The ADSCO ADVOCATE

50th Anniversary
1877-1927

Fifty Years of Service in Proving, Perfecting and Extending District Heating and the Underground Transmission of Heat

Published by the American District Steam Company

North Tonawanda, N.Y.
HIS year the American District Steam Company celebrates its fiftieth corporate birthday.

If we could invite all our good friends to a big birthday party, we could and would make you feel that we do appreciate the part you have played in our success.

While we are fifty years old today, we do not “feel our age”. Many of those who so courageously backed Mr. BIRDSENN HOLLY in what others considered a visionary venture, have passed on; in their places we, as comparatively young men, pledge to you our best efforts in carrying on the work so ably started by Holly and his little group of far-sighted associates.

Officers - Directors
and Employees of
AMERICAN DISTRICT STEAM COMPANY
NORTH TONAWANDA, N.Y.

1927 Marks Golden Anniversary of District Heating
A Back Yard Experiment That Grew Into a Big Industry

BACK in the early sixties Mr. Birdsell Holly, who had invented the great “Sybills” Steam Fire Engine and the Rotary Pump, moved his machine manufacturing business from Seneca Falls, N.Y., to Lockport, N.Y., where he organized the Holly Manufacturing Company for the manufacture of sewing machines, skins and boxes, flat irons, sinks and many other articles of iron and brass. Later the company took up the manufacture of cistern pumps of all kinds and began building rotary pumps on a large scale. This necessitated larger and more modern shops.

Mr. Holly next perfected the system, now in universal use by water works, of pumping water under pressure into mains laid underground. The demand for this system became so great that shops for the manufacture of pumping machinery had to be more than doubled.

So far, all of Holly’s inventions had met with instant success. However, when next he advanced the scheme of heating buildings by steam from pipes laid underground, this newest idea was greeted with much criticism and pronounced by leading engineers, mechanics and trade papers as “foolish, visionary and totally impractical.” Failing to obtain either financial or moral support, Holly made experiments at his own expense to demonstrate his theory. He improvised a small boiler in the basement of his home on Chestnut Street in Lockport, N.Y., and laid a continuous 700 foot line of 1 ½” pipe around his back yard and the adjoining property. The pipe was covered with layers of asbestos, felt, building paper and finally manilla paper, secured with twine. As no wood casing could be obtained, 2” x 10” planks were used to make a wooden conduit. The trench was deep enough to provide a coverage of three and a half feet.

When steam was turned on, the installation worked even better than expected. Mr. Holly then had his residence fitted up with crude coils of pipe. Steam was first taken to the attic into what he called a distributor. From here supply pipes took it to coils in the various rooms. A loop in the basement served as a trap and returned the condensation
to the boiler. In spite of this demonstration the critics refused to believe that steam could be carried successfully for any considerable distance.

Holly, who had given up the active management of the Holly Manufacturing Co., tried to interest capital to develop his district heating scheme. After much discouragement he finally secured some financial help from men who, though without mechanical training, had imagination and foresight. It was some time before anyone with mechanical ability considered the underground distribution of steam anything but a foolish experiment.

In the spring of 1877, fifty years ago, Holly and his enthusiastic backers organized the Holly Steam Combination Company, Limited, with a capital of twenty-five thousand dollars. Their plan was to heat a section of Lockport. The town of Lockport willingly granted the new company a franchise to open the streets for the laying of steam pipes.

The company built a small boiler house and coil shed and a chimney 30' square by 30' high. The station was equipped with one second-hand upright boiler about seven feet in diameter and ten feet high with drop tubes. Drawings made by Holly on scraps of paper were used for making the expansion joints and other fittings. Bored-out wooden water pipe was used for the insulation and conduit covering the iron pipes. Guesses were made as to the proper size pipes to lay. The pipe sizes selected ranged from four inches down to two inches. The first season saw 2350 feet of mains laid connecting with the principal residences, churches, hotels and other buildings in the district. The service lines were three quarters or one inch pipe. With the mains in and connections made, the stage was set.

There was considerable excitement in Lockport the day steam was turned on. One of Mr. Holly’s young sons turned a valve and the mains were quickly filled with steam at thirty pounds pressure. In less than an hour the coils were hot in every building. The first chapter in district heating history had been written. The system was pronounced a success. Steam gauges in the buildings heated by the new system showed a loss in pressure of only two or three pounds. This was a revelation to the skeptical.

Everything ran smoothly for a few days; then trouble began. Foreign matter in the canal, such as small fish, lizards, eelgrass and paper stopped the boiler feed pumps. Screens were placed before the pumps but even these permitted much of the finer matter to find its way into the drop tubes of the boiler—and as they were solid on the ends over the fire, they could not be cleaned. The accumulated matter baked in, causing the tubes to burn off and put out the fires. This caused a number of embarrassing shut-downs for repairs during the first winter. However, none of the buildings on the line had abandoned their stoves or furnaces and were not greatly inconvenienced.

The company finally struggled through the winter and at a loss. Holly and his associates were even more enthusiastic and backed their confidence with cash and courage. During the summer more capital was called in and readily supplied. The company extended its mains 2,500 feet. Another boiler 5'x16' made by the Holly Manufacturing Co. was installed. The same summer the company also added to its prestige and revenue by installing plants at Auburn, New York; Garden City, Long Island, and at Soldier’s Home in Dayton, Ohio.

Very little trouble was experienced the second winter. The upright boiler in the station was equipped with new tubes but was used only when cleaning the horizontal boiler. Several extensions were made the following spring. The winter had been a good one; encouraging and profitable.

News of this radical departure in heating began to spread. Committees from other cities came to Lockport to investigate District Heating. New York capitalists sent Charles G. Emery, a noted engineer, to make experiments and tests. His report to his principals resulted in the installation of what is today the largest plant in the world for the distribution of steam for power and heating purposes.

Up to this time very little was thought of heating by exhaust steam, but in the winter of 1880 the company contracted with capitalists in an Eastern city for a large installation.
of this kind using both high and low pressure. Two eight inch lines were laid in one trench. One line supplied power at eighty pounds steam pressure to a large number of factories whose engines exhausted into the other line which heated several buildings. Since then exhaust steam has become an important factor in District Heating.

On January 19, 1881, The Holly Steam Combination Company, Limited, was reorganized to take care of a rapidly growing industry and utility. The name was changed to the American District Steam Company. The officers and trustees of the company (among whom were the original backers) were David F. Bishop, M.D., President; Ransom Scott, shirt manufacturer, Lockport, Vice-President; Isaac H. Babcock, connected with the Farmers & Mechanics Savings Bank, Lockport, Treasurer; Barnett D. Hall, dry goods merchant, Lockport, Secretary; Birdstill Holly, Consulting Engineer and E. P. Holly, Chief Engineer. Besides the officers, other trustees of the company were Wal-

lace C. Andrews, wealthy capitalist of Cleveland, Chas. Emery, noted Engineer of New York City, Nathaniel Lerch, prosperous farmer near Lockport and Rufus E. Rockwell, Saratoga Rogers and Alfred E. Ten

ant, prominent business men of Lockport. The new company was capitalized at ten million dollars.

At the time of its reorganization the company was busy installing a number of plants both in Pennsylvania and in the West, the profits from which were used to buy more boilers for the Lockport plant. The company decided, however, not to extend its lines until those already laid were better loaded. This was a wise move because that winter proved that many of the pipes were entirely too small. It was necessary to enlarge several of the mains and to build a larger stack at the Station on Elm Street.

As the success of the Lockport heating plant was discussed by city officials and utility executives elsewhere, the new company received many inquiries which developed into installation contracts. The following is a partial list of some of the steam heating and power companies who went into the heating business under the Holly patents during the first few years of the company's existence— from 1877 to 1887: Lockport, N.Y.; Auburn, N.Y.; Springfield, Mass.; Dubuque, Iowa; Burlington, Iowa; Garden City, L. I.; New Haven, Conn.; Belleville, Ill.; Denver, Colo.; New York, N. Y.; Williamsport, Pa.; Clearfield, Pa.; Bellefonte, Pa.; Phillipsburg, Pa.; Lock Haven, Pa.; Bloomsgrove, Pa.; Wilkesbarre, Pa.; Reading, Pa.; Harrisburg, Pa.; Hazelton, Pa.

The above includes most of the important installations during the first ten years of business and represented an aggregate investment of several million dollars in plant and equipment.

The size of the installations ranged from one and one-half to sixteen miles of underground pipe.

For several years steam was sold at a flat rate. Mr. Holly realized the folly of this procedure and solved the problem by designing a meter. The meter showed that many customers were using twice as much steam as they required for satisfactory service. The installation of meters stopped waste and for some time it was possible to dispense with the use of one boiler at the Lockport plant. Other improvements were also made, one of which was a varia
tor which took the place of the junction box. The varistor, being a closed or packless expansion joint, eliminated the need for many manholes in the streets.

The manufacture of traps, regulators, meters and other equipment required by the company kept the Lockport machine shops busy. They regarded the Holly Steam Combination Company, Limited, as a "good thing"—and charged such enormous prices that the company, which had confined its activities to the sale of steam in Lockport and the installation of District Heating plants in various parts of the country, decided to operate shops of their own for the manufacture of their devices.

The first shop was located in two rented rooms over a store on Main Street. The equipment which consisted of one 18-inch lathe, one 18-inch and one 12-inch drill, a 20-inch planer and a one-man pattern shop, enabled the company to make its own patterns and manufacture its own traps, regulators and meters, but not the larger devices which were still built by other local shops. The pay-roll started off with five men.

As more contracts for underground work came in and the demand for heat in Lockport increased, the Company built new coal sheds at the heating station on Elm Street and converted the old ones into a two story shop — 34 feet by 100 feet. Here it was able, for the time being, to manufacture all of its products. The building had no elevators. Everything was hoisted by block and tackle...
through a trap door. The shop as well as the boiler house was illuminated at night by kerosene "boat lamps."

In the early days Holly had designed a sheet metal atmospheric steam radiator to take the place of the crude and unsightly coil box. For the next few years many of these were sold to parties using district heat. Mr. Holly now brought out the iron pipe atmospheric radiator. Hundreds of these were made and sold to district heating plants throughout the country. Shortly after, the Walworth Company brought out an iron pipe radiator and the Reed Company brought out the first cast iron radiators. Steam heating was becoming very popular.

The company outgrew its second shop in a few years. A larger and more modern four-story building was erected across Elm Street and equipped with modern tools throughout. In a short time, this also proved too small. An addition was built, in which provision was made for the company's first drafting room and engineering department. Up until this time all castings were made by Lockport foundries and at a considerable cost to the company. The volume was constantly swelling and the economy of a company foundry became apparent. It was decided to build modern foundries at North Tonawanda, N. Y. This step proved itself, for soon they were producing their own castings for about one-half the previous cost. As a result of all of these improvements and the continuing good business, a reserve was established, dividends declared and later the company was able to build the present large and modern shops at North Tonawanda, N. Y.

Mr. Holly did not live to see the full realization of his early efforts in central station heating. After giving to the world his many valuable inventions, he died in 1894, a comparatively poor man.

During the years that intervened between 1880 and the building of the present plant in North Tonawanda, N. Y., several changes were made in the board of trustees and officers of the company. Wallace C. Andrews, then also president of the New York Steam Company, became president of the American District Steam Company. On April 7, 1899, Mr. Andrews met with a tragic death in New York City. His mansion on Fifth Avenue was destroyed by fire. Mr. and Mrs. Andrews, Mr. Andrews' sister—Mrs. G. C. St. John and her three children, who were then visiting there, together with a number of servants, perished in the flames. Mr. St. John, who was located in the West, moved to New York to take charge of Mr. Andrews' affairs. He succeeded Mr. Andrews as president of the New York Steam Company, the American District Steam Company and as an officer and director of many other companies in which Mr. Andrews was interested. He remained president of the New York Steam Company until 1920 and still continues as president of the American District Steam Company. Mr. St. John, who has retired as an officer and director of many of the companies in which he was active, devotes much of his time to the Wallace-Andrews charitable inter-ests, including the Andrews Institute for Girls at Willoughby, Ohio, which Mr. Andrews endowed with four million dollars.

The active management of the American District Steam Co. is under Mr. Robert Hall, Vice-President and General Manager. The Steam Company has grown at an unprecedented rate since it moved into the North Tonawanda plant and today is recognized as the authority on underground distribution of steam for power and heating purposes. Mr. Hall, who is a son of the late Barnett D. Hall, one of the original promoters and the first secretary of the Steam Company, became interested in district heating at an early age. In 1894 David F. Bishop, then president of the Company, sent young Mr. Hall to Scranton to assist with some underground construction work and asked him to make any suggestions he could for improvements. Out of various recommendations made, many are in use today.

That Fall and in the Spring of 1895, Mr. Hall completed a business course at Bryan & Stratton Business School in Buffalo, N. Y. In the Fall of 1895 he decided on a college career. Desiring to study electrical and mechanical engineering, he selected Union College in Schenectady, where Mr. Charles Steinmetz was attracting world-wide attention as an electrical wizard. For the next two and one-half years he attended Union College, working in the General Electric Co.'s shops in Schenectady during the summer months. His college career terminated with an attack of typhoid. Recovering from this, he entered the employ of the Steam Company, starting in on field and construction work, in which his engineering training proved invaluable. Having a keen engineering mind and a penchant for improving things, he rose rapidly through the ranks, occupying positions in every department. This broad experience fitted him admirably for his present position of Vice-President and General Manager. Mr. Hall has surrounded himself with able men in the department—many of whom are personally known throughout the district heating field.

In order to more advantageously handle construction work and piping installations, the Steam Company in the summer of 1925 incorporated in New York State the Northeastern Piping & Construction Corp. During the same year its other subsidiary, the Canadian District Steam Company, Limited, was organized under Dominion charter to take care of district heating installations anywhere in Canada. Branch offices and agencies are maintained in all of the principal cities of both countries. At the head office in North Tonawanda there has recently been established an "Engineers' Service Department" which is doing a vast amount of helpful work by placing before engineers the experience of half a century through suggestions, criticisms and recommendations, freely given on any problems submitted having to do with steam or hot water distribution.

During 1927 the business of the American District Steam Company has been the largest in its history. With the growing interest in District Heating apparent everywhere today, the outlook for the future is exceedingly bright.
Fathers of District Heating

Birdsill Holly, who conceived the idea of District Heating.

John D. Walsh, who devoted his life to the development of District Heating.

District Heating — a Monument to Birdsill Holly and John D. Walsh

A Dream of Yesterday — Today a Reality

Shortly after the death of Birdsill Holly in 1894, the following appeared in the Buffalo Express under the heading — "Some Achievements in the Life of the Distinguished Inventor and Engineer of Lockport — A Useful and Busy Career."

"We publish a portrait today of a man to whose genius many a town in this and other countries is lastingly indebted. The city of Lockport may always be proud that it was his home. That man was Birdsill Holly, the inventor of the Holly system of water-works, now generally used in the United States and many places in other lands.

"Mr. Holly was born in Auburn, N.Y., August 8, 1820, and was reared in that town and at Seneca Falls where his father, Birdsill Holly, Sr., a skilled mechanic and millwright, died in 1828. Like the father, the son became an expert mechanic. When a young man he went to Unions town, Fayette County, Pa., where he first became superintendent, and afterwards proprietor, of a large shop, which he conducted for a few years. Returning to Seneca Falls, he became a member of the manufacturing firm of Silsby, Race & Holly, and engaged for several years in the manufacture of hydraulic machinery.

"Mr. Holly gave the greater part of his life, from that time on, to his inventions, of which he perfected and patented over 150. Some of these inventions in machinery were bought in Europe, where the machines are now manufactured. But the invention with which Birdsill Holly's name will always be best identified is that of the Holly system of water-works. Keeping pace with the rapid march of modern progress, very marked improvements have been made in supplying cities in this country with water. The builders of pumping machinery for this system, the Holly Manufacturing Company, organized in 1859, have now a capital of $1,000,000; employ 500 men and their works occupy over two blocks in Lockport. They have already placed their system in over 2,000 towns and cities of the United States and Canada where it is now in successful operation. The Holly system not only supplies a city with water, but dispenses with fire-engines and requires no reservoir or stand-pipe. These results are accomplished by placing a set of pumping machinery in a convenient building where the water is received, and from which it is pumped into mains and pipes.

"Birdsill Holly gave long years of hard study and persistent labor to the development and perfection of many useful and important labor-saving machines, and is justly entitled to the high rank which he holds among the great inventors of this wonderful century of mechanical progress. He was a firm
believed in the practicability and commercial value of the proposed hydraulic canal from the Niagara River to Lockport."

Although Mr. Holly was best known by his System of Water-Works, he devoted the last seventeen years of his life to the development of his ideas for District Steam Heating.

Up to 1881 he had two American Patents issued to him, covering the general idea of District Steam Heating, Steam Generators for warming buildings, Street Mains, Meter Valves, Steam Heating Radiators, Steam Meters and Steam Pressure Regulators—three English Patents—six French and Belgian Patents and two German Patents, covering many of the same items. These patents were added to until he had issued to him over fifty different patents, covering much of the equipment used in District Heating.

Mr. John D. Walsh was closely associated with Mr. Holly in working out his many patents, both for the Water-Works System and District Heating. Walsh was born of a poor family. His father was a mechanic. At the age of seventeen, young Walsh enlisted in the service for the Civil War. He was injured in action, a bullet piercing the calf of his leg, incapacitating him for future conflicts.

At the close of the war, he was honorably discharged and entered the employ of the Holly Manufacturing Company as an apprentice in the Pattern Department where, after learning the trade, he remained for several years as a full-fledged Pattern Maker.

Walsh was of an extremely mechanical mind and was called upon repeatedly to carry thru various ideas conceived by Mr. Holly. When Mr. Holly's mind gave birth to the idea of heating thru underground mains, Mr. Walsh assisted him on all details, even to the installation of the first system in Mr. Holly's back yard in Lockport.

Walsh, in addition to his duties as superintendent of the Company during all these years, made all the drawings for the pattern shop and for the street work, as well as contributing his genius as an inventor, whenever the occasion demanded. For thirty-eight years he was engaged in the work he loved so dearly and he happily saw the culmination of his endeavors in the construction of the most modern shops that now exist at North Tonawanda.

Leading Figures in District Heating
Review Past Progress
Predict Bright Future

Within the past few years District Heating has forged ahead at a remarkable rate. Perhaps the greatest factor contributing to this growth has been the solution by the industry of the many problems which confronted it in the past. Those who are close to the industry regard the future outlook as bright and predict that the demand for steam service should multiply many fold within the next few years.

A. W. Robertson, president of the Allegheny County Steam Company Pittsburgh, Pa., summarized the situation in these words:

"In our opinion district steam heating is here to stay. We have been in the business since 1912. During the first few years many difficulties were encountered, making it almost impossible to make our service attractive to the customer. However, during the last few years there has been a radical change in the situation. Much has been accomplished and a considerable increase in business has been obtained both in number of customers served and in the amount of steam distributed during this period. We have very materially reduced the rates and improved our service."

Recalling some of the haphazard business methods in force in the industry and expressing satisfaction concerning present policies, A. E. Bettis, vice-president of the Kansas City Power and Light Company, writes:

"It was extremely unfortunate for the heating industry that at its beginning rates were quoted so low that the business became unprofitable and a burden to the operator. This condition, however, I believe is being largely corrected and the heating industry is becoming every day more of a financial success. I believe that a great deal of this success is due to the constant and vigilant assistance of the American District Steam Company."

The present financial success of the industry is again exemplified by William J. Baldwin, Jr., assistant secretary of the New York Steam Corporation, who explains the present strong position of his concern:

"Prior to 1915 our development was rather slow compared to its very large growth during the past four years. For the fiscal year ending June 30, 1923, the gross earnings were $7,500,000.

"While we are the largest steam utility company, the fact is we supply only two comparatively small sections of the city. The future possibilities of this great metropolis are enormous and although we are actually six months older than the great New York Edison Company, we are still in a very infant stage as compared to what we can and will be in the not far future."

How the public regards district steam heating when offered as a steady service at a fair price is stated briefly by C. B. Holliday of the Central Illinois Light Company of Peoria, Illinois:

"The business district has welcomed central station heating and at the present time practically every building within the district reached by mains is served."

Public acceptance of district heating is also observed by O. W. Kastens
of the Consumers Power Company of Grand Rapids, Mich. He views the situation from the viewpoint of the customers and also observes a benefit reflected in civic improvement. He says:

"District heating in Grand Rapids is looked upon with favor by community and civic officials. This makes me very optimistic for the future of central heating, not only from the basis of cost to the consumer but also from the advantages which accrue to the community served. It eliminates smoke in the commercial and residential sections. It reduces the amount and frequency of coal deliveries and ash removals. This is bound to result in a decrease of traffic on city streets. It will reduce the fire hazard and thereby reduce the cost of insurance premiums. These advantages alone are enough to assure the future of district heating."

That the community derives a benefit from district steam heating is expressed by these words of A. D. Leach, superintendent of the steam heat department of the Northwestern Electric Company, of Portland, Ore.

"A great amount of traffic has been relieved in the congested area through the elimination of fuel deliveries. In addition to this, the air has been purified considerably due to the discontinuing of some 350 smoke producing chimneys."

Mr. Leach, speaking of the growth in recent years, said:

"District heating not only reduces traffic congestion, fire risks, smoke nuisance, coal deliveries and ash collections but increases the comfort of living."

"Due to a 700% increase in the amount of steam used in the last five years, it was necessary to install more plant capacity in addition to the 3000 H.P. then feeding the exhaust system."

"Central station steam heating has been popular in this city, and it is conservatively estimated that before the end of the next ten years the company will require the delivery of one billion pounds of steam to satisfy the demands of customers."

Another example of a continuous, healthy growth has been experienced in Erie, Pa. H. C. Thuerk of the Home Heating Company of that city, wrote:

"District steam heating is proving popular in Erie. We are this year adding 10% to the total length of mains already installed. The number of customers will probably increase 10%. In addition, we are replacing some of the present mains and replacing them with larger ones."

"For a number of years we have used the services and equipment of the American District Steam Company and have been very well pleased with the results obtained from both."

Mr. T. S. Ayers, Supt. of Distribution of Central Station Heating in St. Louis, Mo., gives some interesting facts relative to the growth and dependability of his local plant as follows:

"Mr. T. S. Ayers, Supt. of Distribution of Central Station Heating in St. Louis, Mo., gives some interesting facts relative to the growth and dependability of his local plant as follows:

"The first Central Station plant was installed in 1917 when 4000 H.P. boilers were put in the Tenth St. Station."

"We now have about 22,000 feet of underground mains with the extreme travel of about 7,000 ft. and all lines constructed for 250 lb. pressure."

"We furnish steam to practically all stores, hotels, theatres, restaurants and office buildings that are in our district and new buildings are being constructed with no provisions for heating plants, depending entirely upon Central Station service."

"The two prominent newspapers—one morning and one evening—have depended entirely on us to give them 100 lbs. continuous service and in five years on no occasion has it been necessary for them to shut down due to our failure to serve them. This certainly is an endorsement of Central Station dependability."

Not only did the idea of district steam heating originate with Mr. Holly, founder of the American District Steam Company, but his successors have maintained a commanding position in the industry. An observer on this point, C. B. Holiday of the Central Illinois Light Company of Peoria, Illinois, remarks:

"In addition to the original installa-

"In addition to the original installation made in 1903, the American District Steam Company has installed many of the distribution mains now in use, and practically all of the valves, expansion joints, fittings and wood log casing have been of American District Steam Company manufacture."

"Something of the reliability of service with which this equipment has enabled us to maintain is conveyed by the fact that none of the buildings served have any other means of heating."

In the case of the York Steam Heating Company of York, Pa., the advice and assistance of the American District Steam Company turned what was an unprofitable property into a successful paying enterprise. Gordon Campbell, president of the company, describes their experience in the following words:

"We are very well satisfied with our steam heating system and the service seems to be popular. As you know, this was not the case at one time. Steam had been sold on a flat rate, resulting in excessive consumption and inadequate returns. Also, due to inferior drainage from our old construction, there had been considerable deterioration which necessitated partial re-construction. This was brought to the attention of our customers to determine whether to
put money in re-construction or discontinue the service. The outcome was that our customers signed up almost unanimously for the continuance of the service at higher rates, and an important section of the system was re-constructed by you last year, with the benefit of the latest engineering knowledge.

"Since then we have had little trouble; our customers are satisfied and the number has increased. We can, therefore, say that steam heating is a success and with us constitutes one of our most reliable sources of revenue.

"We know that you have been consistent in your faith in district steam heating and have, by your advice and assistance, been influential in bringing about this satisfactory outcome from most discouraging premises.

"We desire to express our appreciation of your cooperation and our hope for your further success in this field."

Another operator, Charles A. Collier, vice-president of the Georgia Power Company, commends the American District Steam Company for the part it has played in their growth:

"We have asked assistance of the American District Steam Company and their cooperation and help have been very fine. We are very happy to extend to them our best wishes on the occasion of their fiftieth corporate birthday."

With the American District Steam Company at the half century mark and with the leading engineers in the District Heating industry ever on the alert for new improvements, C. L. Edgar, president of the Edison Electric Illuminating Company of Boston, indulges in a bit of optimism for the future of the industry:

"District steam heating is becoming very popular, and the industry is rapidly growing throughout the country. It is reasonable to predict that in the near future district steam heating service will be universally supplied in our large cities as electricity, gas and water are now supplied."

D. S. Boyd, superintendent of Heating of the Edison Electric Illuminating Company of Boston, expresses almost the same thought regarding the future of central plant heating in the following remarks:

"District steam heating is a distinct civic improvement to the community in which it operates, and it is reasonable to expect that in the near future steam service will take its place among our present indispensable utilities."

A. W. Robertson, president of the Allegheny County Steam Heating Company in reviewing the past progress of the industry and speculating upon its future, sums up his opinion in this encouraging expression:

"Civic progress of large communities demands suitable steam service. We must be prepared to supply this demand; there is no way in which this responsibility can be neglected."

"In the past the American District Steam Company has contributed greatly to the development of the distribution problem. It is our hope that this company may continue to further contribute to this good work."

Today District Heating is well organized and on a sound business basis.

**The Future of District Heating**

*By Robert Hall*

Vice-President and Manager, American District Steam Company

**The** broad acceptance of any idea or movement depends largely on the average man's familiarity and confidence. The idea of District Heating has reached the stage where business men are discussing it intelligently in their offices, at their clubs, in pullman smokers and wherever men talk things over.

Cities are granting franchises for central station heat. New real estate developments are being heated from a single boiler plant. Articles on the subject are appearing in magazines and business publications. Bankers are backing new heating enterprises as illustrated by recent bond issues. All this is creating a tremendous interest in District Heating.

In the vast audience of those who are watching with keen interest the development of District Heating, are to be found outstanding national figures who direct the affairs of public utilities, executives of large industrial organizations, capitalists, architects, engineers, building owners and operators and a host of substantial citizens, who see in District Heating the ultimate and ideal solution to the heating problem.
In Fifty Years District Heating has spread from Lockport, New York, to all parts of the United States and Canada

The dots graphically portray the extent of district heating. The plants shown by dots represent the investment of millions of dollars—and the operation of hundreds of miles of underground mains, both low and high pressure, by public utilities, municipalities, colleges, institutions and manufacturing plants.
During the present year, millions of dollars are being spent for new boiler plants and underground steam distribution systems. Other millions of dollars are being spent for enlarging and extending present heating plants. New heating customers are petitioning for service in unprecedented numbers.

One may ask "Why was such a desirable industry not established in every city years ago; why such a rapid growth today?" The answer is disclosed through a study of facts and conditions.

As already mentioned, broad acceptance follows intimate knowledge. Until recently, District Heating was scarcely heard of by the average man. Utility companies were striving to keep pace with the phenomenal progress in the electrical field and in the distribution of water and gas. Few experienced District Heating engineers were available. Financing was difficult and expensive. Some of the plants in operation showed unsatisfactory returns either from selling steam on a flat rate basis or by establishing inadequate rates when sold by meter.

With the passing of the years all of these conditions have been corrected. Early in the history of the heating industry many plants were installed in widely separated localities—from New York to Seattle and from Brandon, Manitoba to Birmingham, Alabama. The results obtained in operation served as a guide in the designing and building of new plants.

Today, by observation and frequent contacts, a wealth of valuable operating data and statistics has been amassed. The diversity of the plants that have been installed—exhaust and live steam, low pressure and high—has led to a knowledge from which can be drawn dependable designs for new installations to meet any combination of conditions.

The organization of the National District Heating Association, 18 years ago, was the first definite step toward the free exchange of ideas which has contributed so much to better service, more economical operation and improved earnings from heating properties.

Engineers, plant operators, superintendents and managers who have contributed generously to the advancement of District Heating, have acquired much of their knowledge from the Association. Returning from the annual conventions, they have applied and passed on to their associates the knowledge which they acquired. Today, there is available a large number of District Heating engineers who, as plant managers and operators, are well equipped to render a splendid account of heating properties entrusted to them.

In passing, a tribute to an outstanding figure is timely. The success of the National District Heating Association is due in no small measure to Mr. D. L. Gaskill of Greenville, Ohio, the secretary and treasurer of the Association since its inception. Mr. Gaskill is known to all in the District Heating field as an untiring worker.

Today, utility companies are well organized to care for their electric, water and gas service and are seeking additional avenues for broadening their service to the public. With but few additions to their personnel, they find they can operate a District Heating plant with only slight additional overhead and by reason of their familiarity with this character of service, many savings can be effected.

While it is true that the desirability of District Heating is appreciated by all who are familiar with the subject, some of the benefits are not so manifest as others. The obvious advantages of District Heating are the...
elimination of coal, ashes, wages of engineers and firemen and the certainty of sufficient heat at all hours of the day. Equally important, but perhaps not so quickly grasped, are the safety of fireless heat, the saving of space previously occupied by coal, ashes, boilers, chimney, etc., which can be turned to useful or profitable service. The architect and building owner realize that thousands of dollars can be saved by eliminating boilers and chimneys.

One of the large buildings, buying steam from the Kansas City Power & Light Company, more than pays for all the steam required during the year from the annual rent of basement space, previously occupied by boilers and coal pits. When executives consider the saving in depreciation and upkeep of boiler plants and equipment, the great reduction in fire risk and improved health from cleaner air and uniform temperatures, the factors in favor of District Heating are beyond number, reasons for its popularity today are the saving devices, is not content to use up the potential of the fuel, and is fast learning that District Heating brings all these and other advantages, including economy.

With the art of District Heating perfected, with its manifold advantages becoming public knowledge, with utility companies anxious to render heating service, there remains merely the matter of financing. Bankers, who are familiar with utility financing, tell us that public utility corporations today command the confidence of the investing public as never before. Heating companies are showing annual statements, which prove beyond doubt that steam can be sold at a rate which is both popular and profitable.

The financing, then, of any district heating project, backed by responsibility, amply justified, properly designed and installed and efficiently managed, should present small difficulty. Each installation is an engineering problem and must be so considered. To be assured of utmost success, the heating plant must be designed to meet local conditions. The importance of this is apparent from a glance at present plants.

In reviewing hundreds of installations made by the American District Steam Company, a number of interesting variations and applications reflect trends and possibilities. In some of the larger cities, high pressure steam is being sold for operating printing presses, elevators and steam engines. Hotels and restaurants are using District Steam for cooking. In St. Louis distribution lines are designed to carry steam at 250 pounds pressure. Incidentally, a 5,000 foot run of 20 inch steel pipe was installed in that system without a flanged or screwed connection, everything being welded. Even the valves, expansion joints and special fittings were welded into the line.

Another interesting construction is in Saginaw, Mich., where the entire underground steam line conduit was completely waterproofed. This was necessary because at certain seasons of the year, high water is within a foot or two of the surface of some of the streets. In Rochester, N. Y., there are many kinds of underground construction and some innovations. A high pressure booster line is employed to carry high pressure superheated steam from the boiler to the center of distribution of the low pressure system. The idea of high pressure feed lines is being applied to many of the later installations and shows attractive economies.

In the boiler plant much progress has been made. Pittsburgh, Rochester, Cleveland and other modern plants use pulverized coal and employ automatic equipment which cuts labor expense to a minimum.

Another economy is effected in Winnipeg, Manitoba, where cheap off-peak electric power from the hydro development is used at night to generate steam in electric boilers. This permits of banking the coal boilers for several hours. The same idea will probably be employed in the new London, Ontario, plant, using off-peak electric power from Niagara Falls. All of these interesting variations are exceedingly helpful in studying economies for existing properties and in designing new District Heating plants.

Under consideration at the present time are some of the largest heating installations ever conceived. The electric utilities are leading the field, not only because they are the logical people to sell steam, but because they frequently have favorably located boiler plants suitable for supplying steam to a District Heating System. The ability to furnish steam heat invariably brings them worth while business otherwise denied to them.

While industrial plants, colleges and other group buildings are constantly applying the idea of central or district heating to solve power and heating problems, by far the greatest progress in underground transmission of heat will come through supplying the heating requirements of business and residential sections. There are hundreds of cities and communities where district heating offers attractive opportunities for development.

With organization, experience and finances available, there is no good reason why every city in the heating zone should not have a district heating service within the next few years. It is to bring to each of these future installations the knowledge and experience of fifty years of specialization that this company is committed.

The ability to furnish steam heat brings worth while business otherwise denied them.
Gross earnings of the New York Steam Company, 1913—1926 Inclusive.

Early Plants Successfully Operating Today
Continually Serving Wider Areas

Many of the most successful companies in the district heating business have been operating for nearly half a century. The largest of these, the New York Steam Corporation, was organized forty-five years ago (1882) by Wallace C. Andrews. In 1921 the corporation was reorganized with James D. Hurd of the National City Company as president.

During the past five years, the company has made rapid progress. One of the reasons for this remarkable growth was the extension of the street mains into what is known as the 42nd Street midtown section. This required an investment of several million dollars. It was undertaken only after somewhat urgent requests of the 42nd Street Property Owners & Merchants Association and the prominent real estate operators and owners in the district.

Within a three-year period the principal streets of almost the entire section from 28th Street north to 45th Street and from East River to Sixth Avenue have been included in the new extensions. The majority of the large important buildings in that section are now being supplied with steam from the street mains.

During the last year the corporation has started its extensions in the Broadway district as far west as Fifth Avenue. Among the new customers are more than 25 theater buildings, including the Schubert group. A few of the commercial buildings now heated are the General Motors, U. S. Rubber Company, Carnegie Hall, New York Journal, the Lefcourt and several hundred others in the Broadway district.

To meet the demands of this important growing industry, the Corporation has erected a new boiler plant at 35th Street and East River with distributing mains which interlock with its several other stations and which connect with the Waterside plant of the New York Edison Company. This tying in of mains gives great flexibility to the distribution system. The new boiler plant will ultimately approximate 140,000 boiler horse-power, over one-third of which is now available. The type of street steam main construction is such that the life of the mains is indefinite, thus insuring uninterrupted service at all times.

Steam is supplied at practically any pressure required for heating, hot water, kitchen requirements, manufacturing purposes and for operating high pressure engines, pumps, etc.

In addition to the excellent physical and operating condition of its property, the Corporation's financial position, as shown by its Annual Report, is favorable. Its bonds and preferred stock are handled through its own money market, which resulted in decreased operating costs. The company has always paid a fair rate of return.

Among the first plants to supply steam for heating as a by-product was the Iowa Railway & Light Corporation of Cedar Rapids. This corporation was originally organized as a coal and power company. After making a survey of construction costs and estimated profits, a heating system was installed by the American District Steam Company in 1892.

A gradual and continuous growth of steam heating business parallel with electrical load was experienced in Cedar Rapids. At intervals of from two to five years the American...
District Steam Company has been called on to install additional mains and equipment. Today the Iowa Railway and Light Corporation has five underground steam lines out of its 36,000 K. W. Cedar Rapids Plant.

An idea of how intensively it is possible to serve a community where district steam heating is available may be gained from the present situation in Springfield, Illinois.

In 1898 the Illinois Power Company constructed their first district steam plant in Springfield. The system consisted of about 6 blocks of mains, ranging from 4" to 20" in the business district. In 1923, 1924 and 1925 the system was rebuilt and extended so that today there is a total of more than 4½ miles of mains. Ninety-seven per cent of the buildings in the business section are heated by this company. The entire system is operated on 3 pounds exhaust pressure.

The Illinois Power Company also operates a pressure hot water circulating system, consisting of over five and one half miles of mains ranging from 3" to 16".

Lack of space prevents us from describing the growth of other early plants including those operating since the '90's in several Pennsylvania cities such as Wilkes Barre, Johnstown, Reading, Allentown, Pottsville and Harrisburg, the latter plant having grown from three customers in 1886 to 1190 customers today, all of whom, in the words of P. A. Elias, vice-president of the Harrisburg Light & Power Company, "are well satisfied with the service."

Adęsco Red Diamond Brand Casing and Expansion Joints solve many problems of underground steam distribution.

Adesco Red Diamond Brand Casing and Expansion Joints solve many problems of underground steam distribution.

Adesco Multicell Tile is widely used both for high and low pressure installations.

Improvements in Equipment Have Contributed to Advancement of District Heating

WHEN District Heating first became a reality, there was an immediate need for new materials, devices and equipment. The fathers of District Heating had to feed and clothe this infant industry. It is largely due to the engineering skill and inventive genius exercised by those pioneers that District Heating has progressed so rapidly. The chief and immediate problems encountered had to do with the installation of steam mains. There was no established practice for any extensive piping.

The Evolution of Pipe Joints

The first and most commonly used method of joining the lengths of wrought iron and steel pipe together was by screwing couplings over the threaded ends. Later, the use of "long recessed" couplings facilitated making these joints. This method is still used extensively, particularly with the smaller size pipes. After many years, it was found that in some places the corrosive action of condensate, and outside moisture, eating into the pipe, caused leaks around the joints, since the threads in the pipe left but little metal at these points. When the oxy-acetylene method of welding was introduced, Adesco realized the value of welding in District Heating installations and was quick to experiment and subsequently adopt its use.

Experiments in welding proved many things of interest to the District Heating industry. A pipe weld could be made in a given time by an expert welder, using the proper equipment and materials, that would be stronger than the rest of the pipe, absolutely steam tight and could be so guaranteed." On the other hand, a good welder, but not an expert in this special branch of the art, with the same equipment could make, apparently, the same joint but it might leak steam, be subject to internal strains that later would crack the joint or might "burn" the metal and produce a joint of doubtful strength or dependability. Also, an expert man, using the wrong equipment or materials, might do no better. The great importance of a guaranteed weld in underground construction is manifest to all. In order to so guarantee its work, it has been imperative for Adesco to rigidly school its corps of expert welders and watch its welding with consummate care.

Later, when electric arc welding was perfected, more extensive use of welding became possible. The use of seven units of Fordson tractors, with welding generators mounted in the rear, provides Adesco's subsidiary construction company with mobile equipment to weld many miles of piping in a season. Both the electric and gas method of welding are used—often both on the same installation, since each method has its peculiar advantages.

Various kinds of flanged joints are used, including the Van Stone and Adesco-Van Stone type, and other similar joints, particularly between the pipe and fittings. With proper welding and fittings, complete underground steam distribution systems are now being installed having no flanged or screwed joints, everything being welded; the pipe welded direct to steel fittings. This construction is being most successfully used, even...
in extreme conditions with operating pressures over 300 pounds to the square inch, and with high superheat.

Providing for Pipe Expansion

That characteristic of metal, which causes it to expand when heated, is a most important factor in the design of District Heating piping. In the early days, junction boxes, so-called, were designed to serve as expansion joints. From a study of the failure of various designs of expansion joints and through experimentation with scores of new types, there has been developed over a long period, a knowledge of the fundamental requirements of expansion devices for every operating condition of pressure and temperature.

Designing new expansion joints seems to be a favorite pastime for many. Almost every month one hears of a new expansion joint. The uninitiated may easily select a new and untried joint which is cleverly illustrated and described. Although scores of different joints are submitted to ADSCO engineers, there are exceedingly few they would feel safe in installing in underground steam lines, where dependability, long service and freedom from attention are so important.

ADS CO joints have been designed especially for the severe service of District Heating companies. Thousands of these joints have been in continuous operation under the streets of scores of cities for a quarter of a century and more. The "variat or", which is a closed type or pack less expansion device, eliminates the need of manholes. It absorbs the pipe expansion on corrugated sheet metal diaphragms strengthened by steel backing plates.

For high pressure and high temperature steam lines, a special joint called the "ADSCO Duplex-Sleeve Guided" expansion joint assures a tight joint. This joint, because of its special construction, has been holding tight for years in long lines transmitting steam at 300 pounds and 600 degrees. The Duplex and other special joints are illustrated in a comprehensive bulletin on expansion equipment.

Special Valves for Underground Service

To lend flexibility to the steam distribution system, valves are installed as required. Ordinary valves are sometimes used in these installations but it is customary to install valves which have been especially designed to meet underground conditions. For many years the ADS CO valve has been well known among utilities for 125 pound service.

With the growing tendency toward higher distribution pressures, ranging now up to 350 pounds, ADS CO realized the need for a line of 250 pound and 400 pound gate valves. Rather than spend years in designing, experimenting and perfecting these valves, ADS CO recently purchased the complete patterns and equipment of the old Nelson Valve Company for such lines as desired. After a year and half spent in careful re-designing to meet the exacting needs of District Heating work, they are now supplying ADS CO Nelson Gate Valves in cast iron and steel to operate on any pressure up to 400 pounds and any temperature up to 750°F. These valves have proven their merit in long years of service and, with ADS CO improvements, they add another tremendous opportunity for ADS CO to meet the needs of the District Heating industry.

Removing Line Condensation

A certain amount of steam condensed in the distribution piping and to draw this off without loss of steam required a device that would pass water but close against steam. Like all ADS CO equipment, the steam traps required years of experimental and development work before one could be perfected that would meet the exacting conditions encountered. The traps being installed underground, in manholes, were not easily accessible for inspection and maintenance work. The steam frequently contained a great deal of dirt. Complicated traps required constant and costly attention. The perfect trap would be the simplest possible one with plenty of room for dirt to accumulate below the valve, with dependable ball float and just as few, simple parts as possible. The present improved Empire Trap embodies all the desirable features. In thousands of manholes it is keeping low pressure (20 pounds) steam lines free of condensation and at a cost for equipment and maintenance which is a tribute to its simplicity, efficiency and dependability. On higher pressure lines the ADS CO Trap is doing the same thing. How these same traps, in legion, are serving District Heating companies in customers' premises is mentioned later.

Need for Special Fittings

In this classification come such devices as anchor fittings, angle fittings, rollers, alignment guides, manhole covers, etc.

The pioneer engineers realized that service pipes coming off the steam main should connect at a fixed or anchored point, so that the expansive movement of the main would not break or strain the connection. The design of the mains divided the expansion between alternate anchored points and expansion devices. By designing both the anchor fitting and the body of the expansion joint to provide not only for easy and secure anchoring in concrete but also to provide service outlets, the need of additional and special service fittings was avoided. Where no service was required at the anchor points, a
special pipe clamp was designed with anchor extensions to provide secure anchorage and cut the cost of installation. A bead is welded around the pipe on each side of the clamp so that the pipe cannot shift in either direction.

In the installation of the pipes underground, the most unexpected and complicated conditions are exposed. Water pipes, sewers, gas lines, electric conduits and many other things conspire to prevent adherence to the layout and grades as planned. Frequently, changes in direction made necessary by these unforeseen conditions cause expensive delays in installation work while special fittings are being made. To meet such conditions, ADSCO engineers designed a series of special flexible angle fittings which can be adjusted quickly to permit of any angle from a fraction of a degree up to 45°. These adjustable wedges, angle flanges and angle joints are extensively used, not only in District Heating installations but by railroads in round houses, by piping contractors and others.

After the piping is laid in the trench and connected, it has to be supported in the conduit, not only to keep it away from contact that would cause a loss of heat, but so that it will be free to expand and contract longitudinally and without shifting out of proper alignment. To make special roller guides for every type of construction and every size of pipe would lead to confusion, so a line of guides and rollers was provided for every size of guide and every size of pipe, so that it would be adaptable to a variety of installations. Where covering is applied over the pipe a saddle plate is used. This saddle, resting on the roller guide, supports the pipe while permitting of complete application of insulation. By moving with the pipe it prevents crushing the pipe covering.

In pipes conveying high temperature steam, the tendency to buckle, twist and weave is pronounced. If this distortion from true alignment is permitted to reach the slips of expansion joints, there is danger of the slip becoming cramped. When this happens, the irresistible force of expansion may tear the joint away from its anchor or break out the opposite anchor. Even though no break occurs, the distortion of the packing in the stuffing box may permit of serious leaks. This distortion of long runs of pipe cannot be entirely eliminated but it can be absolutely controlled and so avoid any trouble. The alignment guide was especially developed for high pressure piping. When this device is placed ten or more inches in front of each expansion joint slip and is firmly anchored in concrete, it allows the pipe to move freely in a longitudinal direction but prevents any lateral deflection. This assures a true thrust of the slip into the body of the expansion joint and overcomes many major difficulties in high pressure steam transmission.

The manholes are sometimes located in busy streets and sometimes in areas where heavy traffic the covers must support great weight but for light traffic there is no need for so much metal. Two types of manhole tops and covers were designed to meet these conditions, one heavy, one light. Both have double covers which serve to keep out surface water and reduce heat loss.

Insulation and Conduit

Naturally the insulation of the District Heating distribution system is of great importance. There is, however, a point where the added cost of higher efficiency is not compensated for by the economy effected. In this respect each installation is a problem within itself.

ADSOCO Casing is an ideal combination insulation and conduit. It is built up in all sizes from thoroughly kiln-dried, selected lumber. Machined segmental staves, with tongue and groove, are formed into hollow logs from four to eight feet long. A heavy galvanized steel wire is closely bound around the outside and drawn into the wood, flush with the surface. Opposite ends of each section of casing are mortised and tenoned half the thickness of the casing wall and four inches long. Each section is then heavily coated on the outside with a special asphaltum waterproofing and rolled in fine sawdust. The sawdust protects the waterproofing while the casing is in transit or being handled.

The casing is made with wall thicknesses of 2", 3", and 4". While in some very low pressure installations the casing is used unlined, it is frequently supplied with a double lining of asbestos paper and bright, highest quality tin plate. The lining of the casing adds to its efficiency and prolongs its life. Four inch wall, tin and asbestos lined ADSOCO Casing is used on the expansion of steam lines conveying steam up to 50 pounds pressure. Where higher pressures are employed, a larger size casing is used which permits of a one inch covering over the steam pipe before the casing is applied. The 3" casing is largely used on serv-
ice lines or on other lines where the first cost of installation is of greater concern than a few points in insulation efficiency. The 2" casing, lined and unlined, is chiefly employed on condensation return and hot water lines.

In application, a casing is selected having an inside diameter 2" larger than the steam pipe. Guides and rollers support the pipe concentrically in the casing so that there is maintained a one inch annular dead air space between pipe and casing. This adds materially to the operating efficiency and permits of free movement of the pipe in expanding and contracting. Being completely waterproofed, the ground water cannot reach the steam line. As every stave is thoroughly kiln-dried there is no shrinkage when steam is turned on, so that ADSCO Red Diamond Brand Casing maintains its excellent efficiency for years after ordinary wood logs or casings have crumbled into decay.

Hundreds of old installations are mute testimony to the great life and high efficiency of ADSCO Casing. Every year ADSCO is called on to enlarge steam mains in many cities and unearth old ADSCO Casing installed from fifteen to thirty years ago. The wood is as solid and tight as when installed, and the tin plate, having been so well protected, is as bright as when received from the mill. This salvaged casing is frequently re-installed.

**Multicell Tile for High Pressures**

In quite recent years, the trend toward higher pressures (much over 125 pounds) has led to the development of other types of underground conduit systems. But costs must bear a reasonable relationship to efficiency. They require of their underground conduit systems: (a) long life, (b) freedom from maintenance work, (c) a degree of elasticity to compensate for changing temperatures, the absence of which will cause cracks in the conduit and loss of efficiency from water seepage, (d) accessibility to pipes for cutting in new services, (e) the protection of dependable underdrainage, and, what is very important, (f) a flexible construction that readily adjusts itself to unforeseen conditions, accommodates one or more pipes as occasion may require and lends itself economically to enlargement, extension or duplication.

While for high pressure work much concrete conduit has been used, it is far from ideal. It does not check heat conduction and it costs more than other conduits of higher efficiency. Its life is long but being in continuous section, it is subject to cracks and ruptures due to expansion. The cutting in of services in a concrete conduit is a considerable job. In a few carefully worked out designs where these and other factors are provided for, concrete construction is giving satisfactory results.

To meet every need and overcome the disadvantages of other high pressure conduit systems, ADSCO adopted and has perfected, the ADSCO Multicell Tile type of construction. An ADSCO Multicell Tile is similar to a building tile being four inches thick, eight inches high and sixteen inches long. Two longitudinal air cells provide the insulating qualities of dead air. The tile is extra strong and heavily salt glazed. In both top and bottom four inch surfaces there are cast two mortar-locking grooves.

The following brief description will show clearly how the modern ADSCO Multicell Tile Conduit meets every need of the distribution system.

Adequate underdrainage is supplied by farm tile laid to grade and covered with broken rock. Over this a substantial concrete base is made of proper width and with a raised middle section so that the conduit wall cannot shift inwardly. The pipe or pipes are laid, supported, guided and covered (after testing) then the conduit walls are built up by masons using the Multicell Tile either flat or on edge. At intervals the ends of the tile are stopped off to prevent air circulation. If the conduit less than 16" centers and Multicell Tile supported on these to make the roof. After this, the top is plastered over with mortar and frequently water-proofed.

Any combination of pipes may be readily housed in a Multicell Tile Conduit; the air insulated double wall and roof construction is efficient and much stronger than required. The multiplicity of joints accommodates conduit expansion without cracking. Additional lines may later be laid alongside or on top, making good use of the conduit already in. Changes in direction and grade are simple matters. Cutting in a service merely means breaking out a single tile, on the top or side of conduit. The cost of this ideal construction is seldom more and frequently less than other and less desirable conduits.

**Regulating Steam to Meet Customers' Requirements**

Having brought steam to the customers' premises, there still were problems to be solved. The steam pressure in the mains was higher than desired for heating purposes. To reduce the pressure and at the same time maintain the lower pressure constantly, regardless of varying distribution pressures, required another type of device. Years were spent in developing a dependable, simple and inexpensive regulating valve which could be set to deliver a pressure of a few ounces or pounds, regardless of whether the line pressure was five pounds or twenty pounds. Ultimately the Perfection Reducing Valve was produced. Today, thousands of these are in use, many hundreds of which have been in constant service for over twenty years.

---

The above cut shows a clever combination of gauges regulating valve and steam meter—a relic of the early days.
Accurately Measuring the Steam

So that the steam sold could be properly billed, a meter had to be designed. Some fantastic devices were employed in the early days but as the industry grew it became apparent that two classes of meters would be needed. There was need for a meter to accurately measure and record the steam consumption by weighing the condensation. This brought out the Simplex Condensation Meter. There were some customers, however, who used the steam for power or process work and no condensate was available for measurement. To meet this condition the St. John Steam Flow Meter, an invention of Mr. St. John's, was adopted and perfected. Both of these meters, now much improved, are accurately measuring millions of dollars worth of steam every year.

ADSCO Rotary Meters are a later development to meet the demand for this type of device.

Steam Conservation

Wherever a condensation meter is used, some device is needed to keep the steam from passing through the meter and being wasted. On many District Heating installations ADSCO Pipe Receivers perform the dual work of condensation tank and steam trap. Other installations standardize on steam traps whether or not receivers are used. Here is where the ADSCO and Empire Traps (previously mentioned) are saving District Heating companies thousands of dollars every year. The simplicity, efficiency and low cost of the Empire make it the favorite, not only of heating companies but others requiring low pressure traps.

Although there are many other ADSCO devices manufactured to serve wherever steam is to be economically distributed, the foregoing will convey some idea of the long process of experimentation and development behind the perfection of ADSCO equipment.

When ADSCO's construction subsidiary, the Northeastern Piping & Construction Corp., is retained to install underground steam lines, these tried and proven devices are invariably used. The assured service of this equipment, combined with the broad experience of the engineers, makes possible a guarantee of perfect operation of the entire distribution system. Each year large utilities and others contract with the Northeastern Company for many miles of steam and hot water piping, knowing that the expansion devices, anchor fittings, guides, gate valves, traps and other equipment used on the work, as well as the construction itself, will give complete satisfaction under the most severe operating conditions.

A Pledge to Service

In looking back over the years, the officers and directors of the American District Steam Company feel a justifiable pride in the major part the company has played in originating, developing and extending District Heating as a solution to heating problems, a national economy and a distinct public benefit.

Although District Heating has made rapid strides, every indication points to accelerated progress; we see before us the day when public heating will rank with electricity, water and gas, serving everywhere institutions, communities and cities with clean, fireless heat, contributing in large measure to health, comfort, economy and profit.

This company and its subsidiaries, the Northeastern Piping & Construction Corporation, and the Canadian District Steam Company, Limited, are committed to the extension of District Heating and to the service of all those institutions, industrials, public service corporations and municipalities that are giving thought to the distribution of steam for heating, power and other purposes.

Vice-President and Manager

AMERICAN DISTRICT STEAM COMPANY

NORTH TONAWANDA, N.Y.