

ANNUAL REPORT OF THE STATE NATURAL GAS SUPERVISOR.

OFFICE OF STATE NATURAL GAS SUPERVISOR,
KOKOMO, IND., January 12, 1903.

Prof. W. S. Blatchley, State Geologist:

Sir—In obedience to Section 7504 of the Revised Statutes of the State of Indiana, I submit to you herewith my Eighth Annual Report and the eleventh annual report from this department.

In closing this, my eighth year of service in this office, I desire to acknowledge the very cordial support that I have at all times received from you. It has been my constant endeavor to perform the duties of the office in accordance with the law and in so doing I have been very materially aided by your instructions, helpful suggestions and encouragement.

I respectfully submit this report and remain,

Yours sincerely,

J. C. LEACH,
State Natural Gas Supervisor.

ANNUAL REPORT OF THE STATE NATURAL GAS SUPERVISOR.

The law creating the office of State Natural Gas Supervisor makes it the duty of that officer to make a report to the State Geologist annually, which is incorporated in the annual reports of the Geologist and published. In these annual reports is to be given certain statistical information regarding the geological formation of the gas field, the rock pressure and production of gas wells, pipe lines used for the transportation of natural gas and such other data regarding the gas rock and the production of natural gas as will tend to make the reader familiar with the conditions in the gas territory. In other words, it is one of the lawful duties of the Natural Gas Supervisor to make public annually the true conditions in the gas field. The purpose of this provision of the law is plain. The law-makers thought it wise that not only the resources of the field be advertised to the world, but that the limitations surrounding the same be made known. It is hardly possible for the average consumer to know much of the progress and conditions in the field from actual observation, and it is certainly due him, and especially the large consumer, the manufacturer whose business prosperity depends largely on the life of this fuel, that the actual conditions in the field be made known at least once each year, if not oftener.

From the beginning the annual reports from this office have said, in substance, that the natural gas in this field, as in all other known fields, is a stored product, that has accumulated in rocks of a suitable structure to serve as a reservoir; or, in other words, we are drawing upon a fixed stock of this fuel from which a given number of millions of cubic feet can be used for a certain number of years, and when this stock is exhausted there is no more possibility of its renewal in the reservoir than there is of the growth of coal in the mines that have been worked. This statement is not the result of mere guesswork nor has it been deduced from false data. There are some facts regarding a natural gas reservoir, the generation and storage of natural gas that can be accurately ascertained by any one who will give the subject attention. The exact location of the gas rock, as well as the composition and texture of the same can be known. The compo-

sition of the gas contained in the gas rock is equally well known. At this time no one doubts the prevailing theory advanced regarding the origin of natural gas. In none of the deep wells that have been drilled in the various sections of the field has any material been found, aside from petroleum, from which natural gas could be generated. Then, considering the history of other gas fields, and the positively known conditions surrounding this gas territory, it has not required much of the prophetic instinct to foretell the future, except that no one knows when the gas reservoir will cease to honor the draught. How long will gas last? is a question often asked, and it is but natural that it should be, especially by those who have not given the subject much thought. There have always been a few "knowing ones" throughout the field who have given the public the benefit of their superior knowledge of the subject, but unfortunately they have had to revise their guesses every few months. I have always been frank to confess my ignorance. I do not know how long it will last. The life of this field, as of all other fields, must be determined by the extent of the reservoir (supply of gas) and the consumption. Regarding the former, its capacity has not been determined, nor can it be; nor is the latter known. The two principal factors in the case being unknown, the third must remain a matter of speculation until the last. And again I desire to say, and emphasize it, that year after year for the past eight years, I have said on all occasions, and especially in my annual reports, that the stock of natural gas was fixed, and that the near future could not bring anything but absolute exhaustion of the gas reservoir. In making this statement I have not claimed any superior knowledge of the subject, for this is the only rational conclusion to which any one can arrive who knows the conditions and considers them unprejudiced. During the early history of the field the statements that I made regarding the diminution of the supply of gas and the final exhaustion of the reservoir were very freely criticised by land agents, professional "boomers," a few citizens and newspapers who were more interested in booming the gas field regardless of consequences than they were in the real conditions of the field; but evidence in proof of my statements has increased with the years, and at present there is but little discussion or disagreement. I think that I know and fully appreciate the value of natural gas as a domestic and manufacturing fuel, and I understand what the loss of it means to the citizens of the gas belt and the State; yet, for any one or class of citizens to say that natural gas will last forever, that the geologists of the country know nothing about the subject, and that the reports of the Natural Gas Supervisor are false, has not changed the history of the field.

The Indiana natural gas field has been the most productive ever known. With thousands of others, I regret that its product was not from the beginning used as it should have been. If it had been sold as other fuels are, by measurement, and none permitted to be wasted, the end, in my opinion, would not be near. Pity it is that it has not been within the power of the State under existing laws to regulate the consumption of this fuel; for, through crude appliances and unscientific methods of use, a large per cent. of the gas consumed has been wasted. To an observer it seems that everything has conspired from the beginning to impress the consumer of natural gas that the supply is abundant for all time, regardless of how it is used. Under such conditions it has been difficult indeed to enforce the law regarding willful waste.

Let it be understood that what has been said regarding the annual reports from this office and the relation that the statements contained therein regarding the condition of the gas field bears to the present condition of the field has not been written in a spirit of "I told you so," but somewhat in self-defense. I would be glad if those who have been so willing to enlighten the public regarding the condition of the field and discredit the reports from this office would spend a little time in the field now. By a careful examination they might find some little evidence of a decline in the natural gas supply.

THE PAST AND THE PRESENT.

That period in the history of the Indiana natural gas field has arrived when the compilation of a report giving the true condition of the field is a difficult task. This has not always been so. During the early history of the field, and, in fact, until the last three or four years, very similar conditions were found throughout the entire gas area. Of course, there were some localities in which salt water appeared early, influencing both the rock pressure and the flow of wells, but these were confined to a narrow outer zone, and on account of the large area of productive territory, received but little consideration. At that time the rock pressure tended to equalize during periods of light draught, and was comparatively uniform throughout the field. But few failures were recorded, and the difference in the volume of flow was not marked. Exceptions to this general statement might be found in wells located in widely separated sections of the field, in which the texture of the gas rock varied. During the time under consideration it was but necessary to test a few wells in different localities to ascertain the field pressure. The progress

of the field seemed to be regular and uniform. As I have said, this condition continued for a number of years. But now, how different! What at one time seemed to be one immense gas-holder or reservoir is apparently a number of small pools or reservoirs of gas of very limited production. A little investigation and consideration will convince the most skeptical that this is the real condition of the gas rock at present.

What is known as gas rock in this field is that part of the Trenton limestone that serves as a reservoir for the natural gas. This limestone is not always a gas rock; neither is it the only rock in which natural gas is found, for it is found more frequently in sandstone. In Indiana the gas rock is located in the upper part of the Trenton limestone. It is not equally porous throughout, and not of uniform thickness, as every driller in the field can testify. This gas rock seldom if ever comes to the surface of the Trenton limestone, from one to fifteen feet of the uppermost portions usually being hard and nonporous. It must be known, also, that not only the lower but the upper surface of the gas reservoir is very uneven, as the records of numerous wells throughout the territory will testify. A relief map of the upper surface of the gas rock would show many ridges, valleys, elevations and depressions. Then, it must be plain that as the supply of gas diminishes, the salt water will advance and finally meet the lower portions of the overlying strata of hard limestone first, completely occupying the gas rock at the lowest points. Thus, various localities in the field which differ only in the elevation of the gas rock become hermetically sealed, one from the other. And, instead of there being one gas reservoir, there are numerous small reservoirs, each completely sealed in by the salt water. At points near the border of these small gas-holders both gas and salt water seem to be present, waging an unequal warfare for possession of the rock.

THE CONDITIONS IN THIS FIELD.

The conditions described above are the conditions in this field at present. When the drill strikes a valley in the gas rock where the salt water completely occupies it, the result is evident. It is but reasonable that as the total supply of gas diminishes and the salt water advances that what seems to be small reservoirs at present will be divided and subdivided and the per cent. of absolute failures will become greater each year. And also, in the light of the above facts, the reason for the great difference in the life, rock pressure and volume of wells located in the same section of the field is plain.

And it is from the condition of these wells that the field must be judged. The average consumer who seldom sees a gas well, much less tests one, is indeed very poorly equipped to pass judgment on the condition of the gas field.

The history of this field during the past year is in many respects very much unlike that of former years. Every one at all acquainted with the early history of the field understands something of the manner of development from year to year. It followed natural and practical lines. For a considerable time after the field was discovered, systematic drilling was unknown. In locating wells, convenience to the distributing plant or consumer was given first consideration. Cities were supplied from wells within their limits, or the immediate vicinity, and factories seldom went beyond their own yard for fuel. This condition did not continue long. The transportation of natural gas long distances was practical, and cities outside of the gas belt coveted the new fuel. The fifth year after gas was discovered had not passed until pipe lines from six to twelve inches in diameter were conveying gas to cities and towns in every direction. These lines tapped the field at the nearest point, and thus an outer zone around the entire gas field was the first to be systematically drilled, and consequently the first to show signs of exhaustion. Pipe line companies very early saw the necessity for planning their field of operation; of leasing territory for future drilling. When the larger companies began to plan for future operations and to lease available territory, cities in the gas belt and manufacturers were compelled to do the same. Some of the larger gas companies have for years been paying rentals on a very large acreage, probably much larger than they will be able to drill. The result is that there is but little land in the gas territory that is not now or has been at some time under lease for gas or oil, or both.

As the territory near the edge of the gas area began to show signs of exhaustion, the pipe lines were extended toward what was thought to be the center of the field. As the pipe lines were extended year after year, new wells were drilled, sometimes one-fourth of a mile apart, but usually not nearer than one-half mile. At the beginning of this year it seemed to all who were at all acquainted with the field that it was completely developed, that is, that enough wells were drilled to drain the reservoir. Pipe lines from the west crossed and recrossed and headed near lines from the east, and so with lines from other directions. An occasional small area of gas territory could be found not drilled, but it was usually so located that it was under

the influence of one or more pipe lines or had been tested and found unproductive.

With these conditions, and others that have been noted, the future of the gas industry at the beginning of 1902 was anything but bright, notwithstanding the fact that a few "expert" gas men, who probably had never seen a gas well, were telling the consumers throughout the field that there was plenty of gas; that the reports to the contrary were false.

Most gas companies have made an effort to obtain an adequate supply for the present cold season. How well they have succeeded to the present time is well known. But few main line extensions were necessary the past year, service and lateral lines being sufficient. Many of the wells drilled in 1902 were in territory once drilled, and where this was not the case the wells were drilled unusually close together. The per cent. of failures has been large, and the per cent. of really good wells very small. The average well has been small, and the gas found has been compelled to wage an unequal warfare with the salt water from the beginning. The wells drilled now are very short-lived, as must be expected from the condition of the gas rock. Most gas companies are keeping the drill busy during the cold weather in order to supply their consumers as long as possible. At this time many consumers in the gas belt that used gas last winter are using coal or wood.

ROCK PRESSURE IN THE FIELD.

As has been said in another part of this report, the rock pressure of the field varies greatly at this time, and while it is never an index of the capacity of a given well, the relation that it bears to the volume of flow becomes less as the supply diminishes. In what has been known as the main gas field, that is, the territory that is supplying the gas that is consumed by the principal factories and transported by the principal pipe lines, the average rock pressure is not above 40 pounds, and many new wells show even a lower pressure.

RE-DRILLING ABANDONED TERRITORY.

The scarcity of gas has caused a number of wells to be drilled in territory that has been entirely unproductive for a number of years. The results have been anything but encouraging to those who understand anything of the production, piping and consumption of natural gas. In one city in the gas belt, nine wells have been drilled

the past year within the city limits in territory overrun with salt water and abandoned ten years ago. Five were absolute failures, and of the remaining five, the largest does not produce to exceed 150,000 cubic feet daily. From present indications all will meet an early salt water death. Notwithstanding failures in old territory, it is altogether probable that much of the field will be redrilled. After using this fuel for 15 years the people in the gas belt dislike very much to give it up, and will risk considerable in an effort to prolong the life of the supply. In many of the wells drilled in old abandoned territory the rock pressure is high, regardless of the small flow of gas, for, as I have said many times, the rock pressure is not an index of the volume of flow. A majority of the people, however, estimate a well by the rock pressure, and therein is found the reason for so many wells being drilled in territory that does not contain enough gas to pay for the fuel used in drilling the wells.

NEW TERRITORY.

Considerable drilling has been done the past year around the edge of the field, with the hope of finding some projection of the gas rock that had been missed in the early location and development of the field. As a result, on the northern boundary of the field in Wabash, Grant and Huntington counties, a number of productive wells have been drilled. Much of the gas used in Wabash, Converse, Huntington and Marion, this winter, is from this territory. The gas rock is not uniform in texture, and a number of "dusters" have been found, but the rock pressure is comparatively high, and enough gas has been found to warrant further development of the territory. It must be remembered, also, that the price of natural gas has advanced during the past two or three years, and that wells once unprofitable can be operated with profit now.

NATURAL GAS AS A MANUFACTURING FUEL.

In former reports I have said that natural gas would be used as a domestic fuel in the gas belt long after it is abandoned as a manufacturing fuel and by pipe line cities. At this time the truthfulness of the above statement is admitted by all. But few factories in the most favored localities are depending entirely upon gas now, and those that do are compelled to shut down occasionally. Some factories run at night time only, and thus take advantage of the light draught on the gas supply. It is probably not necessary for me to say here that the conditions of the gas field are such at this time that

natural gas can no longer be depended upon as a universal fuel for any purpose.

Of course, residents of the gas belt are anxious now, as they have always been, regarding the manufacturing industries that located in this section of the State on account of the natural gas. I feel warranted in saying with increased emphasis, as I have said many times before, that when the supply of gas is exhausted that a large majority of the factories will successfully adopt other fuels and remain here. This is especially true of those factories that have proven to be successful business enterprises. Some of the largest factories in this part of the State have been erected the past year. These are equipped with the most modern appliances to use coal, and are in successful operation at this time. Older factories are either supplementing their gas supply with coal or are equipping their factories for coal with the purpose of abandoning natural gas as fuel.

OIL IN NATURAL GAS TERRITORY.

Natural gas and oil are usually spoken of as associated products of the earth's crust, and the Indiana natural gas field and the Indiana oil field are accordingly thought of as one and the same territory by those not engaged in either business. Unquestionably, these products have the same origin and were generated under similar conditions, and it is also true that natural gas and oil are frequently found in the same rock, but, nevertheless, that oil always follows gas, as is heard so frequently in the Indiana field, is not true. In Indiana there is an area that is distinctly oil territory. It never has been gas territory, although in some cases enough gas has been found to operate the oil wells. There is an area that is distinctively gas territory, showing no signs of oil. There is also considerable territory that produces both gas and oil. What is known as the Indiana oil field is located on the northeastern border of the gas field, and occupies a portion of six counties, viz.: Jay, Adams, Huntington, Wells, Blackford and Grant. This is distinctively oil territory, though that part of it lying in Blackford and Grant counties and part of that portion in Jay County was formerly gas territory. Van Buren Township, in Grant County, and Washington and Harrison townships, in Blackford County, are wholly in this territory. The territory to the south and west of this is gas territory, though the oil industry is rapidly invading it.

In June, 1899, a "wildcat" well was drilled on the B. F. Van Vactor farm, about three miles southeast of Marion, Grant County. It

showed both gas and oil in large quantities, and was promptly closed by the State to prevent the waste of gas, which discouraged and stopped the progress of the oil industry for the time. Early in 1900, the gas pressure had so decreased in that section of the field that oil wells could be operated in localities near large pipe lines or where the gas could be consumed near the wells. Since that time the oil industry has had a steady growth in that part of the original gas field. The per cent. of failures is small, and though the operator is compelled to pump much salt water, some of the leases have been quite profitable. Much of the developing for oil in this locality is done by manufacturers or oil companies prepared to care for the gas. From the hundreds of wells drilled for oil, much of the gas consumed in the factories in Marion comes. Operations in this particular locality have to date been confined to Center, Franklin, Mill, Monroe and Washington townships. This part of the gas field has exhausted very rapidly the past year, and at present there is but little gas, as is evidenced by the fact that many drillers are compelled to use coal. From this small field the oil operators are pushing toward the north-east, and it will only be a short time, from present indications, until this territory can be classed as a part of the Indiana oil field.

Oil has been found in a number of wells in the vicinity of Fairmount, Grant County, and the indications are decidedly favorable for a productive field as soon as the gas pressure has decreased to a point where the oil can be produced without wasting the gas.

In former reports considerable space has been given to the oil industry in the vicinity of Alexandria, Madison County. From the beginning this has been very productive gas territory and the determined effort made in former years to develop the oil industry has very seriously interfered with the gas production. A number of very productive oil wells were drilled in this locality in 1898. There was considerable delay in closing them and an enormous amount of gas was wasted. They were finally closed by the State. After this nothing was done toward developing this section of the field for oil until 1901, when a second effort was made, mostly by manufacturers this time, to develop the oil industry. About seventy-five wells were drilled for oil during the year mentioned. Large pipe lines were laid to the wells and most of the gas was consumed by factories in Alexandria. While but few absolute failures were reported and some of the wells were large producers when drilled, the history of the field is disappointing to the oil industry. With the exception of two or three leases the production has decreased rapidly from the beginning. At present a very small per cent. of the wells once productive are

being operated and that part of the field can hardly be classed as oil territory.

During the latter part of the year 1900, what seemed to be a very productive "oil pool" was found near Hartford City, and in fact I might say in Hartford City, for many wells were drilled within the city limits. It was not possible to ascertain the normal production of the wells at first on account of the gas pressure. It was not long, however, until pipe lines from the city gas plants and factories were prepared to care for the surplus gas. Most of the wells drilled in this pool have been abandoned, but the drill is pushing north and west and from present indications this part of Blackford County will soon be a part of the main oil field.

Delaware County has comparatively few oil wells. In the eastern part of the county a few profitable wells have been drilled this year. There is but little surplus gas and there is no incentive whatever to waste it, as it can be disposed of at a profit near by.

Washington, the northwest township of the county, has produced a little oil since 1898, but the high gas pressure has discouraged the oil operator who was not prepared to care for the gas.

A few productive oil wells have been drilled the past year in the vicinity of Parker, Randolph County. But little gas is found with the oil, scarcely enough to operate the wells.

THE WASTE OF NATURAL GAS.

This is certainly not a new subject. Of all subjects kindred to the natural gas industry, it has probably been most discussed. Especially has it been a fertile field for the local correspondents of newspapers. As with most subjects in which the public are interested, some things have been said that were true and much that was not. To persons acquainted with the real conditions in the gas field and the production and consumption of natural gas it seems that most of the articles published in two or three of the local papers and the "specials" sent out from the gas field have been written without any knowledge of the conditions in the gas field or else with no regard for the facts. Probably many of the misrepresentations regarding the conditions in the gas field that are circulated can be charged to a lack of knowledge of the real conditions on the part of those who pretend to know. A man spends one day in the gas field and poses as an "expert." And again, those who have criticised this office most severely for failing, as they aver, to stop the waste of gas, utterly fail to distinguish between waste that is prohibited by law and that that is not, and to

consider the area of the gas field, the many avenues of waste and the help at my command to enforce the law.

I have referred to the different classes of waste in former reports and will refer to them very briefly here, that the reader may distinguish between that waste that is prohibited by law and that that is not. Fully one-half of the questions coming to this office pertain to this subject.

That natural gas has been wasted and is being wasted no one will deny who is at all acquainted with the field; and more, it will be wasted as long as there is any to waste. That is to say, the time will not come when all consumers of natural gas will use such appliances as will burn all the gas and put the heat where it belongs. It is generally understood even by those interested in the natural gas industry that the laws of the State prohibit the waste of natural gas. This is true in part only. Some of the greatest avenues of waste do not come under the inhibitions of the law.

HOW NATURAL GAS HAS BEEN WASTED.

In the consumption of natural gas both by domestic and manufacturing consumers it is wasted. A majority of the domestic consumers use it in such a manner as to waste fully 50 per cent. of its heating power. In how many residences in the gas belt and pipe line cities, too, is the gas all burned and the heat applied where it belongs? Incomplete combustion is the rule rather than the exception, and that always means waste. What has been said about wasteful methods of consumption by domestic consumers will apply with equal force to manufacturers. In the days of plenty, when a shortage of gas was not known, the very crudest of appliances imaginable were used in a majority of factories. Consumers have not been ignorant of these conditions and the certain result. Year after year in my annual reports attention has been called to the wasteful methods of using it practiced by all classes of consumers. What the result would have been if the same degree of economy had have been practiced in the use of natural gas from the beginning by all classes of consumers as is practiced in the use of other fuels I can not say. One thing is certain, we would not be at the end yet. *The class of waste just referred to is not prohibited by law.*

GAS USED TO PUMP WATER.

Gas is used to pump water throughout the entire gas field by farmers and drillers. In some cases these pumps are allowed to run

day and night. The amount of gas used is governed entirely by the condition of the pump and the pressure of the gas. These pumps are a great convenience to farmers who have a large amount of stock to water as they are to drillers who have to pump water a long distance. The best that can be said is that it is a very extravagant use of gas and in some cases it is positively wasteful. There is no statute that directly prohibits the use of gas in pumps or engines. In a few cases where the engine was out of repair and was wasting the gas in large quantities I have, following the advice of the Attorney-General, tried to apply the general law prohibiting the waste of gas, but have failed to make a case in every instance. If it could be proven that the purpose of using the gas in the pump or engine was to get rid of the gas or waste it, as is sometimes asserted, the law would doubtless apply. That would be difficult to prove in any case.

NATURAL GAS FLAMBEAUX.

A State law prohibits the use of natural gas for illuminating purposes in flambeau lights (Acts 1891, page 55). The early history of the field on this subject is familiar to every one. Flambeaux were the universal out-door light for farmers, drillers, oil operators, and but few manufacturers used any other light. For many years after the enactment of the law, public opinion was bitterly opposed to its enforcement. Even manufacturers, who of all others should have been interested in every effort to protect the natural gas supply, most bitterly opposed the enforcement of the law. During my term of office I have given my best efforts to the enforcement of this law, though it has been a difficult and usually a thankless task. It has not been an unusual thing for those parties who have made the most noise about the waste of gas in general to be the first to cry out against the injustice of the law. I do not say that no flambeaux are used. The gas and oil fields cover a large territory and it is impossible for me to see all parts of the field at once. It should be understood, also, that many times flambeaux reported by people traveling in the night time through the gas or oil fields are not flambeaux, though the light seen appears to be such. An open boiler door, a cluster of jumbo tips, an open fire for heating purposes, or even a single jumbo tip, seen at a distance can not be distinguished from a flambeau. The flambeau law is well observed throughout the gas field.

THE WASTE OF GAS FROM OIL AND GAS WELLS.

A State law makes it unlawful for "any person, firm or corporation having possession or control of any natural gas or oil well, whether as contractor, owner, lessee, agent or manager, to allow or permit the flow of gas or oil from any such well to escape into the open air, without being confined within such well or proper pipes, or other safe receptacle for a longer period than two (2) days next after gas or oil shall have been struck in such well." The law further provides as follows: "and thereafter all such gas or oil shall be safely and securely confined in such well, pipes or other safe and proper receptacles." To enforce the letter of this law would mean the absolute annihilation of the oil industry in this State. There have been but few oil wells drilled in this State that did not show a little gas soon after the Trenton limestone was struck. Though the amount of gas is probably not enough for a common flambeau, yet under a literal interpretation of the law it is a violation. To complete an oil well within two days next after gas is struck is in most cases impossible. Then, must a well such as the class referred to above be closed when the two days have expired regardless of whether it has been finished or not, in order that a very small amount of gas without value where it is, may be shut in the ground; or can the well be completed and the gas utilized to operate it? It is hardly necessary for me to say here that there are a very few manufacturers in the gas belt that have openly proclaimed their opposition to the oil industry. During the past two years they have in some cases fought it with relentless energy, but with little avail. They were unreasonable in their demands and sought to persecute those interested in one of the most valuable industries in the State rather than prosecute those who violated the law. They were not content with the way this office enforced the law. They sought to take matters into their own hands for a while, but failed. It is but fair to say that most of these parties are now in the oil business.

In December, 1901, I addressed a letter through Prof. W. S. Blatchley, the State Geologist, to Hon. W. L. Taylor, Attorney-General of Indiana, asking a construction of the law. December 17th I received an opinion from that officer covering the subject quite fully. In concluding his opinion, Mr. Taylor says: "That the well must be closed and the gas confined within two days after the first forcible flow of gas has been struck." And then again to the question, When shall the supervisor begin to count the two days? the Attorney-General answers, "At the time the first profitable flow of gas appears from the well." This is certainly a reasonable construc-

tion of the law and I am endeavoring with the limited amount of help at my command to enforce a strict observance of the same.

While during the past year sixty-four affidavits were filed against oil operators and manufacturers for violating the law, in but two cases did I find what seemed to be a manifest disposition to violate the law. In many cases the person responsible for the violation of the law had been but a short time in the field and had not acquainted himself with the provisions of the law. In but one instance has it been necessary to file the second affidavit.

WASTE OF GAS FROM PIPE LINES.

Natural gas escaping from the many pipe lines that line nearly every road in the gas belt attracts the attention of the public more than any other class of waste. A very small amount of gas whistling from a pipe line near the highway usually attracts more notice than 100,000 cubic feet of gas escaping from a gas or oil well. I do not underestimate the amount of gas wasted from pipe lines and am giving much of my time to the enforcement of the law relating to the same. There is much misunderstanding regarding the provisions of the statute relating to pipe line waste. Previous to 1899, there was no law prohibiting pipe line waste, and The General Assembly that met that year enacted a law making it the duty of the Natural Gas Supervisor upon the discovery of any leak in any pipe line to notify the owner or superintendent of the same to repair the line, and in case he does not do so within two days after receiving the said notice it then becomes the duty of the supervisor to make such repairs as may be necessary to stop the leak and collect all costs of the same from the owner of the line. I am frequently requested to have persons arrested for permitting gas to escape from a pipe line. To those who read the law the reason that I do not is certainly plain. Giving the two days' notice as is provided by law has been sufficient to date.

THE PLUGGING OF ABANDONED GAS AND OIL WELLS.

Though this subject has been referred to in former reports, I desire to call attention to it again. It is well known by all interested in the subject that the law is defective. It stipulates the manner of plugging wells and provides a penalty for its violation which is entirely inadequate. This is not the worst. The law provides no way by which the supervisor can ascertain when a well is to be plugged, and if plugged, it is next to impossible to prove that it has not been plugged properly. Complaint is made to me that a well has been

abandoned and not properly plugged. The person making the complaint was not present when the tubing and casing were taken from the well and, in all probability, can not cite any person that was. The only evidence that the well is not properly plugged is the condition of the oil and gas rock in the vicinity of the well. A large number of wells have been abandoned the past year, and the annual number will increase. There is little doubt but that many of these have been left practically open, thus allowing the water to rush in and occupy the surrounding rock. I have brought two suits under the law during the past year. In each case the party was fined a small amount and the well remains open. The damage was done long before the suit was brought.

A bill was submitted to the last Legislature that sought to remedy the defects in the present law. It was indorsed by the principal gas companies and oil operators of the State. It was passed by both branches of the Legislature without a dissenting voice. The Governor vetoed it.