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MUNICIPAL CORPORATIONS AND NATURAL GAS SUPPLY.

Read by Professor Orton at the meeting of the Ohio Institute of Mining Engineers. Prefacing his remarks by a review of the valuable properties of this form of fuel, the uncertainty of finding it in any particular location, its low cost of transportation by means of pipe lines, and noting its wonderful adaptability to various uses, Professor Orton went on to say :

The value of the new fuel can perhaps be best appreciated by giving its equivalent in coal. On the average 20,000 feet constitute the equivalent of a ton of Pittsburgh coal. The range in practice is, however, very great, from 14,000 to 28,000 feet being found as the equivalent of a ton of coal in these various applications. Now, then, gas is struck within or near the corporate limits of a town. From the casing of the well, which is an iron pipe $5\frac{1}{8}$ inches in diameter, a torrent of this volatile but most valuable fluid flows out. If the production is less than one million feet in twenty-four hours, the well is counted a small one. Wells of two, three, and four million feet are commonplace. A production of six, eight, and ten million feet is counted good, but the largest wells of Ohio have reached fifteen, eighteen, and in one case, thirty-five million feet per day. Think of what these figures mean. Translate them into coal. A well of one million feet is equal to fifty tons of coal every 24 hours, or 18,250 tons in a year; while a well yielding ten million feet is equal to 500 tons a day, or a full train of loaded coal cars. Not only will this 500 tons of coal in gas come to the surface every day from a well that it has cost less than a thousand dollars to drill, but when it reaches the surface it is ready to travel ten, twenty, fifty miles, at its own charges, if only a track is laid for it. What a demoralizing discovery! What an unsettling of values is sure to follow!

What shall be done with this great flow of gas that comes surging to the surface of the earth? The city or town desires it, of course, but to utilize it in the town involves large expenditure in the way of pipes and appliances for distribution. Who shall assume this outlay? The owner of the first well has no control of the underlying gas, as has been shown. His well may be duplicated in ten days' time, and its product may, perhaps, be multiplied manifold by the new well. If the State could interpose and take control of this entire stock of stored

power; if it could wisely and honestly regulate the bringing it to the surface and its distribution and use, an economy that we can only dream of now might be secured. On the other hand, capital is ready to step in, in the form of companies, to make the necessary outlays and to secure for itself a large reward. To do this the company must have access to the streets and alleys of the town for laying its pipes; must, in fact, acquire for the time a right of eminent domain. But when it has brought in the gas, to what uses shall the new fuel be put? How much shall be charged for it? By what system shall it be sold? Shall a price be fixed equal to the value of the fuel which it displaces? It is evident that such a rate would make a gas well better than a gold mine. Questions like these must be settled by the municipal corporations which accordingly grapple with them.

Shall one company have the exclusive right to bring gas into the town, or shall two or more companies compete with each other by distinct and independent lines? This would be extremely wasteful and ill-advised from many points of view, and could be justified only by some great advantage that could not otherwise be secured.

But here is a town twenty, forty, sixty miles distant from any valuable gas field. It will be left behind by its more fortunate neighbors unless it finds access to the new fuel. How shall this be accomplished? Capital combined in considerable aggregate stands ready to undergo the work. These gas companies, when the prize is large, are generally made up of those who have been successful in the great petroleum interests of the country. Experience has been acquired which is invaluable in the management of the new business. But they, too, come under the control of the municipal corporations.

Why should not the latter undertake the work for themselves? This question is sure to come up. The business seems to be one of extraordinary profit; why allow these corporations, already dangerously strong, to reap all the advantages, to double and quadruple their investments in this way? What advantage will it be to a town to have discovered this wonderful fuel if it is obliged to pay as much for it as it paid for the old? And, then, the great corporation that is confessedly in the field for the purpose of making money for itself may not have the interest of the town especially at heart. It may not care especially to encourage manufactures, because it can get the most for its gas when it is used for domestic supply. The last consideration carries great weight. If manufactures are not brought in, what chance for a real estate boom? And, without

such a condition, is life worth living? The extra comfort and convenience arising from natural gas in domestic use are whistled down the wind as of small account.

A dozen or more municipal corporations in Ohio have within the last five years taken up the question and have solved it according to the lines that I have indicated above, namely, by supplying gas for domestic use and manufactures, one or both, to their respective towns. In doing this they have expended large sums of public money raised by the same bonds, which became a debt of the corporation, and which must be met either by the proceeds of the gas plant, or by general taxation. In some cases they have secured an extraordinary growth of the towns by the manufacturing plants which they have introduced; the population has been increased 300 per cent in five years, and wealth in still higher ratio.

By the side of these towns are others that are supplied by the great companies above referred to. We are able to compare the results of the two systems of public and private supply, and to note their relative advantages and defects.

In the first, an approach is made to that form of social action which we are coming to designate as nationalism. It is not nationalism, pure and simple, but it is grounded on the same general views of society which that system involves. The facts seem to be worthy the attention of the students of economical social science.

Let me call your attention in passing, however, to the fact that conclusions cannot safely be drawn from this experience that shall apply to municipal control of artificial gas plants, or of water supply. These come under an entirely different head. A natural gas plant is a mining enterprise. All the risks and uncertainties that inhere in the search for underground treasures belong to this as well. The business can never be other than extra-hazardous in its nature. A different class of men would likely be called to the control of one from those which would have charge of the other. The most hopeful, enthusiastic, and positive would lead the mining enterprise, as a rule, while the other interest would most naturally be entrusted to the conservative, the careful, the level-headed. Theoretically, I believe in the municipal control of gas and water supply as highly desirable advances, especially in the matter of public economy, and I am not discouraged in regard to these subjects by any unfavorable facts that come to light in this connection.

How, then, do the two systems of supplying natural gas compare in actual practice? In what sort of light does nationalism, in its first venture in the mining field, appear?

1. In the first place, the municipal corporations are under a considerable disadvantage from their lack of experience and knowledge in this work. It would be impossible that it should be otherwise. In the handling of oil and gas a great deal has been learned within the last 30 years in this country. This knowledge is special to a considerable degree. It can be acquired, however, by diligent use of proper opportunities. But it often happens that by the time an elected gas trustee is trained so that he can become of value to the town, he is displaced by some law of rotation of office, or from other cause. Rising out of this inexperience and lack of knowledge, there may be mentioned, (*a*) an adequate provision for gas supply in the territory secured. For an adequate supply of the town, especially where manufactures are to be encouraged, a large acreage of gas land is essential, and this acreage must be held in as continuous blocks as possible, so that the volume and pressure of the gas may be to some extent under the control of the company. The private companies have, without exception, when undertaking a large supply, provided themselves with as much gas territory as could be secured. This they have done at large and continuous expense to themselves. In fact, they have aimed to get the entire productive territory, and have used the best knowledge and judgment available in selecting it. This has been one of their main advantages.

The companies have not, however, been able to corral the whole field; individual land-owners would occasionally prove obdurate and refuse to lease their lands. Least of all did the great companies count it necessary to lease the small holdings of a few acres scattered here and there through the field, or of the village lots that are each large enough to hold a derrick. One municipal corporation of Ohio is now constructing a pipe line 45 miles long, on which \$250,000 have been expended, and its gas supply is based on the gas right of 450 acres in a field already approaching the limit of exhaustion, or the pressure of which has already been reduced at least 40 per cent.

The municipal corporations coming late into the field have often found themselves obliged to take such gas lands as I have named, if they found any properly situated, viz., the outskirts of the gas territory, the isolated tracts situated within the lines of the great holdings, village lots and the like. In but few instances have they acquired territory large enough and good enough to warrant them in undertaking a supply from what might properly be called their own stores.

Another explanation of these facts of selection might be offered, that they were not willing to recognize the rights of

acreage that have generally obtained in this interest. They have led, by their action, to the unnecessary multiplication of wells, by drilling near boundary lines, and on village lots, a reprehensible policy on the part of any that participate in it.

(b) In like manner, the lack of experience has often led to faulty and inadequate service. The lines of the municipal corporations are sometimes poorly laid and their service within the towns is often inferior. In this respect they are, as a rule, unfavorably contrasted with the great companies whose interests depend upon the successful service that they render.

(c) There can be charged against the municipal corporations the third sign of ignorance, the circumstances of which are greatly to be regretted. They have led to a wanton waste of this precious fuel that can best be characterized by the old historical word "vandal like." They have made night hideous by their blazing torches and arches; they have poisoned the air of entire districts with unburned gas. They set rivers on fire to entertain their visitors or illuminate fair grounds by night for horse races, with the most precious form of fuel that man has yet discovered.

The great companies are guilty of no such exhibitions. They know the value of gas. It is money to them when brought to market and not a foot is unnecessarily consumed or lost.

The municipal corporations have sinned in ignorance. They have unexpectedly come into possession of their marvelous fortune, and they have said to themselves, "To-morrow shall be as this day, and much more abundant," in spite of the warnings of experience and science. Geology did not give them the gas, they say; they got it in spite of geology and geological deductions. Why should they heed its teachings as to the duration of the supply? In the gas fields of Ohio, 40 to 80 per cent has been already lost of the initial pressure, and even the central sections of the best fields are becoming greatly impoverished. Sometimes it has happened that when gas trustees have learned the real nature of the fuel they were handling, they have been led to such an economical policy that they have become unpopular, and have been succeeded by bolder men whenever the opportunity has come to make the change. But nothing is more certain than that these gas fields are exhaustible. There is a certain amount of gas in store, for the world is old, and the processes of manufacture and accumulation have been in operation for vast periods. The day of geology is a thousand years. When exhausted once, they are exhausted forever—or at least there will be no restoration of the supply in our day.

2. In the second place, the municipal corporations have adopted a policy of encouraging manufactures that is certainly questionable if not demonstrably unsound. They have offered a practically free supply of fuel to manufacturers, even to those whose work demands the largest use. Glass manufacture and iron work they have been most eager to bring into the towns, because of the large amount of skilled labor that these lines of business involve. As a rule, no restraint has been placed upon the use of gas. In one field, for example, an edge-tool works was first established on free gas. It was very successful, as can be easily understood. To it was presently added a 10-inch rolling mill; after that in succession a large chain works, and a 20-inch rolling mill, and the proprietors finally proposed to add an 8-inch mill also. This establishment, I found, last summer to be using nearly five million feet of gas per day, equivalent to 200 tons of Pittsburgh coal. Its entire use of free gas expressed in the same equivalent would be 200,000 tons of Pittsburgh coal. Findlay has secured the location of glass manufacturing establishments that aggregate 200 glass pots, consuming not less than ten million cubic feet per day.

The municipal corporations have given other advantages as well to manufacturers in the shape of bonuses and contributions. One city, for example, turned over to a manufacturing establishment \$50,000 of its bonds to secure its location. But these towns were only doing what their neighbors were doing in this matter of subscriptions for such purposes. It is the *use of gas* with which we are now concerned. The corporations often guaranteed a free supply of gas for from three to five years, sometimes adding a proviso so as to cover the maintenance of the wells. Their charges are generally covered by an annual rate based on the number of glass pots of the factory or the amount of production of the establishment. The rate on glass pots was generally \$10, \$20, or at most \$30 *per annum*. If these rates had been monthly instead of annual, the prices for gas would still have been ridiculously low. A window glass pot consumes, as I have said, 70,000 feet per day, or 2,000,000 feet in a month. At one cent a thousand feet, the gas would be worth \$20 a month; at 2 cents, \$40; and at 5 cents, below which the price ought certainly to never have been dropped, \$100, or \$1000 for an annual run per pot. At the rate at which corporations have supplied the gas, Pittsburgh coal would be worth about 5 cents a ton.

There is now used in northern Ohio, on what has been practically free fuel up to this date, 22,640,000 feet every day. The glass interests of northern Ohio at the present time are

consuming an aggregate of 6,720,000,000 cubic feet per annum, a supply large enough for a hundred thousand people for a year. It is easy to see how demoralizing to all sound business concerns a competition thus based must have proved. The established glass manufacture of the country has had especially hard lines. Had it not been for the much-abused trusts, many of the older glass centers of the country, outside of the natural gas fields, would have been swept out of existence during the last five years. As it is, there seems to be a surplus of production, primarily due to the cause now under consideration.

The municipal corporations have maintained very low rates, as a rule, on the gas used in domestic consumption. In this way the people have really obtained a noticeable relief, and this is well-nigh the only redeeming feature of the situation.

The fuel of the people under this administration has cost them only a small part of what they were obliged to pay before the advent of gas, but as the fields begin to fail, the corporations have found it necessary to use more money in maintaining their supply. Being generally unable to increase charges on manufacturers, by reason of the guarantees under which they were brought in, they have increased the rates upon private consumers. In one town the manufacturers have been using 80 to 90 per cent of all the gas brought in, while paying less than 20 per cent of the income derived from its sale. But even these additions have left the rates very far below the real value of the fuel.

3. The municipal corporations, again, have found it necessary to turn the gas to the commonest and most unjustifiable uses in numerous instances. A brick maker, for example, or a lime burner, bears his part of the public taxation for the introduction of gas, but aside from domestic use there is no application which he can make of the new supply, except in his own line of manufacture. He, therefore, makes a demand for gas to be so used, and the corporation can not refuse him. Probably fifty million of the commonest of drift-clay bricks, selling, when finished, in the local markets for \$4 or less per 1000, were burned last year, with natural gas in Ohio. Findlay, Fostoria, Tiffin and North Baltimore furnish the examples.

The burning of lime in new centres, with practically free gas has almost undone what was before a large and prosperous business in northern Ohio. The price of lime has been brought down close to 40 cents per barrel in this way. It is not to the public interest; it is decidedly opposed to such interest to have

prices temporarily revolutionized in this way. The small saving effected for the individual user by no means compensates for the loss and failure of established industries, to which intelligent care and wise economy have been for a lifetime devoted. There was abundant competition before to protect the community against exorbitant rates.

In this respect, again, the private companies have made fewer and far less costly mistakes than the municipal corporations. The latter furnished gas in small amounts to manufacturing establishments, it is true, while their pipe lines were full and the pressure was high, but as soon as the signs of declension in the field were made manifest they hastened to shake off these larger consumers and consequently they have but little to answer for under this head. They have wasted no gas in burning common brick and draining tile and have supplied but little to lime kilns, and this last they have generally sold by meter. They have also got rid of the few glass works and iron mills that they had taken on their lines as soon as possible after the real nature of the supply became apparent.

How shall I sum up the facts that have now been set forth as between the private companies and the municipal boards? The former appear at a decided advantage in almost every particular. They bring better knowledge and better training to their work than the municipal boards have generally secured; as a rule they lay and maintain better lines; they make a more adequate provision for their gas supply and thus pursue a more honorable policy by paying for what they take; they use the gas more economically; they refuse it for unfit and unworthy work; they make the domestic use of gas, in which as has been shown the public at large has by far the greatest interest, the highest and the favored use and tend thus to conserve the precious stock for the longest possible supply.

Why do the private companies adopt this, in the main, desirable policy? Are they actuated by general benevolence? Have they a deep concern in the public welfare? Are they large-hearted philanthropists, ready to make great sacrifices for the good of their fellows? I do not so understand the case. I take it that they are moved by the selfish considerations which we expect to find in the avenues of trade and commerce. They are in the gas business to make money and to make all they can. If they could be assured in some way that they could be better paid by burning every foot of gas that is tributary to their lines tomorrow or next year if it were possible, I know no reason for doubting that tomorrow or next year would see the last of natural gas, so far as their fields are concerned.

They are in the business to make money, I repeat, but they have had the sagacity to see that the domestic use of gas will bring in by far the largest revenues and those that will last longest.

But, you say, the companies that get control of a good gas field make the enormous fortunes out of it. Exactly so. And if the field is not good? They then stand a chance to lose their investments. The business is a mining venture. It has all the hazard that belongs to the search for gold or silver. You further say that the policy here indicated would result in the largest possible returns to the capitalists who constitute the gas company.

This is true, but certainly it is not on this account that I advocate it, but rather I advocate it in spite of this fact. Such companies have a right to be paid for the risk they take. There is another element that we must not leave out of the account and that is the benefit of the community at large. It is a less evil that unearned and undue returns shall flow to the coffers of these corporations than that the indescribable advantages of gaseous fuel, for example, shall be shortened for a city or town to a half or a tenth of the time which a wise management would render possible. To many persons, the growth of the colossal fortunes of the present seems one of the gravest dangers that threaten our institutions. I confess to sharing this feeling, but the growth of these enormous fortunes is so inwrought with the greatest and most beneficent characteristics of our time, as for instance in modes of transportation, in the communication and diffusion of news, in invention, in manufactures, in the supply of light, heat and power to large communities, characteristics the surrender of which would almost be a relapse into barbarism, that no one as yet seems strong enough and well enough to loose the seal and open the book—knots too hard to be untied are sometimes cut. It is always better that they should be untied.

What shall be said in summing up the case for the municipal gas boards of Ohio? From some points of view, the facts are mournful to contemplate. These corporations have, principally because of their ignorance of the business that they were called on to undertake, squandered in a brief period of time the contents of the wonderful treasury of heat, light and power to which they had found access. They have needlessly sacrificed a large part of the unspeakable advantages which the discovery of natural gas could have brought to their respective communities. They have wasted the substance of their gas fields in riotous display and in the commonest and

most unworthy uses. They have brought in by meretricious arts a vastly larger volume of manufactures than their towns are normally entitled to, and in so doing they have inflicted great loss and suffering on long established industries in other sections of the country. They have also made a more or less disastrous reaction a certainty when their short-lived stocks of buried power run out. As a rule, they have made no adequate provision for the payment of their gas bonds out of the proceeds of their gas plants.

I may have spoken of the municipal gas boards in such a way as to imply that the individual members are responsible for these unfortunate results, but let me disclaim all such reference. These gas trustees faithfully represent the majority of their communities and are often chosen from the most honored citizens of these communities. In making majorities, votes are counted, not weighed, it must be remembered. In Indiana, the private gas companies have followed the same policy that the municipal boards have adopted in Ohio. What is complained of in both districts is the lamentable state of ignorance of the facts involved, coupled with a sanguine enthusiasm that disregards the teachings of experience and an optimism that shuts out all discouraging facts.

It is in Ohio that we first find the principles of Nationalism unconsciously applied to mining enterprises, and I submit that Nationalism does not appear at an advantage in this line of work.

On the other hand, in the supply of cheap household fuel to the entire population, and in using the common resources of the town for the expansion of its industrial activity, have not the municipal corporations "builted better than they knew?" May we not find in their action some germs of great promise for the future?

It is certain that our progressive civilization will not stop short of gaseous fuel for all our compact and fairly prosperous populations in cities and towns. The advantages of such fuel are too great to allow them to be overlooked. Its economies are too important to allow them to be neglected.

Who shall supply the gaseous fuel? It will be supplied either by private companies or by the municipalities themselves. If a private company furnishes it, an indispensable condition of the manufacture is that it shall be profitable to the company. Every foot that is sold must yield some fraction of a cent in profit. You cannot make this fraction so small that it will not constitute an enormous aggregate of profit when the consumption of the city rises to one million, five million, ten

million, fifty or a hundred million feet per day. The companies that should succeed in this work would be certain to accumulate fortunes more towering even than any that we now know. The profits of illuminating gas companies are popularly believed to be enormous. We know that in many instances one dollar invested soon comes to stand for two, three, or more dollars, every dollar bringing good returns in interest all the while. But illuminating gas as compared with fuel gas would be a puny infant as compared with a full grown man. Do we wish, do we dare, deliberately and with distinct fore-knowledge to lay the foundations for more of these vast and threatening accumulations of capital?

If private companies are not to undertake this work the municipalities must. The great aggregate of profit that the former would require must be turned back to the people themselves in lower rates for fuel. Can the municipalities be trusted to do this work? Can they supply as good a product and at a lower rate than the great companies? Not as we know them now, I acknowledge, but it is only moral power that they lack. At least, if this can be adequately re-enforced, all other deficiencies can be supplied. To declare that the cities and towns cannot command their best talent and their best character for these public services is an abject confession of the failure of our system that I, for one, am not willing to make. A great revival of public spirit, a new birth of civic pride, a conscience enlarged to cover all that we owe to the State, these elements will qualify our cities to take care of themselves in this and all other needful ways.

THE CHAIR: Gentlemen, I confess for myself that I am very glad that I am here this evening. I have no doubt but all of you feel the same, after listening to the very able paper on Natural Gas by Prof. Orton, much more truth perhaps than any other man in the State could put in so many lines. It is true, as most of us here know, that there has been a great waste in natural gas, a terrible waste; but like all selfish nature (and humanity is composed largely of selfishness), I for one, and a great many of you, are the same, do not deplore this waste quite as much as some others, because it nearly killed our business a few years ago. Now, there is retaliation. While I admit myself, that is a deplorable state of affairs, there is no question about that, for I have seen what Prof. Orton has already stated, the gas escaping by a flame as if there were enough gas to last for a million years. The cry used to be, with those who were favored with natural gas, that it was inexhaustible and that it was manufactured as fast as it could be taken out of the earth.

Now, as I said before, it is a deplorable state of affairs, that a thing which is so useful should be wasted in this way. There is nothing in the shape of fuel that has ever been found or perhaps ever will be found as desirable in every way as natural gas. But, as those that were favored with it were bound to waste it, all I can say, as I said before, is that for one I don't know that I should cry very much about it. I think that the coal business, and we are all more or less engaged in that, will revive again and will be better than it has been for the last two or three years. The coal mining interests of the State have been very low, as we know. I at one time heard Prof. Orton here read a paper on natural gas, and at that time I had almost made up my mind that the coal business of this country was gone, but the first paper or lecture that I heard the professor read on that subject somewhat revived the feeling in me that everything would come all right, from the very fact that gas was exhaustable and we have seen that to a great extent it is. The deplorable condition of the affair is that it changed the business of the entire country. Now, you take Findlay, for instance. While a great many that have built plants there have made money, yet when the gas gives out, which it certainly will, you will find that Findlay will be a very dead town and those that have put there money there will be sorry for it. Then they will have to seek centers where they can get fuel, if not this new fuel that the Professor spoke about, they will at least go where they can get plenty of good coal.

PROF. ORTON: Speaking of the relation of coal dealers to natural gas, I would like to tell a little chapter of my own experience in Indiana. A thriving town in Indiana had struck gas and was making a very lavish use of it. The hotel was about a mile from the depot, and they had torches stretched along the street that made the night hideous. I found a gentleman at the hotel that was laboring with the gas trustees, telling them that they were not half advertising their town and that they ought to have arches instead of these single torches. I said, my friend, what business are you in. He said, "I am a coal dealer." [Applause and laughter.]

THE SECRETARY: Mr. President, I have here petitions for membership, and I think this is as good a time as any to present them to the institute.

They are—

Joseph Collier,.....	Pigeon Run, O.
P. F. Schmidt,.....	Post Boy, O.
R. R. Watt,.....	Barnesville, O.
Henry C. Lord,.....	Columbus, O.
J. B. Strawn,.....	Salem, O.
James Moss,.....	Byesville, O.
Ebenezer Lewis,.....	Krumroy, O.
William G. Atchison,.....	East Palestine, O.
James H. Burt,.....	Akron, O.
William Phillips,.....	Akron, O.
James Hicks,.....	Wellston, O.

THE CHAIR: This matter is before the institute and you can make a motion to have the secretary cast the ballot for all the candidates or in some other way.

PROF. ORTON: Mr. Chairman, I move that the secretary be instructed to cast the ballot of the association for the gentlemen whose names have been read.

The motion being seconded was unanimously adopted.

SECRETARY HASELTINE: Mr. President, I have a bill here, a House Bill, which was handed me to-day with the request that it be read before the institute of Mining Engineers and with a request that they take some action upon it, as expressing their sentiments for, or against it, for the enlightenment of the General Assembly as to the will of the members of the institute in this regard. It is entitled, "House Bill No. 1094" introduced by Mr. Taylor, of Guernsey County, "A Bill to establish a uniform system of keeping time throughout the State of Ohio."

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio,* That the lawful time of the State of Ohio shall be according to the reckoning of the system established and known as central standard time.

SEC. 2. This act shall take effect and be in force from and after the first day of April, 1891.

PROF. LORD: I move the following resolution:

Resolved, that in the opinion of Ohio Institute of the Mining Engineers a uniform system of time is highly desirable and that they recommend the adoption of standard time all over the State of Ohio and urge any legislative action which will conduce to that result.

After quite a lengthy discussion, the question coming upon the resolution of Prof. Lord, it was adopted.

MR. ROY: Mr. President, if it is not time yet to go home, I would like to bring up a subject which may need a little discussion. At your Massilon meeting last summer, I sent a paper which I believe was read by the president, not being able to get there myself, on the question of certificated mine bosses and mine inspectors. The matter was left over to be discussed at this meeting, I understand. Now I heard a very weighty remark made by Prof. Speer of the University. In this new mining department, there are some 20 or 25 students and about four-fifths of them are from the State of Pennsylvania. He said the reason was, which was a rather curious fact, that Pennsylvania provides for educated mine bosses and educated mine inspectors but has no school in which to educate them. Ohio has provided a mining school, yet makes no provision to educate her miners.

PROF. SPEER: There are a few statements that I would wish to correct. I do not want to be understood to have said to Mr. Roy that Ohio made no provision for educating miners. It does make provision for educating them but does not compel them to be educated.

After further discussson upon the subject, Mr. Wileman moved the following:

That the president appoint a committee of three to report tomorrow a proper resolution embodying a suitable bill to recommend for passage to the proper parties.

The motion being seconded, was carried, and the Chair appointed upon the committee Messrs. Wileman, Roy, and Haseltine.

SECRETARY HASELTINE: Mr. President and gentleman of the Institute: I find on my desk this afternoon a communication from the Jeffrey Manufacturing Company kindly offering to furnish transportation in carriages or busses or some other way for all of the members who desire to visit their works and they wish to be informed of our desire in the matter.

A MEMBER: I move that we accept the invitation extended to us by the Jeffreys Manufacturing Co. The motion, being seconded, is carried.

On motion the institute adjourned until Friday morning.

FRIDAY MORNING, JANUARY 23, 10 O'CLOCK A. M.

The Institute was called to order by the Secretary, who said:

President Howells intimated to me last evening that it was barely possible, owing to some legislation that was coming up, that he might not be present this morning, and asked that some one might take his place during the morning session. Now, what is the pleasure of the institute as to who shall act as president this morning?

A MEMBER—I propose Mr. Roy take the chair this morning.

The motion being seconded, was unanimously adopted.

MR. ROY—Mr. Secretary and gentlemen: There is nothing to do now except to push things, and the first thing on the programme is a paper by Mr. Ede. I have the pleasure of introducing Mr. Ede.