unscreened kitchens. The region is of limestone formation and the water supplies are very probably subject to periodic pollution. Contact with the sick was responsible for several of the cases. The situation here must be studied further by laboratory methods before it can be satisfactorily dealt with.

Near North Garden, Ablemarle county.—On August 19th–21st, in response to reports received, a close examination was made of conditions around those houses near North Garden in which there were several cases of typhoid. There were also a number of scattered cases throughout the district. The two families stricken had undoubtedly acquired the fever by contact with a young man who had come home sick, mingling freely for ten days with his relatives before taken to bed. At other homes, polluted water and insanitary disposal of human wastes were responsible. The physician in charge, Dr. H. M. Williams, had taken all necessary precautions to prevent further spread.

The Environs of Charlottesville.—Inspected August 20 for typhoid, furnished a striking contrast to conditions within the city. In a surburban population less than one-half that of the city more than five times as many cases of typhoid existed as in the city. Only three cases existed within the limits while sixteen were found within half mile of the corporation. The difference was directly traceable to careful supervision of sewage disposal within the city and to its neglect without. It is gratifying to know that the county supervisors and city authorities are seriously considering a plan for uniting their health forces in an offensive campaign against preventable disease.

Tazewell, September 8th.—The presence of several cases of typhoid fever in the town of Tazewell necessitated a visit from the director. Insanitary privies and flies in this case furnished both the cause and the medium of spread. Recommendations were made, which, if carried out, will prevent further trouble for the future.

Edinburg, Shenandoah county, September 11th.—In a visit to Shenandoah county the director had occasion to look over the typhoid situation in the town of Edinburg. Several violent cases had occurred with one death. There was no sanitary privy law for the town, and many insanitary spots required attention. Definite recommendations were made to the local authorities, and assurance was received that they would be adopted.

The Plains, Fauquier county, September 12th.—Upon request from the physicians and town authorities, the director visited The Plains and carefully examined the surroundings of all houses, four in number, in which typhoid was present. In all cases but one, flies and soil pollution were probably responsible. One was due to the use of water from a well subject to gross contamination. A meeting of the citizens was held and steps were taken for permanent and properly handling the public health interests of the town. At The Plains there was a striking illustration of the value of screening against flies to limit the spread of typhoid fever. There were two families living about thirty feet apart. In one, an unscreened house, three cases of fever developed. The other, a house full of children which was most effectually screened, was not visited at all by this disease.

Dante, Russell county, September 17th.—Dante is the seat of a large coal mining operation, and was subjected to a close inspection by reason of the undue amount of typhoid fever present among employees living there. The cause of the outbreak, which was among the office force, was not made clear. Much of the water, however, used in the place contained intestinal bacteria, and was condemned as unfit for use.

Norton, Wise county, September 18th.—Typhoid fever existed here especially in the mining settlement at the east end of the town where the main source of water supply is unfiltered river water, and where there is a deplorable lack of sanitation. The body of the town is as clean as any municipality in the State, and is co nse

quently free from infection. Recommendations were made both to the town authorities and to the operators of the mines which are expected to work a change for the better.

Dorchester, Wise county, September 19th.—Dorchester is a straggling series of mining villages along Powell River. It has been visited this year by typhoid fever as for several years past, by reason of the lack of proper sanitary supervision. The water supply of many of the homes is polluted, and privy vaults are full to overflowing. Specific corrective measures were outlined to those in authority, and it is hoped that good results will follow.

East Stone Gap, Va., September 20th–22nd.—This village is on the Virginia and Southwestern Railroad about two miles from Big Stone Gap, and was visited this year by a serious epidemic of typhoid. Close inspection of all premises infected and bacteriological investigation of all water supplies placed the blame upon water pollution. A deep well on the premises of one citizen, a spring at the home of another and a spring near Jerry Well's house were all grossly polluted with intestinal bacteria. The discontinuance of the use of the water was urged, and no further developments have been reported.

With reference to the general typhoid situation, it is worthy of remark that it takes a very small outbreak of typhoid in a community now to arouse the people, and the intelligence with which they co-operate with the State Board of Health in the correction of evil conditions is a splendid commentary upon the effectiveness of the educational campaign in public health conducted by it.

In furtherance of the typhoid work, it might be well to note in closing that while working around Charlottesville, the director examined the records of typhoid cases at the University of Virginia Hospital and traced back the cases to their origin in nearby counties. Inquiries were addressed to all localities from which cases were reported and conditions were noted.

SMALLPOX INSPECTIONS.

Nine communities in the State have required the presence of the inspector by reason of smallpox,—South Boston, Amelia, Martinsville, Henrico, Rappahannock, Albemarle, Newport News, Carroll and Floyd. It is very gratifying that the local boards of health are assuming in increased numbers the full management of their smallpox situations. This is as it should be, and is an earnest omen of the time when adequate vaccination will entirely banish this absolutely unnecessary and loathsome disease.

SCARLET FEVER AND DIPHTHERIA.

The director personally has visited this year only three communities afflicted with the above disease.—Amelia, Albemarle, and Warwick.

STATE INSTITUTIONS INSPECTED.

As opportunity and time is afforded, visits of inspection are made to the State institutions that lie within the range of the inspector's itinerary, and during the past year four inspections of this character have been made.

The most comprehensive investigation made was at the Eastern State Hospital for the insane at Williamsburg on the occasion of a slight outbreak of typhoid fever among the nurses of the institution. The detailed report made at the time call attention to the fact that while the buildings, grounds and farm are splendidly managed, there is need for the extension of the main sewer outlet to tidewater not more than a mile away. This improvement will necessitate additional appropriation by the legislature, but the matter is of such importance that it must be again emphasized.

Inspection has likewise been made of the Central State Hospital at Petersburg and Southwestern State Hospital at Marion. No detailed report was deemed necessary following these inspections further than to commend the efficient way in which these institutions are serving the people of the State.

ADDRESSES AND ARTICLES ON PUBLIC HEALTH.

The policy of the State Board of Health requiring its officials to spread the truths of preventive medicine by every means possible, has necessarily thrown upon the bureau of inspections its full share of public lecturing.

Every opportunity presented of reaching audiences by illustrated talks or otherwise has been utilized. Municipal gatherings in courthouse or public hall, schools and patrons' meetings, churches, farmers' institutes, civic associations and organizations of many different characters have been reached in this manner. A special series of lectures has been given on three separate occasions to colored audiences in villages through the rural district, and speeches have been made in eleven of their churches. The itinerary of these tours was arranged by J. M. Gandy, executive secretary of the Negro Organization Society, whose efficient co-operation with the State Board of Health is resulting in much benefit to the colored people in the country.

Special addresses have also been made this year by the director before State and National bodies such as the State Public Health Association in Norfolk, The Southern Sociological Congress in Atlanta, and the International Congress on School Hygiene in Buffalo.

The increasing demands upon this bureau and the necessity for fulfilling the routine duties with which it is already charged point with irresistible logic to the need for more men with which to compass the work for the coming year.

APPENDIX FIVE.

Report of the Bureau of Sanitary Engineering.

RICHARD MESSER, C. E.,

Director in Charge.

GENERAL STATEMENT.

The general work of this bureau as outlined in previous reports, has been carried forward during the present year.

Since its organization in 1910, the director has inspected at least once the water supply and sewerage system of every city and town in the State. The data thus collected have been carefully tabulated and are available for future use and reference.

As this work has gone on, it has been gratifying to note the increase each year in the number of requests for investigations and advice. These indicate the awakening interest among the people at large who now see the value of good water and adequate sewerage facilities as an asset to any community. The people understand, too, that the lack of these things is a menace to the health of every citizen.

PUBLIC WATER SUPPLIES.

During the year, five towns have completed the installation of new public water supplies, two have voted in favor of bond issues and one has under construction a purification plant. At the present time, with one exception, every municipality with a population exceeding 1500 is provided with some kind of public water supply or has one under process of construction.

In a few instances our investigations have shown the water furnished is subject to serious pollution which at any time may result in an outbreak of typhoid fever. In every such case the local authorities have been warned and urged to take immediate steps to correct conditions.

It is the intention of the bureau to prepare as soon as possible for general information a special bulletin containing a list and brief description of all the public water supplies of the Commonwealth.

EMERGENCY HYPOCHLORITE PLANTS.

A portable hypochlorite plant is kept on hand in the office ready to be shipped at a moment's notice in the event of an unforseen pollution of a municipal water supply. The value of such a plant was demonstrated in the outbreak of typhoid fever at Front Royal. Within twenty-four hours after we learned that several cases of typhoid fever had appeared in the town, we had set up the plant there and had it in operation at the water works intake. Almost precisely two weeks from that date the epidemic came to an end.

During the year emergency hypochlorite plants have been installed under the supervision of this bureau at the following places: Richmond, Bristol, Fredericksburg, Radford and Farmville, and such a plant was recommended at Bedford City. Lynchburg has under consideration the installation of liquid chlorine apparatus.

In this connection it may be noted that the publicity given to the method of sterilizing water with chlorine has created a general impression that this constitutes the only remedy under any and all conditions. Such is not the case. In the case of water heavily polluted, some kind of purification plant, usually filters, must be installed to render it safe and sterilization should merely be used as a finishing process. In certain instances, hypochlorite plants have been recommended to treat the water during the time necessary to build a permanent purification plant, notably at Front Royal. As an emergency and temporary measure to stop a widespread epidemic and for use with slightly polluted waters, hypochlorite or chlorine is invaluable.

SEWERAGE AND SEWAGE DISPOSAL.

The work of the bureau in regard to sewerage and sewage disposal had been carried on along with the work on public water supplies. During the year four towns have installed new systems,—one has begun construction of such a system, and two voted in favor of bond issues for that purpose.

There are in Virginia only two towns operating plants for the treatment of sewage; Winchester with a population of 6000 and Colonial Beach, a summer resort, with a winter population of about 1000 and a summer population estimated at 12000 to 15000. Several towns, in accordance with recommendations made by the board have under consideration the installation of plants. Disposal by dilution has been in the past and in all probability will continue to be for a number of years the general method.

In the opinion of the director, the time has not yet arrived in this State, except in special cases, to urge artificial treatment of sewage in the hope of maintaining the larger rivers at a high degree of purity.

PRIVATE SEWAGE DISPOSAL PLANTS.

A number of communications concerning private sewage plants have been received and given careful attention. The board has in print a bulletin containing general plans of several types of systems suitable to different localities, and these are generally recommended. As far as can be learned the plants already built in accordance with the instructions contained in this bulletin have given fair satisfaction. Individuals are urged to submit detailed information as to local conditions when making applications for advice.

GENERAL SUMMARY

Of Work of the Bureau for the Year Ending September 30, 1913.

Cities and Towns.

1.	Water supply inspections	19
2.	Proposed water supply investigation	3
3.	Emergency hypochlorite plants installed	6
4.	Water supply plans approved	1
5.	Sewerage inspection	5
6.	Proposed sewerage investigation	7
7	Sewerage plans approved	1
8.	General sanitation investigations	8
9.	Stream pollution investigations	2
10.	Typhoid fever investigations	2
11.	Nuisances investigated	1

State Institutions.

1.	Water supply inspection	5
2.	Proposed water supply investigations	3
3.	Water supply plans approved	1
4.	Sewerage system inspections	7
5.	Sewerage system plans approved	1
6.	Sewerage disposal plants, plans prepared	4
7.	General inspection of buildings	9
8.	Typhoid fever investigations	3

Individuals.

1.	Private sewage disposal, plans prepared	15
2.	Private sewage disposal, advice	13

Miscellaneous.

1.	Private water supplies, advice	3
2.	Private water supplies, inspections	1
3.	Stream pollution investigations	1

STATEMENT

Showing the Cities and Towns Visited During the Year, with a Brief Summary of Each Investigation or Inspection.

Abingdon—February 13.

Inspection of plans for proposed sewerage system with reference to location of outlets and type of treating plant required to prevent excessive pollution of Wolf Creek.

Appomattox—July 23, 24—By request.

Investigation of four cases of typhoid fever in one home, with inspection of all the private wells and privies in the town. Recommendations made to local health officer for educational campaign to improve general sanitary conditions.

Amherst—September 10—By request.

Investigation of available sources for proposed public water supply. With mayor and members of water committee, the director inspected springs under consideration and advised that opinion of competent geologist be obtained as to probability of securing an adequate supply from a drilled well. The director also made a general sanitary inspection of the town.

Ashland—January 21-24.

Inspection of water works owned and operated by private company. The supply is derived from two drilled wells and pumped to an elevated tank. Inspection showed that the quantity was inadequate, that the elevated tank needed repairs and that the distribution system was not of a design to furnish good fire protection.

On January 24 the director lectured before a mass meeting called to discuss the proposed bond issue of $50,000 for a new water supply and for the extension of the sewerage system. This bond issue was defeated on January 27, by vote of 60 to 54.

Basic—August 27—By request.

Inspection of Lithia Springs from which supply is taken of the pumping station and of the gravity pipe line connecting the two.

RECOMMENDATIONS.

1. Drainage from a slaughter house located about one-fourth of a mile above the spring should be intercepted by a ditch and turned into the river.
2. The privies in the vicinity be made sanitary according to the regulations adopted by State Board of Health.
3. The walls of the intake well at the pump house should be raised to prevent the possibility of creek water overflowing into it.

Bedford City—July 28-29.

Sanitary inspection of watersheds and the public water supply. This supply is derived from two sources—Stony Creek and Little Stony Creek—both of which rise on the Peaks of Otter. The intakes are located about eight miles northwest of town and the two gravity mains join about two miles below the corporate limits.

Stony Creek Watershed.—This water is subject to dangerous pollution from about twelve habitations, one school and drainage from a public road parallel to the creek. One habitation is located less than one-fourth of a mile above the intake and on the banks of the creek. The school is located not more than one-half of a mile above the intake, near the creek, and is not provided with sanitary closets.

Little Stony Creek Watershed.—This water is subject to dangerous pollution from about a dozen habitations, one school, one church, and the Mons Hotel with accommodations for twenty guests. During the summer, approximately 1500 people visit the Peaks, pass over the watershed and cross the creek at several points.

RECOMMENDATIONS.

1. An emergency hypochlorite plant of a style suggested should be installed at each intake at the earliest possible moment.

2. The supply from Little Stony Creek should be cut off until the end of the summer season.

3. The supply from Stony Creek should be cut off and water drawn from the other intake at the beginning of the school session.

4. Immediate steps should be taken for the installation of a permanent purification plant. Such a plant should be installed after complete investigation and report by an engineer as to location of plant, additions and changes in the distribution system.

The above recommendations were submitted to a meeting of water committee and mayor on July 29, with a statement that the water now furnished citizens of the town is at all times subject to constant and dangerous pollution.

Blackstone—October 17, 18—By request.

Inspection of the watershed and springs, at the time of the investigation of typhoid fever at the Blackstone Institute.

Several suggestions were made as to minor improvements necessary for the better protection of the spring from surface contamination.

Bristol—August 19, 20—By request.

Public water supply inspection. The supply for Bristol, Va., is derived from two separate sources—(1) Mumpower Springs, located about four miles north of the city and (2) Henry Preston Spring located near the Norfolk and Western R. R. about six miles northeast of the city. The Henry Preston Spring is owned jointly by Bristol, Va., and Bristol, Tenn.

Mumpower Springs.—The inspection showed about ten springs outcropping from a limestone formation. From these the water is collected in a storage reservoir having a capacity of five million gallons. On the watershed immediately above the springs are about fifteen habitations, which, by reason of the limestone formation, are at all times a menace to the supply. Recent analysis indicated dangerous pollution.

Henry Preston Spring.—This spring is located immediately adjoining the Norfolk and Western R. R., outcrops from limestone rock and is protected by a substantial house. The inspection of the surroundings and drainage area did not show any direct local source of pollution except that a family living on the property had a key to the house in order to get water from the intake chamber. Recent analyses, however, seemed to indicate serious contamination.

RECOMMENDATIONS.

1. An emergency hypochlorite plant should be installed at each of the two sources. The city engineer was furnished with full instructions regarding the arrangement and operation of the suggested plants.
2. The Henry Preston Spring-house should be locked and a pump should be installed to supply the family living there.
3. Investigation should be made to install a permanent purification plant or to procure a safe supply from some new source.

Buckroe Beach—June 10—By request.

Inspection of the beach with reference to proposed sewer from the hotel and cottages.

RECOMMENDATIONS.

1. Sewage may be discharged into Mill Creek south of the Boardwalk and near the spot where the main channel begins.
2. A sedimentation tank should be constructed near the outlet to intercept solids which would otherwise float on the water.
3. The sewer should be laid at an elevation sufficient to render it accessible to all the cottages on the beach.

Buena Vista—April 4.

Inspection of the public water supply. Water from two streams in the Blue Ridge is collected in two reservoirs with capacity of 200,000 and 75,000 gallons respectively and flows by gravity to the town. The watersheds are free from human habitation and are controlled by the municipality. In addition a general sanitary inspection was made, which shows that only a small part of the town is provided with sanitary sewers. The privies, with few exceptions, are insanitary and unscreened.

Chase City—May 21—By request.

Inspection of the public water supply and sewerage system just completed. Water is derived from an 8-inch drill well, 250 feet deep, and is pumped to an elevated steel tank with a capacity of 100,000 gallons. A concrete tank with a capacity of 100,000 gallons is located at ground level to furnish an additional storage supply for fire protection. The sewerage system has three outlets with septic tanks at each, built in accordance with the recommendations of this board.

Chatham—June 3, 4—By request.

Inspection of the public water supply at request of the Civic League.

The supply is derived from two sources, known as the East and West Springs. From the former, water flows by gravity directly into the distribution system; from the West spring, water is collected in a covered concrete reservoir, capacity 48,000 gallons, and is then pumped into a steel standpipe with a capacity of 98,000 gallons. Except during periods of dry weather, when the supply from the East spring is inadequate, the supply in the stand-pipe is held in reserve for fire protection.

RECOMMENDATIONS.

East Spring.—1. The concrete walls around the spring should be raised and a ditch provided to intercept all surface drainage, especially during periods of heavy rainfall.

2. A roof should be built over the reservoir to keep out sunlight and thereby to reduce the growth of vegetable matter.

3. The site owned by the town should be enclosed with a substantial fence to keep out trespassers. The entrance should be kept locked.

West Springs.—1. Drain pipe should be put in to collect the water from the several springs.

2. The ditch around the site should be made deeper, in order to intercept all surface drainage.

3. Notices should be posted and enforced against trespassing.

Chilhowie—February 13.

Inspection of general sanitary conditions. The town is not incorporated and is without a water supply or sewerage system. The geological formation is limestone which, in all probability leads to the contamination of the wells from cesspools and insanitary privies.

Colonial Beach—April 10—By request.

Inspection of the public water supply and sewerage system, complete and ready to be turned over to the town by the contractor.

The water supply is derived from an artesian well about 600 feet deep and is pumped to an elevated steel tank, capacity of 50,000 gallons. A concrete tank, built at ground level, provides an added storage of 60,000 gallons for fire protection.

Sewage is discharged into Monroe Bay, after it has passed through two sedimentation tanks. The outfall is located about 175 feet from the shore and is beneath the low water level. Built in accordance with the suggestions of the board, this system is arranged so that additional treatment of the sewage can be had whenever necessary.

Dendron—June 13—By request.

General sanitary inspection and special inspection of a branch receiving sewage from three private residences.

RECOMMENDATIONS.

A small disposal plant should be located below the jail to prevent the excessive pollution of the branch.

In this locality was inspected a lumber camp where three cases of typhoid fever had occurred. Recommendation was made that the company provide pumps for all wells used by its employees.

Farmville—April 5—By request.

Inspection for suggested improvements to the pumping station and filtration plant. Official report forwarded to the town council, April 7.

RECOMMENDATIONS.

1. The water of Little Buffalo Creek, now subject to dangerous pollution, should be excluded from the intake through which the water is pumped to the filter plant.

2. The town council should employ an engineer to make surveys and collect engineering data necessary to determine the best method for enlarging the plant and changing the intake.

3. A hypochlorite plant should be installed as soon as possible to increase the efficiency of filtration.

Fredericksburg—June 27, 28—By request.

Inspection of the public water supply, canal, and drainage area above the sedimentation basin.

RECOMMENDATIONS.

1. A hypochlorite plant should be installed immediately at the pumping station.

2. An ordinance should be passed prohibiting persons from frequenting the banks of the canal above the intake.

3. The present inlet should be removed to the extreme upper end of the sedimentation basin to provide more time for storage.

4. A new force main from the pumping station to the reservoir on the hill should be installed and direct pumping into the distribution system should be abandoned.

5. A purification plant should be installed as soon as possible.

The hypochlorite plant recommended for Fredericksburg has been duly installed.

Front Royal February 20–26, March 31, April 1—By request.

Investigation of typhoid epidemic elsewhere reported. As an infection of the public water supply was the cause of this epidemic on March 5, recommendations were submitted to the town council.

RECOMMENDATIONS

1. Every habitation of the watershed above the reservoir should be provided with a sanitary closet at once.

2. An inspector should be appointed to visit the watershed regularly and to see that the supply is fully protected from pollution.

3. A gravity mechanical filtration plant should be installed, with provision for applying hypochlorite of lime.

4. All drinking water should be boiled until further notice.

Since the time of this inspection, Front Royal has awarded contract for a filtration plant.

Gordonsville—August 15.

Public water supply water inspection.

The water is derived by gravity from two sources—about one-fifth from a spring two miles northeast of the town and four-fifths from a group of springs located on the Cameron estate, one and one-fourth miles from the town.

RECOMMENDATIONS.

1. The sewer outlet from the Cameron estate should be located on the side of the hill opposite its present site.

2. The walls of the reservoir should be rebuilt and the ditch made deep enough to intercept all surface drainage.

Luray—April 2, 3—By request.

Sanitary survey of the watersheds of the public supply. This supply comes from two streams in the Blue Ridge, known as the Stony Man and Mary's Rock source. The water is conveyed to a storage reservoir with a capacity of 4,000,000 gallons, located about three miles northeast of the town. Recommendations were submitted to the town council on April 5.

RECOMMENDATIONS.

Stony Man Source.—1. The springs adjacent to the summer resort known as "Skyland" should be protected from all possible contamination by persons who visit them.

2. No cesspools on the Skyland property should be allowed on the side of the ridge draining into the watershed. The one so located should be removed.

Mary's Rock Source.—1. As the stream above the intake receives dangerous pollution from the public road and from several habitations, about 2,400 feet should be added to the pipe line and a reservoir provided at the junction of the two stream.

2. The town should acquire control, if possible, of available land above the proposed intake.

Lynchburg—July 25—By request.

Conference with Mosby G. Perrow, chief health officer, as to the installation of a hypochlorite plant at the dam. We reached the conclusion that the evidence at the time did not warrant a belief that the water supply was polluted. Analyses, subsequently made, however, indicated that such pollution was present, and accordingly, at a conference held September 29, the director advises the installation of a system of liquid chlorine sterilization as soon as possible.

Manassas—July 17.

Investigation with Henry Stevens, engineer, of suggested plans for the proposed sewerage system. We investigated the stream flowing northeast of the town and thence into Bull Run and discussed the location of an outlet and the type of disposal plant needed. On July 14, the director examined the plans for the proposed system and lectured to a mass meeting of citizens. On August 2, the town voted in favor of a bond issue of $75,000 for water, lights and sewers.

Marion—February 14.

Inspection of the public water supply and examination of the drainage area. The water supply is drawn by gravity from a mountain spring situated about four miles southeast of the town. The spring is enclosed with concrete walls and is covered with wire. The flow appears to be sufficient for fire protection without a storage reservoir. The sewerage system, owned jointly by the town and by individual citizens, is incomplete.

Pembroke—November 21—By request.

Inspection of Little Stony Creek, from which the water supply of several families, the hotel and a store is drawn. This creek is polluted by drainage from more than ten habitations.

RECOMMENDATIONS.

A pipe line should be extended to a spring about one-half mile above the store, and the creek supply should be abandoned.

Radford—November 20, 22.

Sanitary survey of the watershed and examination of the water supply. This supply, taken from a small stream known as Conley's Run, is carried to a collecting reservoir within the town limits. There are, in addition, distributing mains, a pumping station and a standpipe. On the watershed, which is about five and one-half square miles, are located about forty habitations, one church, one school house and a blacksmith shop, constituting a population of about 200 to pollute the stream. The attention of the town authorities and officials of the water company was called to these conditions, with the recommendation that a purification plant be installed. This, however, was not the first time that the board had pointed out to Radford the importance of improvements in its water supply, a report with recommendations having been made as early as September 11, 1909. During the month of May, 1913, another visit was made to Radford and a detailed inspection was carried out. This included an examination of all the houses on the watershed. Photographs were also made. Following this inspection, an official report was was forwarded the town council, including a blue print of the watershed, copies of the photographs and detailed recommendations.

RECOMMENDATIONS.

1. Notices should be posted warning the people to boil the water drawn from the public supply before drinking it. These notices should apply to the water used at the soda fountains and should be placed conspicuously.

2. The town authorities should take immediate action to procure a safe and pure water supply in accordance with detailed suggestions made in the report.

With the commissioner the director visited Radford on August 1 and urged the necessity of prompt measures to protect the supply. As a temporary measure, we urged the installation of a hypochlorite plant. This was done without delay under the supervision of the director of this bureau.

Richmond—June 25—By request.

With Dr. E. C. Levy, chief health officer and Wm. Lawton, assistant superintendent of the water works, the director supervised the installation of an emergency hypochlorite plant at the settling basins.

Rocky Mount—June 5—By request.

Inspection of an outlet under consideration for a contemplated sewerage system and particularly of a proposed sewer to be run from the county jail. A general sanitary inspection of the town was also made.

Rural Retreat—February 15.

General sanitary inspection of the town, which has no public water supply or sewerage system.

Salem—August 22—By request.

Inspection of the springs, reservoir and deep well of the public water supply, including a study of the drainage area to determine whether or not a connection existed between Dry Run and the springs. As no direct evidence was forthcoming, the question was left for future consideration.

Scottsville—May 26, 28—By request.

Investigation of the available sources of a proposed water supply. The town had no funds available for the establishment of such a system at the time, but was macadamizing its streets and, with rare foresight, determined to lay water mains and sewers for a future system. After examining the three available sources, Monk creek, James river and Totier creek, recommendations were made.

RECOMMENDATIONS.

1. The supply should be procured from Totier creek.
2. The system should include a pumping station and filtration plant, to be located near the junction of the east and west branches of Totier creek, the necessary pipe lines and a standpipe or concrete reservoir to be built west of the town.

Shenandoah—May 26, 28—By request.

Investigation to determine the outlet for a proposed sewer on Front street. Complaint had been made that a sewer from the Shenandoah Hotel was creating a nuisance in the town and the director was requested to bring about co-operation between the property owners on Front street and the owner of the hotel in order that they might unite in building a sanitary sewer. The proposed outlet was immediately below the intake of the pumping station maintained by the Norfolk and Western Railroad.

Vinton—November 18, 19—By request.

Investigation of the pollution of Tinker creek by sewage from Roanoke. It appeared that about one-third of the sewage from Roanoke is emptied into Tinker creek near the western boundary of the town of Vinton, and it was evident that the flow of this creek during the summer months was not sufficient to care for the sewage. As a result, property owners were complaining of the nuisance. The complainants were referred to the court.

Virginia Beach—June 20, 21—By request.

General sanitary inspection, including the water supply and the sewerage system. The water supply is derived from twenty-three driven wells, from thirty

to sixty feet deep, and is pumped to an elevated tank which has a capacity of 80,000 gallons. Three years ago, in order to remove objectionable mineral constituents of the water, a pressure filter was added to the system.

Practically every residence and hotel within the town had a sewer connection. These empty into a covered tank located near the town hall, from whence the sewage is pumped by a six-inch main into one of the branches of Linkhorn bay.

Waverly—January 22—By request.

Investigation of nuisances along the town ditch due to the discharge of sewage from private residence and to waste fluids from the lumber yards. The interested parties were urged to agree upon a proper method of disposal.

Waverly—August 27—By request.

Inspection of a proposed new source for the public water supply. Prior to last May the supply had been drawn from the Baker spring, but as satisfactory terms for a new lease could not be agreed upon, the council had under consideration the construction of a pumping station on the adjoining property. Inspection showed that the proposed supply would not be safe for domestic use unless filtered.

MISCELLANEOUS INSPECTIONS AND CONSULTATION DURING THE YEAR, WITH THE PURPOSE THEREOF.

A—Public and Private Institutions.

Baptist Orphanage, Salem.—Report on proposed water supply and approval of plans submitted.

Blackstone Female Institute, Blackstone.—Investigation of typhoid fever outbreak.

Central State Hospital, Petersburg.—Inspection of trunk sewer under construction to the Appomattox river. Recommendations submitted with reference to change in location and canal crossing.

Emory and Henry College, Emory.—Investigation of the stream receiving sewage. Report was made and preliminary plans for sewage disposal plant were furnished. The water supply and the buildings were inspected.

Masonic Home, Richmond.—Typhoid fever investigation, inspection of water supply and sewage disposal plant.

Randolph Macon Academy, Front Royal.—Investigation of typhoid fever outbreak; inspection of sewer outlets and recommendation for a new sewer.

Randolph Macon College, Ashland.—Inspection of water supply and investigation of other available sources; inspection of buildings.

Richmond College, Westhampton.—Report to board relative to disposal of sewage; recommendation for a sewer line to discharge below the intake of the Richmond water works.

Southern Seminary, Buena Vista.—Inspection of buildings.

Edgewater Academy, Edgewater.—Approval of plans for sanitary closets.

Franklin County Jail, Rocky Mount.—Inspection of present sewage disposal plant; recommendation for the extension of the sewer to the river.

Hampden-Sidney College, Hampden-Sidney.—Water supply, sanitary survey of watershed and investigation of other available sources; a pressure filter at present pumping station recommended; inspection of the sewer outfall; septic tank suggested and plan therefor submitted.

Laurel Industrial School, Laurel.—Investigation of proposed sewerage system and disposal plant; preliminary plans for proposed plant submitted.

Southwestern State Hospital, Marion.—Inspection of spring from which water supply is derived, of sewerage system and of buildings.

State Farm, Lassiter.—Detail plans and specifications for sewage disposal plant prepared; made inspection of watershed, reservoir and buildings.

State Rifle Range, Virginia Beach.—Inspection of water supply, sanitary closets and grounds.

Virginia Normal and Industrial Institute, Petersburg.—Inspection of water supply sewerage system and buildings; collected samples from new drilled well.

Virginia Polytechnic Institute, Blacksburg.—Water supply inspected and recommendations made for proposed improvements. Sewerage system inspected; the installation of a sewage disposal plant recommended.

B.—Private Homes.

Plans of sewage disposal plants, with instructions for building have been sent to the following:

Brookdale, Richmond.—E. G. Schmidt. Hypochlorite plant to sterilize sewage from suburban development property.

Cape Charles.—C. P. Kerlin.

Dendron.—Dr. W. L. Devaney, for three residences.

Forest Hill, Richmond.—S. S. Weiseger.

Front Royal.—S. G. Waller. Septic tank for hotel, public school and six residences.

Gordonsville.—H. Bear.

Hampton.—Clifton Lee, Jr.

Leesburg.—Miss Anne Gulley.

Massawadox.—Dr. Walter B. Widgen.

Richmond.—L. F. Watson.

Richmond.—C. F. Sauer. Suburban development, six houses.

The Plains.—M. D. Corse.

Westhampton.—W. A. Wetherspoon. Inspection of present plant serving six residences and recommendations for extensions.

Westhampton.—Mrs. R. P. Minor.

Woodland Heights, Richmond.—B. F. Scintle.

SEWERAGE SYSTEMS.

Made by Cities and Towns, During the Year Including September 30, 1913.

Alexandria.—Public water supply, construction begun on new masonry dam to cost $125,000. Reservoir to have capacity of 600 million gallons.

Appalachia.—Public water supply and sewerage. New system installed by private company.

Bridgewater.—Public water supply and sewerage, bond issue of $25,000 voted February 21.

Chase City.—New public water supply and sewerage systems completed in May.

Colonial Beach.—New public water supply and sewerage system completed in April.

Front Royal.—Public water supply, appropriation of $16,000 for installation of mechanical filtration plant.

Lawrenceville.—New public water supply, sewerage and electric light systems completed in January.

Manassas.—Public water supply, sewerage and electric lights, bond issue of $75,000 voted August 12.

Pulaski.—Sewerage, contract let and construction begun on new system, to cost about $50,000.

Woodstock.—Sewerage, bond issue reported for new system.

APPENDIX SIX.

Report of the Bureau of Vital Statistics.

W. A. PLECKER, M. D.,

Assistant Registrar in Charge.

[The report of this Bureau appears in the report of the Health Commissioner, *supra*, pp. 23 to 33, inclusive. It will also be reprinted, with certain modifications, as a regular number of the Virginia Health Bulletin.]

	POPULATION			BIRTHS										STILL BIRTHS AS BIRTHS		
				WHITE			BLACK			Grand Total	Rate per 1000					
	WHITE	BLACK	TOTAL	Male	Female	Total	Male	Female	Total		W	B	Total	White	Black	Total
State total	1,448,892	674,948	2,123,840	17,938	17,270	35,208	6,648	6,672	13,320	48,528	24.3	19.1	22.8	1,028	1,155	2,183
Accomac county	24,166	13,708	37,874	203	200	403	113	118	231	634	16.6	16.8	16.7	27	34	61
Albemarle county	25,175	11,975	37,150	281	308	589	117	108	225	814	23.3	10.4	21.9	13	18	31
Alexandria city	11,476	4,083	15,569	99	83	182	48	36	84	266	15.9	20.6	17.0	5	6	11
Alexandria county	8,673	2,698	11,371	116	106	222	3	11	14	236	25.6	5.2	20.7	6	4	10
Alleghany county	16,950	4,048	20,998	220	161	381	42	28	70	451	22.5	17.3	21.4	9	6	15
Amelia county	3,764	4,861	8,625	32	37	69	92	78	170	239	18.3	34.9	27.7	----	6	6
Amherst county	11,656	7,596	19,252	151	138	289	73	65	138	427	24.8	18.2	22.2	11	8	19
Appomattox county	5,840	2,837	8,677	34	40	74	36	17	53	127	12.7	18.7	14.6	1	1	2
Augusta county	28,284	4,180	32,468	332	400	732	38	23	61	793	25.9	14.6	24.4	15	3	18
Bath county	5,594	1,227	6,821	66	56	122	2	20	22	144	21.9	17.9	21.1	3	1	4
Bedford county	21,237	8,070	29,307	292	290	582	118	80	198	780	27.3	22.7	26.6	17	20	37
Bland county	4,941	110	5,051	103	86	189	1	3	4	193	38.3	36.4	38.2	2	1	3
Botetourt county	14,516	3,381	17,897	174	168	342	38	31	69	411	23.5	20.4	23.0	19	4	23
Brunswick county	8,029	11,523	19,552	115	113	228	198	180	378	606	29.4	32.8	30.9	10	24	34
Buchanan county	13,123	----	13,123	302	325	627	2	10	12	639	47.6	----	48.7	24	----	24
Buckingham county	7,700	7,485	15,185	76	75	151	68	95	163	314	19.6	21.8	20.6	8	14	22
Buena Vista city																
Campbell county	14,161	8,818	22,979	156	140	296	41	47	88	384	20.9	10.0	17.1	7	6	13
[illegible] county	7,900	8,662	16,562	109	93	193	91	90	181	374	24.4	20.9	22.5	7	11	18
[illegible] city	21,407	253	21,660	333	347	680	10	12	22	702	31.8	86.9	32.4	24	1	25
[illegible] city county	1,384	3,933	5,317	5	6	11	40	42	82	93	7.9	20.8	17.4	5	9	14
Charlotte county	7,646	8,272	15,918	75	69	144	39	40	79	223	18.8	10.8	13.3	1	----	1

Charlottesville city																
Chesterfield county	14,571	7,477	22,048	159	178	337	107	106	213	550	23.1	27.2	24.4	13	20	33
Clarke county	5,530	1,800	7,330	73	60	133	21	18	39	172	24.0	21.6	23.4	1	4	5
Clifton Forge city																
Craig county	4,646	190	4,836	58	49	107	2	2	4	111	23.0	21.0	22.9	3		3
Culpeper county	8,252	3,025	13,277	83	84	167	40	44	84	251	22.2	23.8	18.9	5	6	11
Cumberland county	3,247	6,008	9,255	25	32	57	59	51	110	167	17.5	18.3	16.9	3	12	15
Danville city	13,654	6,116	19,770	109	111	220	5	10	15	235	16.1	2.4	11.0	11	1	12
Dickenson county	9,626	9	9,635	156	167	323	4	1	5	328	36.2		34.0	15		15
Dinwiddie county	6,134	9,328	15,462	75	77	152	121	121	242	394	27.6	25.6	25.4	6	13	19
Elizabeth City county	14,068	7,687	21,755	124	124	248	69	85	154	402	17.8	20.0	18.4	5	8	13
Essex county	3,854	5,072	8,926	24	32	56	32	27	59	115	13.8	10.0	12.8	3		3
Fairfax county	15,882	5,241	21,123	143	110	253	38	36	74	327	6.9	20.9	12.1	16	12	28
Fauquier county	15,026	7,246	22,272	161	134	295	63	52	115	410	19.6	15.8	18.4	12	9	21
Floyd county	12,938	766	13,704	226	218	444	17	11	28	472	34.3	36.4	34.4	11	1	12
Fluvanna county	4,922	3,183	8,105	64	42	106	44	47	91	197	21.5	28.5	23.0	4	6	10
Franklin county	21,357	5,281	26,638	331	348	679	61	50	111	790	31.8	21.0	29.6	16	18	34
Frederick county	17,032	1,694	18,726	172	185	357	11	10	21	378	20.9	12.4	20.1	11	4	15
Fredericksburg city																
Giles county	11,130	742	11,872	179	145	324	21	20	41	365	29.1	55.2	30.7	12	1	13
Gloucester county	6,674	5,696	12,370	72	56	128	54	39	93	121	19.1	16.3	17.8	2	3	5
Goochland county	4,021	5,131	9,152	40	35	75	52	62	114	189	18.6	22.2	20.5	3	3	6
Grayson county	19,824	333	20,157	296	411	707	12	11	23	730	38.8	69.0	36.2	17	1	18
Greene county	5,843	1,311	7,154	94	89	183	15	11	26	209	31.3	19.8	29.2	7	5	12
Greensville county	4,826	7,704	12,530	41	59	100	62	77	139	239	20.7	18.0	19.0	3	14	17
Halifax county	20,664	2,234	40,898	303	260	563	276	262	538	1,101	27.2	26.5	26.8	9	28	37
Hanover county	10,299	6,776	17,075	137	130	267	98	102	200	467	36.6	29.9	27.3	8	15	23
Henrico county	17,440	4,009	21,449	179	159	338	54	69	123	461	19.3	30.7	26.1	13	15	28
Henry county	11,032	7,185	18,217	181	154	335	79	85	164	499	30.3	22.8	27.3	5	15	20
Highland county	4,993	225	5,218	80	48	128	1	2	3	131	25.6	13.3	25.1	2		2
Isle of Wight county	7,591	7,886	15,477	53	84	137	66	75	141	278	18.0	17.8	17.9	2	11	13
James City county	3,478	3,042	6,520	17	17	34	38	31	69	103	9.7	22.6	15.7			
King and Queen county	4,262	5,407	9,669	44	53	97	46	46	92	189	20.8	17.0	18.6	4	10	14
King George county	3,426	2,790	6,216	42	28	70	28	31	59	129	20.4	21.1	20.7		4	4
King William county	3,585	5,012	8,597	40	48	88	53	56	109	197	24.5	21.7	22.9	1	10	11
Lancaster county	4,780	5,213	9,993	67	46	113	58	77	135	248	27.8	25.8	24.8	5	6	11
Lee county	23,936	1,099	25,035	381	344	725	15	13	28	753	30.2	25.4	30.0	20	3	23
Loudoun county	15,906	5,027	20,933	159	144	303	52	51	103	406	19.0	20.4	19.4	9	5	14
Louisa county	8,935	7,661	16,596	104	99	203	66	71	137	340	22.7	17.8	20.4	6	19	25
Lunenburg county	6,220	6,883	13,103	85	88	173	74	75	149	322	27.8	21.6	24.5	7	14	21
Lynchburg city	17,207	15,368	32,675	253	257	510	142	118	260	770	29.6	16.9	23.5	30	43	73
Madison county	6,820	3,187	10,007	74	73	147	20	25	45	192	21.5	14.1	19.1	5	4	9
Mathews county	6,579	2,548	9,127	39	42	81	25	34	59	140	12.3	23.1	15.3	4	3	7
Mecklenburg county	13,225	16,453	29,678	159	143	302	161	175	336	638	22.8	27.1	21.1	9	27	36
Middlesex county	4,376	4,666	9,042	58	54	112	55	48	103	251	25.5	20.0	23.7	1	6	7
Montgomery county	19,281	2,871	22,152	304	255	559	40	39	79	638	28.9	27.5	28.8	31	7	38
Nansemond county	11,719	16,309	28,028	92	92	184	127	137	264	448	11.8	16.1	15.9	11	14	25
Nelson county	11,905	5,140	17,045	148	141	289	53	59	112	401	24.2	21.8	23.5	10	11	21
New Kent county	1,815	2,812	4,627	24	19	43	45	24	69	112	23.6	24.5	24.2	1	1	2
Newport News city	12,978	7,398	20,376	142	126	268	42	59	101	369	20.6	13.6	18.0	2	1	3
Norfolk city	47,164	37,841	85,005	444	412	856	178	136	314	1,170	18.1	8.2	13.7	11	18	29
Norfolk county	21,452	20,476	41,928	88	76	164	70	68	138	302	7.6	6.7	7.2	3	7	10

BIRTHS—CONTINUED.

	POPULATION			BIRTHS										STILL BIRTHS AS BIRTHS		
				WHITE			BLACK			Grand Total	Rate per 1000					
	WHITE	BLACK	TOTAL	Male	Female	Total	Male	Female	Total		W	B	Total	White	Black	Total
Northampton county	7,720	9,823	17,543	60	60	120	88	104	192	312	15.5	19.5	17.7	5	10	15
Northumberland county	6,759	4,297	11,056	51	41	92	38	35	73	165	13.6	16.8	14.9	3	2	5
Nottoway county	6,460	7,331	13,791	60	47	107	44	48	92	199	16.5	12.5	14.4	2	11	13
Orange county	8,232	5,528	13,760	82	90	172	21	16	37	209	20.8	6.6	15.1	11	4	15
Page county	13,179	1,074	14,253	226	219	445	13	14	27	472	33.7	21.1	33.1	12	1	13
Patrick county	16,116	1,617	17,733	235	262	497	20	19	39	536	30.8	24.1	30.2	16	2	18
Petersburg city	13,729	11,093	24,822	170	127	297	99	139	238	535	21.6	21.4	21.5	11	17	28
Pittsylvania county	32,019	19,835	51,854	402	323	725	189	168	357	1,082	22.6	18.0	18.9	49	53	102
Portsmouth city	24,493	13,426	37,719	167	160	327	86	87	173	500	13.3	11.4	13.1	11	14	25
Powhatan county	2,503	3,378	5,881	17	25	42	58	31	89	131	16.7	26.3	22.2	1	11	12
Prince Edward county	5,968	8,064	14,032	69	66	135	114	110	224	359	22.6	25.3	25.5	2	12	14
Prince George county	3,420	4,457	7,877	36	33	69	67	71	138	207	20.1	30.9	26.2		13	13
Prince William county	9,488	2,812	12,300	113	116	229	34	33	67	296	24.1	23.8	24.0	3	2	5
Princess Anne county	5,769	5,857	11,626	81	48	129	84	63	147	276	24.0	25.0	32.	9	7	16
Pulaski county	15,199	2,838	18,037	183	206	389	11	15	26	415	25.5	9.1	23.0	14	5	19
Radford city																
Rappahannock county	5,828	1,976	7,804	80	59	139	30	21	51	190	23.8	25.8	24.3	3	2	5
Richmond city	89,303	51,098	140,401	962	917	1,879	589	620	1,209	3,088	21.0	23.6	22.0	51	100	151
Richmond county	4,400	3,113	7,513	60	43	103	49	47	96	199	23.4	30.8	26.4	3	2	5
Roanoke city	30,332	8,556	38,888	355	416	771	85	62	147	918	25.4	17.1	23.6	41	27	68
Roanoke county	18,129	2,630	20,759	232	214	446	25	44	69	515	24.6	26.2	24.8	20	6	26
Rockbridge county	20,704	3,781	24,485	235	266	501	32	46	78	579	24.6	20.6	23.6	10	5	15
Rockingham county	33,069	2,247	35,316	465	415	880	25	21	46	926	26.6	20.4	26.2	32	5	37
Russell county	24,002	1,105	25,107	425	378	803	16	14	30	833	33.4	37.1	33.1	21	1	22
Scott county	23,684	466	24,150	368	327	695	3	8	11	706	29.3	23.6	29.2	15		15
Shenandoah county	20,701	448	21,149	260	338	598	4	6	10	608	28.8	22.3	28.7	15	1	16
Smyth county	20,463	825	21,288	338	257	595	13	18	31	626	29.0	15.7	29.4	19	2	21
Southampton county	10,523	16,815	27,338	106	119	225	190	182	372	597	21.3	28.0	21.8	6	30	36
Spotsylvania county	11,313	4,947	16,260	115	86	201	38	50	88	289	18.5	17.7	17.7	5	8	13
Stafford county	6,447	1,615	8,062	67	69	136	13	29	42	178	21.1	26.0	21.9	3	5	8
Staunton city	8,922	2,677	11,599	67	59	126	16	18	34	160	14.1	12.6	13.7	4	3	7
Surry county	3,837	6,252	10,089	54	45	99	92	106	198	297	25.7	31.6	29.4	2	17	19
Sussex county	4,876	9,263	14,139	54	47	101	133	154	287	388	20.7	30.9	27.4	3	22	25
Tazewell county	22,823	2,592	25,415	366	322	688	35	48	83	771	31.1	32.0	30.3	23	7	30
Warren county	7,482	1,033	8,515	76	61	137	13	14	27	164	18.3	26.1	19.2	5	6	11
Warwick county	1,871	4,516	6,387	15	15	30	47	50	97	127	16.0	21.4	19.8	2	6	8
Washington county	37,300	3,428	40,728	494	480	974	26	26	52	1,026	26.1	15.1	25.1	32	6	38
Westmoreland county	4,727	4,610	9,334	31	42	73	29	38	67	140	15.4	14.5	14.9	1	4	5
Winchester city																
Wise county	35,385	3,130	38,515	778	809	1,587	32	35	67	1,654	44.8	21.3	43.0	54	14	68
Wythe county	18,342	2,010	20,352	277	239	516	16	23	39	555	28.1	19.3	22.3	17	6	23
York county	4,171	3,669	7,840	39	45	84	49	46	95	179	20.1	25.8	22.8	2	3	5

DEATHS.

	DEATHS			Rate per 1000			STILL BIRTHS AS DEATHS		
	White	Black	Total	W	B	Total	White	Black	Total
State total	16,508	11,983	28,491	11.4	17.7	13.4			
Accomac county	222	172	394	9.1	12.5	10.4	25	24	49
Albemarle county	294	208	502	11.6	17.4	13.5	14	7	21
Alexandria city	161	134	295	14.0	33.0	18.3	15	12	27
Alexandria county	68	46	114	7.8	17.4	10.0	5	2	7
Alleghany county	146	59	205	8.4	11.1	9.8	15	4	19
Amelia county	38	103	141	10.0	21.1	16.3	1	3	4
Amherst county	138	91	229	11.8	11.9	11.8	12	9	21
Appomattox county	21	31	52	3.5	10.9	5.9	3	2	5
Augusta county	338	75	413	11.9	12.8	13.0	15	2	17
Bath county	58	18	76	10.3	14.6	11.1	1		1
Bedford county	242	121	363	11.3	14.9	12.3	12	17	29
Bland county	54		54	8.7		12.4	3		3
Botetourt county	177	55	232	12.1	16.2	12.9	17	2	19
Bristol city									
Brunswick county	89	168	257	11.0	13.7	13.1	7	18	25
Buchanan county	179	3	182	13.6		13.6	21		21
Buckingham county	79	88	167	10.2	11.7	10.9	6	11	17
Buena Vista city									
Campbell county	120	88	208	8.4	9.9	9.2	2	5	7
Caroline county	76	87	163	9.6	10.0	9.8	6	8	14
Carroll county	206	3	209	9.6	11.8	9.1	18	3	21
Charles City county	13	24	37	9.3	6.0	6.9	2		2
Charlotte county	49	48	97	6.4	5.8	6.0	3	4	7
Charlottesville city									
Chesterfield county	207	150	357	14.2	20.0	16.1	15	16	31
Clarke county	72	30	102	13.0	16.6	13.9	2	4	6
Clifton Forge city									
Craig county	54	8	62	11.6	41.1	12.8	2		2
Culpeper county	87	58	145	10.5	11.5	10.9	6	5	11
Cumberland county	25	54	79	7.6	8.9	8.5	3	12	15
Danville city	243	165	408	17.9	26.9	20.6	27	9	36
Dickenson county	91	18	109	9.4		11.3	14		14
Dinwiddie county	60	335	395	9.7	35.9	25.5	5	10	15
Elizabeth City county	147	214	361	10.4	27.6	16.5	6	11	17
Essex county	28	49	77	7.2	8.0	8.6	3		3
Fairfax county	154	81	235	9.6	15.4	11.1	12	9	21
Fauquier county	168	91	259	11.1	12.5	11.6	11	12	23
Floyd county	121	21	142	9.3	27.3	10.3	9	2	11
Fluvanna county	48	58	106	9.7	18.2	13.0	2	4	6
Franklin county	215	74	289	10.0	14.0	10.8	10	16	26
Frederick county	247	38	285	14.5	12.4	15.2	13	1	14
Fredericksburg city									
Giles county	125	12	137	11.2	16.1	11.5	12	2	14
Gloucester county	59	71	130	8.8	12.4	10.5	3		3
Goochland county	40	101	141	9.9	19.6	15.4	1	3	4
Grayson county	210	12	222	10.5	36.0	11.0	13	2	15
Greene county	52	15	67	10.6	11.4	9.3	4	5	9
Greensville county	55	80	135	11.3	10.3	10.7	2	8	10
Halifax county	238	267	505	11.5	13.1	12.3	11	23	34
Hanover county	128	152	280	12.4	22.4	16.3	8	12	20
Henrico county	239	125	364	13.7	31.1	16.9	14	16	30
Henry county	121	114	235	10.9	15.8	12.8	4	10	14
Highland county	63	3	66	12.6	13.3	12.6	2		2
Isle of Wight county	88	120	208	11.5	15.2	13.4	1	10	11
James City county	109	70	179	31.3	23.0	27.4		1	1
King and Queen county	48	51	99	11.2	9.4	10.2	4	8	12
King George county	39	51	90	16.0	18.2	14.4		4	4
King William county	50	112	162	13.9	22.3	18.8	1	6	7
Lancaster county	46	97	143	9.6	18.6	14.3	5	6	11
Lee county	299	12	311	12.4	10.9	12.4	25		25
Loudoun county	202	73	275	12.6	14.5	13.1	7	5	12
Louisa county	104	127	231	11.5	16.5	13.9	5	13	18
Lunenburg county	74	107	181	11.8	15.5	13.8	8	6	14
Lynchburg city	310	293	603	23.2	19.0	18.4	30	45	75
Madison county	49	38	87	7.1	11.9	8.6	6	3	9
Mathews county	64	36	100	9.7	14.1	10.9	2	2	4
Mecklenburg county	136	242	378	10.2	14.7	12.7	9	18	27
Middlesex county	29	73	104	6.6	15.6	11.2	1	3	4
Montgomery county	216	54	270	11.2	18.8	12.1	26	7	33

DEATHS—CONTINUED.

	DEATHS			Rate per 1000			STILL BIRTHS AS DEATHS		
	White	Black	Total	W	B	Total	White	Black	Total
Nansemond county	141	194	335	12.0	11.9	11.9	10	8	18
Nelson county	99	69	168	8.3	13.4	9.8	10	13	23
New Kent county	11	47	58	6.0	16.7	12.5	-------	1	1
Newport News city	184	162	346	14.1	20.0	16.9	1	4	5
Norfolk city	744	917	1,661	15.7	24.2	19.6	37	121	158
Norfolk county	180	281	461	8.3	13.7	11.0	8	10	18
Northampton county	45	119	164	5.8	12.0	9.3	2	8	10
Northumberland county	62	54	116	9.1	12.5	10.4	4	2	6
Nottoway county	64	64	128	9.9	8.7	9.2	6	7	13
Orange county	75	51	126	9.1	9.1	9.1	10	1	11
Page county	155	22	177	11.7	21.4	12.4	12	3	15
Patrick county	133	12	145	8.2	6.8	8.1	14	2	16
Petersburg city	214	365	579	15.5	32.9	23.3	22	37	59
Pittsylvania county	277	269	546	8.6	13.5	10.5	40	18	58
Portsmouth city	260	297	557	10.6	22.1	14.6	32	47	79
Powhatan county	16	75	91	6.3	22.2	15.4	-------	4	4
Prince Edward county	75	169	244	12.5	20.9	17.3	-------	10	10
Prince George county	35	87	122	10.2	19.5	15.4	-------	13	13
Prince William county	113	38	151	14.0	13.5	12.7	4	2	6
Princess Anne county	62	135	197	10.7	23.0	18.1	8	8	16
Pulaski county	133	34	167	8.7	12.3	9.2	15	2	17
Radford city									
Rappahannock county	41	27	68	7.0	13.6	8.7	2	1	3
Richmond city	1,419	1,418	2,837	15.8	29.7	21.2	83	186	269
Richmond county	41	39	80	9.2	12.5	10.6	3	1	4
Roanoke city	353	194	547	11.6	22.6	14.0	41	26	67
Roanoke county	223	103	326	12.2	39.1	15.6	17	3	20
Rockbridge county	218	58	276	10.5	15.3	11.2	10	3	13
Rockingham county	356	47	403	10.7	20.9	11.4	33	5	38
Russell county	202	24	226	8.4	21.7	9.0	16	1	17
Scott county	210	13	223	8.8	27.8	9.2	13	-------	13
Shenandoah county	251	9	260	12.1	20.0	12.2	8	-------	8
Smyth county	274	11	285	13.3	13.3	13.3	18	2	20
Southampton county	110	233	343	10.4	13.8	12.1	7	12	19
Spotsylvania county	112	78	190	9.9	15.7	11.6	6	5	11
Stafford county	60	23	83	10.8	14.2	10.2	2	3	5
Staunton city	220	44	264	24.6	16.4	22.7	5	4	9
Surry county	37	86	123	9.6	13.7	12.1	1	17	18
Sussex county	57	133	190	11.6	14.3	13.4	4	17	21
Tazewell county	182	56	238	7.9	21.6	9.3	18	6	24
Warren county	84	23	107	17.5	22.2	12.5	7	1	8
Warwick county	27	90	117	14.4	19.9	18.3	2	8	10
Washington county	382	57	439	10.2	13.6	10.7	28	7	35
Westmoreland county	36	34	70	7.6	7.3	7.4	2	2	4
Winchester city									
Wise county	382	58	440	10.8	18.5	11.4	56	7	63
Wythe county	168	27	195	9.1	13.4	9.5	20	3	23
York county	48	63	111	11.5	17.1	14.1	2	2	4

NUMBER OF DEATHS

From Specific Causes and for Certain Ages in the Various Geographical Division Reports of Virginia, July 1, 1912-June 30, 1913.

COUNTY OR CITY	Tuberculosis of Lungs.			Tuberculosis of Other Parts.			Typhoid.	Diphtheria; Croup.	Pellagra.	Scarlet Fever.	Measles.	Whooping Cough.	Pneumonia Broncho-pneumonia.	Diarrhea; enteritis under 2 years.	Cerebro-Spinal Meningitis.	Acute Enterior Poliomy Elitis.	Influenza.	Puerperal Septicemia.	Cancer.	Homicide.	Suicide.	Accidents.	Smallpox.	Other causes.	Infants under 1 year.	Children aged 1 and 4 years.	Aged 65 and over.
	W	B	T	W	B	T																					
Accomac county	27	24	51	2	...	2	12	4	...	...	...	1	35	31	1	1	3	1	20	4	3	16	...	207	86	23	96
Albemarle county	20	26	46	5	4	9	13	3	2	1	3	1	44	17	6	1	...	...	24	3	4	24	...	301	73	30	143
Alexandria city	12	16	28	2	...	2	6	5	1	...	...	4	25	25	1	...	1	...	15	...	1	13	...	171	51	22	62
Alexandria county	6	8	14	...	...	...	3	...	1	...	1	1	12	7	...	...	1	...	3	1	1	3	...	62	24	5	22
Alleghany county	10	9	19	1	2	3	2	3	...	...	...	3	16	10	2	...	2	2	7	...	1	16	...	110	39	21	38
Amelia county	3	17	20	...	1	1	1	...	...	...	3	...	11	5	...	...	1	...	1	...	1	4	...	93	44	8	37
Amherst county	10	15	25	2	3	5	6	7	3	...	1	5	11	7	1	...	2	...	4	2	3	10	...	138	40	23	59
Appomattox county	2	4	6	...	1	1	...	...	...	...	1	2	3	1	...	...	1	...	5	...	...	...	...	31	10	4	12
Augusta county	32	21	53	1	...	1	7	6	2	...	11	1	36	25	1	...	1	2	14	4	4	8	...	245	77	39	151
Bath county	6	3	9	2	...	2	1	1	...	...	...	...	3	1	...	...	1	...	5	...	...	3	...	50	10	...	23
Bedford county	23	17	40	2	1	3	7	5	3	...	9	8	24	13	3	1	3	2	12	3	3	19	...	206	63	27	115
Bland county	1	...	1	1	...	1	1	...	...	...	...	1	11	3	2	...	...	1	3	...	...	2	...	27	20	5	8
Botetourt county	20	8	28	1	6	7	1	2	...	...	1	1	27	13	1	...	7	2	6	1	2	9	...	124	62	17	78
Brunswick county	2	19	21	...	1	1	7	...	1	...	2	1	10	5	...	1	2	2	8	...	2	10	...	184	72	14	62
Buchanan county	11	1	12	4	...	4	10	5	...	...	12	2	6	3	...	3	2	1	1	4	...	13	...	104	52	19	25
Buckingham county	1	12	13	...	2	2	2	2	...	...	1	2	7	4	...	...	2	...	2	...	...	10	...	120	21	18	53
Campbell county	9	14	23	2	2	4	4	3	1	...	...	1	13	19	...	2	5	1	4	3	2	12	...	110	27	11	54
Caroline county	9	15	24	1	3	4	6	...	...	...	8	...	9	8	...	1	1	...	8	1	...	6	...	87	33	12	51
Carroll county	18	...	18	4	...	4	4	1	...	...	4	1	18	11	...	...	3	1	7	...	1	9	1	126	49	20	54
Charles City county	6	6	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	...	1	...	1	...	24	4	3	8
Charlotte county	3	6	9	1	...	1	...	3	...	...	...	9	4	...	...	...	1	...	7	1	...	5	...	57	16	9	31
Chesterfield county	33	20	53	3	6	9	7	...	...	...	2	2	32	22	...	...	1	2	10	4	2	13	...	198	62	27	68
Clarke county	5	7	12	...	...	...	1	1	...	...	3	...	7	3	...	...	...	1	2	...	1	3	...	68	24	7	33
Craig county	4	1	5	1	...	1	1	1	...	1	...	1	6	2	...	...	1	...	2	...	...	3	...	37	7	6	12
Culpeper county	3	8	11	...	...	...	4	...	...	...	...	1	9	3	...	...	2	1	9	...	...	7	...	96	35	5	55
Cumberland county	5	13	18	...	2	2	1	1	1	...	...	...	4	1	...	...	...	1	...	...	...	1	...	70	14	7	31
Danville city	25	13	38	3	2	5	7	1	9	1	4	...	36	32	4	...	1	2	15	3	3	26	...	219	75	35	55
Dickenson county	3	2	5	2	...	2	1	1	...	...	5	...	8	4	2	...	...	...	3	13	1	16	...	44	26	15	10
Dinwiddie county	3	45	48	1	2	3	3	...	13	...	3	...	2	7	7	1	...	2	2	6	1	9	...	287	49	18	89
Elizabeth City county	16	20	36	1	2	3	5	4	5	1	4	1	25	22	...	...	...	1	7	5	3	9	...	230	58	21	71
Essex county	...	11	11	...	1	1	2	...	1	...	...	...	4	5	...	...	...	...	3	...	...	3	...	46	23	3	24
Fairfax county	14	17	31	1	1	2	3	2	...	1	1	13	16	12	1	...	4	1	12	1	2	2	...	131	48	19	70
Fauquier county	13	17	30	2	2	4	7	...	1	...	1	5	19	11	3	...	3	...	8	1	...	11	...	155	36	18	104
Floyd county	6	1	7	2	1	3	2	...	1	...	1	...	14	5	2	...	9	2	5	3	...	7	...	81	29	5	32
Fluvanna county	3	12	15	1	1	2	...	...	1	...	3	2	3	2	...	...	...	...	4	1	...	3	...	70	14	8	41

	Tuberculosis of Lungs.			Tuberculosis of Other Parts.			Typhoid.	Diphtheria; Croup.	Pellagra.	Scarlet Fever.	Measles.	Whooping Cough.	Pneumonia Broncho-pneumonia.	Diarrhea; enteritis under 2 years.	Cerebro-Spinal Meningitis.	Acute Enterior Poliomy Elitis.	Influenza.	Puerperal Septicemia.	Cancer.	Homicide.	Suicide.	Accidents.	Smallpox.	Other causes.	Infants under 1 year.	Children aged 1 and 4 years.	Aged 65 and over.
	W	B	T	W	B	T																				
Franklin county	30	15	45	4	----	4	5	5	----	----	2	2	25	3	----	1	2	----	12	2	----	15	----	165	44	16	104
Frederick county	15	4	19	4	----	4	1	----	----	1	5	1	12	8	1	3	5	1	19	2	1	8	----	194	32	15	104
Giles county	9	1	10	1	----	1	6	1	----	----	7	----	10	7	----	1	3	----	5	----	2	4	----	79	36	11	36
Gloucester county	2	10	12	----	----	----	2	----	----	----	----	----	8	7	----	----	----	----	5	1	----	----	----	89	20	8	45
Goochland county	4	22	26	----	----	----	----	----	----	----	2	----	8	5	1	----	----	----	4	----	1	4	----	92	29	3	37
Grayson county	15	3	18	2	----	2	5	9	----	1	4	3	24	2	1	----	1	2	2	----	----	----	----	134	67	30	52
Greene county	3	1	4	1	----	1	----	1	----	----	2	----	4	2	----	----	2	2	2	----	----	3	----	43	13	7	25
Greensville county	2	10	12	----	----	----	7	1	1	----	----	2	11	5	----	2	----	----	2	2	----	5	----	95	31	15	20
Halifax county	22	38	60	5	3	8	6	4	4	----	26	6	30	20	1	2	1	2	14	1	1	8	1	295	101	49	115
Hanover county	10	22	32	2	4	6	1	1	1	1	4	----	20	16	2	1	3	2	8	2	----	18	----	172	59	24	76
Henrico county	49	13	62	3	4	7	4	1	2	2	5	14	31	27	----	4	1	1	10	1	1	15	----	184	65	24	73
Henry county	13	22	35	1	2	3	10	4	----	----	----	----	22	8	----	1	----	----	14	----	----	----	----	110	34	27	65
Highland county	5	----	5	----	1	1	----	2	----	----	2	----	4	7	1	----	----	----	1	----	----	3	----	40	12	7	23
Isle of Wight county	1	24	25	----	2	2	11	5	----	----	----	----	13	11	1	----	----	----	5	----	----	----	----	125	45	10	44
James City county	14	16	30	1	1	2	1	----	5	----	----	----	7	1	----	1	2	----	4	----	----	5	----	121	9	2	49
King and Queen county	4	8	12	----	2	2	----	1	----	----	2	----	3	9	1	----	----	----	5	----	----	3	----	61	17	4	40
King George county	5	13	18	1	1	2	----	----	----	----	----	----	6	9	----	----	----	----	3	1	1	1	----	50	16	8	33
King William county	3	19	22	----	2	2	----	----	----	----	----	----	15	2	----	----	----	2	1	1	----	5	----	108	29	14	37
Lancaster county	1	14	15	1	----	1	2	8	----	----	2	1	11	7	----	----	1	----	2	1	1	1	----	86	39	6	24
Lee county	36	1	37	6	----	6	14	13	1	2	1	10	17	21	----	1	2	2	4	5	1	13	----	160	97	34	51
Loudoun county	12	5	17	1	----	1	6	3	----	----	7	6	29	13	4	----	----	----	9	----	2	9	----	169	39	16	118
Louisa county	9	24	33	2	----	2	2	2	1	----	3	----	9	5	----	1	3	----	10	1	----	9	----	150	40	12	71
Lunenburg county	4	20	24	----	----	----	2	3	1	----	1	1	9	3	----	1	----	----	6	3	1	7	----	118	37	10	40
Lynchburg city	25	37	62	7	5	12	8	3	10	2	6	7	44	44	----	----	3	4	19	3	3	26	----	367	128	50	120
Madison county	5	10	15	----	1	1	1	----	----	1	1	1	13	5	----	----	2	----	2	----	----	1	----	48	12	9	28
Mathews county	4	9	13	----	----	----	----	2	1	----	----	----	4	2	----	----	----	----	2	----	----	2	----	68	5	5	35
Mecklenburg county	10	47	57	1	----	1	4	4	1	1	14	2	24	7	2	1	2	1	13	----	----	8	----	236	60	28	93
Middlesex county	6	14	20	1	----	1	3	----	----	----	1	----	6	2	----	----	1	1	----	3	1	2	----	61	23	5	19
Montgomery county	25	6	31	1	3	4	3	----	----	----	4	----	26	13	----	1	1	2	7	1	----	9	----	168	56	16	78
Nansemond county	13	26	39	1	4	5	5	1	1	----	1	2	21	30	----	----	1	1	8	2	----	13	----	205	76	27	65
Nelson county	4	10	14	3	2	5	6	----	----	----	1	4	9	3	----	----	1	1	3	1	----	8	----	105	35	22	50
New Kent county	----	3	3	----	1	1	----	----	----	----	2	----	6	3	----	----	----	----	----	----	----	3	----	41	14	5	11
Newport News city	21	30	51	3	1	4	6	1	1	2	3	----	15	18	1	----	2	1	8	4	5	----	----	183	64	18	34
Norfolk city	55	117	172	18	10	28	23	5	12	----	9	5	138	93	3	----	4	5	56	13	8	82	----	1005	309	63	230
Norfolk county	6	26	32	----	4	4	8	2	5	1	1	7	45	40	1	----	2	1	14	7	----	35	----	256	90	35	70

Northampton county	1	9	10	----	----	2	1	----	----	2	----	3	8	14	----	----	3	----	2	3	----	7	----	112	36	9	47
Northumberland county	4	11	15	----	----	2	3	1	----	----	----	4	4	8	----	----	1	----	5	----	2	21	----	55	23	9	19
Nottoway county	5	9	14	----	----	1	----	----	----	1	----	3	3	10	1	----	2	----	7	1	----	6	----	78	20	10	40
Orange county	1	5	6	----	----	----	1	1	----	2	----	13	5	11	----	----	----	----	8	----	1	4	----	81	15	6	48
Page county	15	6	21	1	1	2	5	1	1	----	----	13	7	11	----	1	2	----	7	1	----	5	----	105	36	9	65
Patrick county	15	1	16	2	----	2	----	1	1	3	----	7	9	7	1	----	3	----	5	2	----	3	----	86	38	9	43
Petersburg city	24	34	58	5	10	10	1	4	----	----	7	43	58	----	----	1	8	3	13	5	5	11	----	343	123	33	92
Pittsylvania county	26	41	67	5	3	8	11	3	4	----	16	2	49	30	5	4	4	1	12	5	1	25	----	299	110	52	107
Portsmouth city	17	29	46	7	4	11	10	4	2	----	----	5	66	37	1	3	8	----	19	7	4	19	----	315	96	31	73
Powhatan county		8	8	----	----	----	1	----	----	----	2	----	8	5	----	2	----	----	4	2	----	4	----	52	19	2	20
Prince Edward county	10	23	33	2	2	4	2	----	----	1	5	2	26	7	----	1	1	----	10	----	----	1	----	135	53	12	57
Prince George county	4	18	22	2	2	2	3	1	----	----	----	2	5	6	----	----	2	----	2	----	----	1	----	66	33	8	21
Prince William county	12	9	21	1	----	1	1	----	----	2	----	2	8	4	----	----	----	----	5	----	----	1	----	99	27	7	44
Princess Anne county	11	29	40	----	2	1	8	1	2	----	----	15	7	15	----	1	1	----	2	----	----	2	----	119	29	14	43
Pulaski county	10	6	16	1	----	1	2	3	----	----	10	----	12	11	1	2	1	----	6	----	----	10	----	92	32	17	40
Rappahannock county	4	3	7	----	----	----	----	1	----	----	3	----	5	1	----	----	2	----	2	----	----	----	----	43	15	----	28
Richmond city	89	155	244	20	18	38	26	1	7	9	2	19	4	228	151	6	2	26	12	114	35	25	110	1759	524	161	518
Richmond county	4	2	6	----	1	1	----	----	----	2	----	----	1	4	----	----	----	----	----	2	----	----	----	55	19	4	22
Roanoke city	31	31	62	9	2	11	9	3	3	3	----	6	45	39	2	----	12	4	20	6	6	22	----	295	123	39	70
Roanoke county	40	27	67	6	----	6	8	2	2	1	3	1	28	19	----	----	7	3	15	4	1	19	----	139	51	15	71
Rockbridge county	18	20	38	4	----	4	4	8	1	2	5	----	21	7	1	----	2	1	9	2	1	15	----	154	50	23	76
Rockingham county	41	10	51	6	1	7	3	3	----	----	3	1	24	14	2	4	6	3	27	1	1	5	----	248	64	21	147
Russell county	9	3	12	2	----	2	3	8	----	1	----	2	16	11	----	2	4	3	5	9	----	39	----	129	63	19	49
Scott county	27	6	33	3	----	3	4	10	1	1	2	9	22	13	2	----	4	1	11	5	1	3	----	102	51	35	48
Shenandoah county	26	2	28	7	----	7	7	4	----	----	2	1	17	11	1	----	----	----	6	----	----	5	----	171	35	19	114
Smyth county	27	3	30	----	----	----	7	3	5	----	5	7	25	4	3	1	3	----	11	1	----	13	----	168	63	14	68
Southampton county	13	29	42	1	3	4	12	5	3	----	2	----	11	18	----	1	1	2	5	1	----	8	----	228	80	36	61
Spotsylvania county	12	17	29	----	----	----	----	1	1	----	----	----	1	7	1	----	1	1	7	4	----	3	----	133	35	9	58
Stafford county	5	5	10	1	----	1	2	----	----	----	1	1	5	6	----	1	1	----	4	----	1	6	----	44	20	2	34
Staunton city	15	4	19	1	1	2	2	----	3	----	----	----	34	5	----	----	----	----	10	----	3	6	----	180	22	7	91
Surry county	2	16	18	----	----	----	6	----	1	----	----	----	5	9	----	----	----	----	6	1	----	8	----	68	26	9	29
Sussex county	7	22	29	1	1	2	1	1	----	----	----	2	9	8	----	----	3	1	6	3	----	12	----	113	45	11	39
Tazewell county	9	8	17	2	2	4	7	6	1	----	----	----	20	13	2	1	2	1	9	3	----	26	----	125	57	15	46
Warren county	5	1	6	2	----	2	14	1	1	----	----	2	10	4	----	1	2	----	5	----	----	5	----	55	14	11	35
Warwick county	5	13	18	----	----	----	4	1	1	----	----	----	8	7	----	----	1	----	2	1	----	2	1	61	28	11	8
Washington county	31	10	41	10	1	11	18	7	2	3	1	27	33	21	1	----	7	----	13	3	2	17	----	232	94	53	109
Westmoreland county	3	6	9	----	2	2	3	----	----	----	2	----	5	----	----	----	----	2	1	2	----	5	----	38	10	3	16
Wise county	24	5	29	7	2	9	13	13	----	3	5	8	34	40	4	2	3	4	7	11	----	47	----	208	143	60	43
Wythe county	15	10	25	1	----	1	4	3	----	1	9	----	22	15	1	----	----	----	6	----	4	7	----	97	38	23	48
York county	4	7	11	1	----	2	6	2	----	----	1	----	2	3	----	----	----	----	4	2	----	4	----	66	18	11	27
Total	1423	1720	3143	226	151	377	518	256	145	38	310	232	2115	1450	98	63	245	109	930	245	134	1265	3	16768	5469	1999	6506

APPENDIX SEVEN.

Report of the Resident Physician of the Catawba Sanatorium.

Prepared in accordance with the suggestions of the National Association for the Study and Prevention of Tuberculosis.

JOHN J. LLOYD, JR., M. D.,

Resident Physician.

INTRODUCTION.

During the past twelve months there have been 477 applications received for admission to the Sanatorium. Of this number 23 were rejected by our examining physicians; 41 withdrew their applications for various reasons, prominent among which was the necessarily long waiting period before they could be admitted owing to the number of applicants during the entire year; 9 died before their names were reached on the waiting list; 39 were dropped from the waiting list owing to failure to respond to letters of notification when their names were reached on the waiting list; 240 were approved for admission and admitted to the sanatorium; and there are remaining on the waiting list at the close of the year 125.

Number of patients treated during the year	340
Number of patients in sanatorium September 30	117
Number of patients to be reported on	223
Of these 223 patients, there were apparently arrested	3
Quiescent	62
Improved	104
Progressive	48
Died	5
Non-tuberculous or doubtful	1

TABLE I.

Class 1.—Patients Who Remained Less Than Three Months.

CONDITION ON ADMISSION	Non. T. B.	App. Arrest.	Quies-cent.	Im-proved	Pro-gressive	Died
Incipient.....11 or 16%	.....	.....	2.	7.	2.	.....
Mod. Advanced.....15 or 21%	.....	.....	1.	12.	2.	.....
Far Advanced.....44 or 63%	.....	.....	.....	29.	13.	2.
Non T. B..... 1						
Total.....71	1.	.....	3.	48.	17.	2

ERRATA.

Table Class 2 at bottom of page 114 should be as follows:

Class 2.—Patients Who Remained Three Months or Longer.

CONDITION ON ADMISSION	App. Arrest.	Quies-cent.	Im-proved	Pro-gres've	Died
Incipient.....25 or 16%	2	18	4	1	.....
Mod. Advanced.....29 or 19%	1	17	9	2	.....
Far Advanced.....98 or 65%	.....	24	43	28	8
Total.....152	3	59	56	31	8

TABLE II.

CLASS I.

Effect of Treatment on Prominent Symptoms.

Patients Who Remained Less than Three Months.

Average Stay 55 Days—Longest Stay 87 Days—Shortest Stay 6 Days	On Admission	On Discharge	Previous	During Residence	Average Gain	Average Loss
Number patients whose expectoration contained Bacilli	63.	60.	57.			
Number patients who had either no Bacilli or no Sputum	8.	11.	14.			
Number patients who had Hemorrhage				8.		
Number patients who had no Hemorrhage				63.		
Number patients who gained weight				52.	9.	
Number patients who lost weight				12.		5.
Number patients who were stationary				2.		
Number patients not weighed				5.		
Number patients who died				2.		
Total number of patients reported on in this table 71						

CLASS II.

Effect of Treatment on Prominent Symptons.

Patients Who Remained Three Months or More.

Average Stay 218 Days—Longest Stay 551 Days—Shortest Stay 90 Days	On Admission	On Discharge	Previous	During Residence	Average Gain	Average Loss
Number patients whose expectoration contained Bacilli	139.	112.	141.			
Number patients who had either no Bacilli or no Sputum	13.	40.	11.			
Number patients who had Hemorrhage				30.		
Number patients who had no Hemorrhage				122.		
Number patients who gained weight				119.	12.	
Number patients who lost weight				24.		9.
Number patients who were stationary				5.		
Number patients not weighed				4.		
Number patients who died				3.		
Total number patients reported on in this table 152						

TABLE III.

Summary.

Extent of physical signs according to Turban	T. B. found at any time	Hygienic-dietetic treatment with tuberculin. Patients who stayed over 90 days. Average residence 202 days					
		Cases	App. Arrest.	Quiescent.	Improved	Progressive	Died
Incipient I	Pos. 4			3	1		
Incipient I	Neg. 2	6	1	1			
Mod. advanced I	Pos.						
Mod. advanced II	Pos. 7	9		4	3		
Mod. advanced II	Neg. 2					2	
Mod. advanced III	Pos.						
Far advanced III	Pos. 36			12	14	10	
Far advanced III	Neg.						
Total		51	1	20	20	10	0

TABLE III—CONTINUED.

Extent of physical signs according to Turban	T. B. found at any time	Hygienic-dietetic treatment without tuberculin. Patients who stayed over 90 days. Average residence 250 days					
		Cases	App. Arrest.	Quiescent.	Improved	Progressive	Died
Incipient I	Pos. 13	19	1	9	2	1	
Incipient I	Neg. 6			5	1		
Mod. advanced I							
Mod. advanced I							
Mod. advanced II	Pos. 21	21	1	13	5	2	
Mod. advanced II	Neg.						
Mod. advanced III							
Mod. advanced III							
Far advanced III	Pos. 61	61		12	29	16	4
Far advanced III	Neg.						
Total		101	2	39	37	19	4

TABLE IV.

Geographical Distribution by Counties.

Accomac	2	Halifax	3
Amelia	2	Isle of Wight	1
Albemarle	4	Louisa	1
Alexandria	1	Loudoun	3
Alleghany	1	Lee	3
Amherst	1	Mathews	1
Augusta	3	Mecklenburg	1
Bedford	4	Middlesex	1
Botetourt	3	Montgomery	2
Buchanan	1	Northumberland	1
Brunswick	1	Norfolk	15
Campbell	13	Nottoway	2
Clarke	1	Nelson	2
Charlotte	1	Prince George	1
Craig	1	Page	2
Cumberland	1	Pittsylvania	12
Caroline	1	Pulaski	3
Culpeper	3	Richmond	1
Dinwiddie	3	Rappahannock	1
Elizabeth City	3	Roanoke	17
Franklin	3	Rockbridge	2
Floyd	1	Spotsylvania	2
Fairfax	1	Southampton	3
Fauquier	3	Surry	1
Goochland	4	Scott	1
Grayson	3	Smyth	3
Giles	1	Warwick	3
Gloucester	1	Washington	8
Hanover	4	Wise	2
Henrico	45	Wythe	2
Henry	2	York	1
		Total	223

TABLE V.

Occupation of Patients.

Accountant	1	Lawyer	1
Bookkeeper	5	Laborer	1
Brickmason	1	Machinist	2
Brakeman	1	Merchants	8
Broom Maker	1	Motorman	1
Civil Engineer	2	Nurses	5
Carpenter	2	None	12
Conductor	1	Operators	3
Cashier	1	Physicians	5
Clerks	21	Plumbers	3
Driver	1	Real Estate Agent	1
Druggist	2	Salesman	9
Dressmakers	3	Saleslady	2
Electricians	2	Students	15
Farmers	17	Steam Fitter	1
Foreman	2	Saw Mill	3
Fisherman	1	Social Work	1
Factory	4	Stenographers	8
Glass Blower	1	Tinner	1
Hotel Clerk	1	Teachers	10
Housewife	38	Undertaker	1
Housework	11	Railroad	3
Insurance Agent	2	Tobacconist	5
Junk Dealer	1	Total	223

TABLE VI.

Average age of patients	29
Average age of female patients	27
Average age of male patients	31

TABLE VII.

Part I.

After-Results of Treatment—Tuberculin.

Condition April 1, 1913, of all Patients Discharged from the Sanatorium Six Months or More

ADMISSION	No.	DISCHARGE	App. Arrested.	Quiescent.	Improved.	Stationary.	Progressive.	Died.	Lost.
Incipient.		App. Arrested							
31	13	Quiescent		8		1	1		3
	18	Improved		2	11		2		3
		Progressive							
Mod. Advanced.	2	App. Arrested	1						1
41	10	Quiescent		7			2		1
	28	Improved		2	15		3	2	6
	1	Progressive							1
Far Advanced.		App. Arrested							
31	6	Quiescent		4				1	1
	15	Improved			6	1	4	1	3
	10	Progressive			3		1	3	3
Total	103		1	23	35	2	13	7	22

TABLE VII.

PART II.

AFTER-RESULTS OF TREATMENT.

Condition April 1, 1918, of all Patients Discharged from the Sanatorium Six Months or More Without Tuberculin.

ADMISSION	No.	DISCHARGE	App. Arrested.	Quiescent.	Improved.	Stationary.	Progressive.	Died.	Lost.
Incipient. 118	16	App. Arrested	10						6
	31	Quiescent		15		1	2	2	11
	64	Improved	2		39		2	4	17
	7	Progressive						1	6
Mod. Advanced. 263	5	App. Arrested	2				1	1	1
	39	Quiescent		21			2	10	6
	173	Improved	1		76	2	13	48	33
	41	Progressive			5		6	22	8
	5	Died						5	
Far Advanced. 257	2	App. Arrested						1	1
	13	Quiescent		4				5	4
	133	Improved			37	3	13	54	26
	89	Progressive			10		5	60	14
	20	Died						20	
Total	638		15	40	167	6	44	233	133

In tabulating the results shown above, we have been most conservative and where any doubt whatever existed as to the condition of the patient on discharge the doubt was counted as against the sanatorium in each instance. This was deemed advisable, as statistics to be of any value in the future must be conservative as well as accurate.

We should like to call attention to a few features of the above tables which seem deserving of especial mention.

1. The number of incipient cases discharged shows a considerable increase over past years. This would seemingly argue well for the future as showing the increased number of early diagnosis made by physicians in the State and also the fact that the general public is becoming aroused to the necessity of early treatment if lasting results are to be obtained. The much better showing in respect to the condition on discharge of the incipient cases, as against the advanced, is self-evident in Tables I and III.

2. The addition of a second assistant has enabled us to devote more time to the educational features of sanatorium life. As a result of this, presumably, the average length of residence in the sanatorium has been decidedly lengthened.

As will be readily observed from Table I, the result obtained in patients remaining longer than three months far surpasses those obtained in patients remaining a shorter time.

3. As will be seen from Table II the weight-gain is satisfactory in both classes of patients. The number of hemorrhage cases this year is considerably lessened by reason of the fact that more complete rest is enforced while active symptoms are present.

4. The result of cases treated with and without tuberculin as shown in Table VII, is almost identical, but as will be seen, many more advanced cases were treated with tuberculin than without.

Very few patients are advised to take tuberculin unless a local process is present, but the choice is left with the patient himself so far as this is possible.

5. Thirty-eight counties of the State have not been represented by patients in the sanatorium and the small number from many other counties would seem to show that the educational work in the State needs vigorous campaigning in regard to tuberculosis.

6. Table V emphasizes the frequency of tuberculosis in all occupations and Table VI strikingly shows its occurrence in the years which should be of greatest usefulness and accomplishment.

7. It has been impossible to trace all former patients owing to lack of proper address, but we have succeeded much better this year than last and hope to have a more complete report next year.

During the past twelve months we have used artificial pneumothorax in seventeen cases. Of these only three have been discharged and in only one of these were we successful in completely compressing the lung. Those at present under treatment will be reported after discharge, but we feel much encouraged by the results thus far obtained and we expect to continue its use in the future.

We have been enabled through the help of the laboratory of the board, which has prepared the vaccine for us, to try autogenous vaccines in certain cases. The result of this line of investigation cannot yet be tabulated, as we have tried it in too few cases for our statistics to be of value. We wish however at this time to express our thanks to Dr. Ferguson for his help in this as well as in many other acts of courtesy shown us.

The overhauling of the old hotel building with the installation of an adequate system of heating has converted it into a splendid nurses' home. This has added very materially to the comfort of the nurses and consequently to their efficiency. Our Training School for Nurses continues to be a source of satisfaction and thus far has proven an ideal solution of the vexing question of proper nursing for tuberculous patients.

We have at times been compelled to employ general graduate nurses, but we are forced to this at longer intervals than formerly and we now have a number of applicants awaiting an opening to enter the training school.

Our graduate nurses are finding other work to do in private nursing, in district tuberculosis work and also in other sanatoria. The demand for tuberculosis nurses in the South is an increasing one and at the present rate the supply will not meet the demand for some years.

The installation of electric power and lights, the addition to the kitchen already complete, and the two additional rooms to the office building have made our plant much more complete. The forty-bed infirmary now nearing completion is a beautiful building, will fill a much needed want in treating those cases confined to bed, and will place Catawba Sanatorium among the best equipped institutions in this country.

Observation of advanced cases treated here for the past two and one-half years has convinced us that the distance from the railroad renders Catawba Sanatorium unsuitable for the care of this class of cases, however ideal it may be for incipients. The trip necessary to reach the sanatorium is a hard one, and, in the case of those already prostrated by advanced tuberculosis, has in several instances undoubtedly done positive harm. The occurrence of hemorrhage shortly after admission in patients who previously have had no hemorrhage would seem to argue that the trip was directly responsible.

There have been instances of patients who have arrived in a hopelessly advanced condition, but whom we have been compelled to allow to remain lest the roughness of the return trip should hasten the end.

The erection of a reception hospital located on the railroad would obviate such a condition. Here all cases could be admitted and after observation sent on to Catawba Sanatorium if suitably early, while the advanced cases retained in the reception hospital so far as capacity permitted. Classification would thus be possible and a magnificent means of educating and diagnosing cases would be afforded us.

The opening of the infirmary here will in nowise alter the situation, for in treating 161 patients—our capacity including the infirmary—there will be certainly 40 who must be kept in bed.

The rapidly increasing number of cases desiring sanatorium treatment—125 being on the waiting list at the present writing—shows the need in the near future of greater capacity for treating and educating the tuberculous. A reception hospital would certainly help solve this problem.

We receive frequent inquiries in regard to admitting negroes and as there is no provision for the negro tuberculous, and as tuberculosis is making such frightful inroads on this race, there is a most urgent necessity for provisions for them at the earliest possible moment. The negro as a source of infection can hardly be overestimated, to say nothing of the fact that as a human being, he deserves treatment.

Through the generosity of those friends mentioned in the list appended hereto the pleasure of the patients has been greatly enhanced. We wish publicly to express our appreciation of the kindness of these friends.

In conclusion, the resident physician wishes to express to the State Board of Health his thanks for their encouragement and help in the work here and also to each member of the sanatorium staff his hearty appreciation of their constant support and assistance in forwarding the work.

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We wish to express our appreciation for gifts to the sanatorium received during the past year from the following:

Judge W. W. Moffett
Mrs. Max Guggenheimer
Mrs. H. C. Boudar
Mrs. John Murphy
Capt. Philip Brown
St. Johns Church (Roanoke)
St. Pauls Church (Petersburg)
Mrs. S. T. A. Kent
Miller & Rhoads
Members Union Station S. S. (Richmond)
Wm. M. Dunford
W. M. Bickers
J. H. Brillhart
John Hearon
Miss Ruby Mcghee
G. L. Fitzpatrick
Frank O'Brien
J. W. Hancock
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W. W. Hardwicke
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Mrs. J. S. Brauer
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Miss Alice O'Brien
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T. J. Tuder
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Chas. E. Straus, Jr.	Catherine Horseley	Mrs. A. W. Gibbs
J. E. West	J. T. Wilson	N. & W. R. R. Co.
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Friends through W. G. Duckhardt.
Ray of Sunshine Circle of Kings Daughters, Richmond.
Friends of Mrs. E. C. Brauer.
St. Johns Circle of Kings Daughters, Richmond.
The Ministers of Salem and Roanoke.

DEFINITION OF TERMS USED IN REPORT.

Adopted by National Association for Study and Prevention of Tuberculosis, May, 1913.

Classification of Patients on Examination.

The following definitions indicate the furthest extent of disease and the greatest severity of symptoms that a patient can present and still belong to the stage defined. All patients beyond the incipient stage fall under the moderately advanced stage, unless the physical signs and the symptoms exceed those of the moderately advanced stage, when they should be classified as far advanced.

Incipient.

Slight or no constitutional symptoms (including particularly gastric or intestinal disturbance, or rapid loss of weight); slight or no elevation of temperature or acceleration of pulse at any time during the twenty-four hours.

Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent.

Slight infiltration limited to the apex of one or both lungs, or a small part of one lobe.

No tuberculous complications.

Moderately Advanced.

No marked impairment of function, either local or constitutional.

Marked infiltration more extensive than under incipient, with little or no evidence of cavity formation.

No serious tuberculous complications.

Far Advanced.

Marked impairment of function, local and constitutional.

Extensive localized infiltration or consolidation in one or more lobes.

Or disseminated areas of cavity formation.

Or serious tuberculous complications.

Acute Miliary Tuberculosis.

CLASSIFICATION OF SUBSEQUENT OBSERVATIONS.

Apparently Cured.

All constitutional symptoms and expectoration with bacilli absent for a period of two years under ordinary conditions of life.

Arrested.

All constitutional symptoms and expectoration with bacilli absent for a period of six months; the physical signs to be those of a healed lesion.

Apparently Arrested.

Same as above, but condition present for three months.

Quiescent.

Absence of all constitutional symptoms; expectoration and bacilli may or may not be present; physical signs stationary or retrogressive; the foregoing conditions to have existed for at least two months.

Improved.

Constitutional symptoms lessened or entirely absent; physical signs improved or unchanged; cough and expectoration with bacilli usually present.

Unimproved or Progressive.

All essential symptoms and signs unabated or increased.

Died.

Terms Used in Definition of "Incipient."

1. *Slight Constitutional Disturbance.*—Slight loss of appetite, of strength, of weight; lassitude; possibly slight acceleration of pulse or possibly slight elevation of temperature. The impairment of health may be so slight that the patient does not look or feel sick in the ordinary sense of the word.

2. *Slight Elevation of Temperature.*—Maximum temperature after rest for one hour, never over 99.5° to 100° F. by mouth (or 100.5° per rectum).

3. *Slight Acceleration of Pulse.*—Maximum pulse rate not over 90 after rest for one hour, sitting or lying, except when due to causes other than tuberculosis.

4. *Absence of Tubercle Bacilli.*—Each monthly examination (if the sputum be negative) to consist of a careful microscopic examination, with a mechanical stage, of two smears, devoting at least three minutes to each smear, made from selected particles (at least six from different parts) of the sputum on each of three successive days. The morning sputum should always be obtained, or, better, the minute bits that some arrested patients raise at very infrequent intervals. It is not yet deemed wise to insist on digestion and centrifugalization or on inoculation of guinea-pigs.

5. *Infiltration.*—Physical signs of slight prominence of the clavicle, lessened movement of chest, narrowing of apical resonance with lessened movement of base of lung, slight or no change in resonance, distant or loud and harsh breathing, with

or without some change in the rhythm (*i. e.*, prolonged expiration), vocal resonance possibly slightly increased; or fine or moderately coarse rales present or absent. If sputum contain tubercle bacilli, any one of these.

6. *Apex.*—That portion of the lung situated above the clavicle and the third vertebral spine.

7. *A Small Part of One Lobe.*—An area of one or two intercostal spaces, or an area not exceeding 60 to 80 sq. cm. in extent, according to the size of the patient.

Terms Used in Definition of "Moderately Advanced."

8. *Marked Impairment of Function, Either Local or Constitutional.*—Local: Marked dyspnea on exertion limiting seriously the patient's activity.

Constitutional: Marked weakness, anorexia, tachycardia.

9. *Moderate Extent of Localized Consolidation.*—An area of one-half lobe or less, but may involve both apices; marked dulness, bronchial or decidedly broncho-vesicular breathing; markedly increased vocal resonance; rales usually present. These signs are to be sharply limited as to area instead of gradually shading into normal physical signs.

10. *Evidence of Destruction of Tissue.*—Presence of tubercle bacilli or elastic fibers in the sputum or the presence of the physical signs of a cavity. There are no absolutely certain physical signs of cavity, but a combination of any four of the following signs is to be taken as indicative of a cavity: (1) cracked-pot note; (2) amphoric breathing; (3) intense whispering pectoriloquy; (4) a veiled puff or post tussive suction; (5) bubbling or resonant rales. "Physical signs of softening" do not admit of any definition apart from that of cavity formation, and the term should not be used.

11. *Disseminated Fibroid Deposits.*—More or less localized areas of fibrous tissue, producing on physical examination some change or dullness in the percussion note, more or less increase of vocal resonance, harsh, suppressed, or broncho-vesicular breathing, rales sibilant or sonorous usually, but at times fine and moderately coarse.

12. *Serious Complications.*—These should be limited to tuberculous complications, such as meningitis, pharyngitis, laryngitis (except slight thickening of the posterior interarytenoid space, and superficial ulceration of a vocal cord), enteritis, peritonitis, nephritis, cystitis, orchitis, adenitis (unless very slight), etc.

Terms Used in Definition of "Far Advanced."

13. *Marked consolidation* indicates dulness merging into flatness, bronchial or tubular breathing and other signs of consolidation as defined in Paragraph 10.

Terms Used in Definition of "Apparently Arrested."

14. *Constitutional Symptoms.*—These include elevation of temperature, loss of weight, loss of strength, night sweats, chills, tachycardia, cyanosis, loss of appetite, amenorrhea, etc.

15. *Physical Signs of a Healed Lesion.*—These may embrace every physical sign of infiltration or consolidation (see Paragraphs 6, 10), with the exception of rales, which must be permanently absent, except possibly a few fine rales at the base, probably atelectatic in origin, and at one apex or over a small part of one lobe. Rales in the latter two places are to be heard only during the cough, at the end of a prolonged expiration, or during the inspiration which follows the cough.

Terms Used in Definition of "Improved."

16. *Constitutional Symptoms Lessened or Entirely Absent.*—By this is meant an improvement in the general condition as shown either by a gain in *both* weight and strength or by reduction of previous febrile temperature to normal without loss of strength.

Terms Used in Definition of "Unimproved or Progressive."

17. *Essential Symptoms and Signs.*—These include, among others, weight, strength, appetite, night sweats, hemoptysis, pleurisy, dyspnea, temperature. pulse rate, dulness, changes in vocal resonance and respiratory movement, rales.

Terms Used in Definition of "Apparently Cured."

18. *Ordinary Condition of Life.*—This term as used implies that the patient is able to live in an environment where he is able to support himself without the assistance of others, or to live in his former surroundings and pursue his former occupation.