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AND

REGISTER OF IMPORTANT EVENTS

OF THE YEAR

1878.

EMBRACING POLITICAL, CIVIL, MILITARY, AND SOCIAL AFFAIRS; PUBLIC DOCUMENTS; BIOGRAPHY, STATISTICS, COMMERCE, FINANCE, LITERATURE, SCIENCE, AGRICULTURE, AND MECHANICAL INDUSTRY.

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she was captured by the British, and was kept a prisoner of war at Bermuda until peace was declared. He served under Decatur in the Algerine war, and received from him a Turkish saber for his bravery in the capture of an Algerine frigate. After serving on the *Guerriere*, the *Washington*, the *Franklin*, and the *Columbus*, he took command at the close of the war of an East India merchantman. In 1825 he was made lieutenant and assigned to duty in the West Indies. In 1841 he became commander, and was assigned to the command of the Pensacola navy yard. In 1844 he was flag captain of the Pacific Squadron, and in 1846 again assumed command of the Pensacola navy yard. In 1854 he bombarded and destroyed the town of San Juan de Nicaragua. He was in command of the navy yard at Sackett's Harbor in 1858, and was afterward ordered to join the Mediterranean Squadron. He soon received orders to return to the United States, which he reached in 1861. He then resigned his commission, but the Department refused to accept his resignation, struck his name from the rolls, and ordered his arrest. He succeeded in eluding the officers in search of him, went South, and was made a commodore in the Confederate navy. On October 11th he attacked the Federal blockading squadron at the passes of the Mississippi, and was appointed flag captain of the New Orleans Station for what he claimed as an important victory. Before Farragut's attack on New Orleans in April, 1862, Commodore Hollins was superseded by Commodore Whittle. After the war he was pardoned by President Johnson, and took up his residence in Baltimore, where he became a crier in the City Court.

HOLLY SYSTEM OF STEAM-HEATING. The idea of generating the heat required in thickly settled communities for the health and comfort of the inhabitants, and perhaps also for cooking and laundry purposes, in central establishments, and of conducting it stored up in steam or some such absorbent medium through pipes and laying it on in dwellings in like manner with water and illuminating gas, has long been looked upon as a promising scheme, which was likely to be realized in the march of mechanical improvements and in the evolution of social methods. Various inventors have busied themselves with this scheme; but its first practical illustration on a large scale has been accomplished by Birdsell Holly, of Lockport, New York, previously known to the public from his invention of the Holly water-works system. Improvement and economy in the methods of artificial heating is of more concern to the people of the United States than to Europeans, owing to the more continental climate of America, which is characterized by a constant range of low temperature through about two thirds of the year over all the Northern States, necessitating the warming of inhabited rooms through the most of the year. Among the inventions offered

for that end was that of Coleman for steam-heating from a central source, quite similar to the Holly plan, but never carried into effect. The Holly system was first introduced into the town of Lockport, where the works commenced running in October, 1877. During the following winter 40 houses were warmed, besides a large schoolhouse and a public hall, and the power was furnished to drive two steam-engines, one of which was nearly half a mile away from the boiler-house. In the second winter (1878-'79) 1,000 consumers were supplied, the total space heated amounting to about 10,000,000 cubic feet. With the methods used for isolating the conducting-pipes and re-converting into steam a part of the water of condensation, the steam is conveyed over long distances without losing any material amount of its heating power. With larger boilers and mains than those employed in Lockport, steam can be thus conveyed and distributed over an area of four square miles from a single central boiler-house. Mr. Holly first seriously directed his studies to the problem of conveying heat into the houses of a city in the year 1866. After he had satisfied himself of the practicability of such a scheme by long experiments, he started the Holly Steam Company in January, 1877, with a capital of \$25,000, which undertook to warm the dwelling-houses of Lockport at a price based on the cost of coal consumed in the ordinary methods of heating. A comparison of the cost of heating by the Holly system and that by hot-air furnaces and private steam-heating apparatus was made on the basis of the results of the first winter's operation. The average cost of the fixtures for each of 1,000 takers using the Holly system was taken at \$200; the annual interest, with the depreciation and cost of repairs, at \$18; and the average yearly bills for steam-service to the company amounted to \$39.80, making the total expense for a year \$57.80, against \$113.75 required to keep a furnace costing \$275, and consuming 10 tons of coal a year, and \$197 expended annually on a private steam-heater using 12 tons and costing originally \$800. This estimate of the cost of the heat is certainly very insufficient, being much higher than it would be if the works were operated to their full capacity and the houses served not so few and so scattered. Improvements and economies in the working of the enterprise can also be reasonably expected to reduce the cost considerably after a longer trial; but, on the other hand, the safety and durability of the elaborate conducting apparatus can only be determined after several years' experience, and the deterioration and cost of maintenance calculated; and the wear and destruction caused by such an active expansive agent as steam, handled under novel conditions, may more than counterbalance any possible reduction in the working expenses. The Holly system offers many other advantages besides a more healthful and less trou-

blesome method of heating houses than those now in use. It will furnish steam-power for machinery in any required amount, at any desired moment, more cheaply and with greater safety than manufacturers can supply themselves; the steam can be used for laundry purposes, and perhaps soon a method will be devised for utilizing it in the different operations of cookery; it can furnish a constant supply of heat at an equable temperature for greenhouses and forcing-houses. Not the least of its benefits, as has been already experienced in Lockport, is that it can keep the water-hydrants from freezing in severe weather, and can afford an ever-ready supply of steam-power for the extinguishment of fires. In the heating of dwellings the greater healthfulness and cleanliness of the mode over any other are important considerations, and also the reduction in care and labor and in the risks of fire.

The details of the invention, as applied in the Lockport works, are described by Mr. Holly in his specifications as follows:

1. All underground steam street main in combination with steam-supplying apparatus, and with a motor constructed to control the pressure of steam in a building, and also record the consumption of steam from such main.
2. Junction-boxes admitting expansion and contraction of mains longitudinally, and with heat-radiators in the buildings.
3. A steam-meter to control the pressure and record the consumption of steam in the building.
4. Heat-radiators.
5. Steam-trap.
6. Steam-trap and re-heater.
7. Water-hydrant.
8. A street steam-hydrant.
9. Steam automatic regulator or governor.
10. Snow and ice reservoirs having open-ended or perforated steam-pipes for escape of steam therein.
- 11 and 12. Expansion chamber, hood, lorin pipe and expansion chamber.
13. Adjustable ring.
14. Junction box and outer covering of steam main.
15. Section of steam main made of nickel-plated metal.
16. Convex ring, wall of expansion-chamber, eye-bolts.
17. Steam street main, isolated and drained by tile.
18. Meter details.
19. Radiators, adjustable.
20. Spring clutch and pencil forger and valve-stem.
21. Conducting and steam pipes having a coil and connecting chamber. A contrivance or contrivances for supplying steam for warming districts of dwelling-houses in cities and towns, and for "driving" machinery and for other driving purposes in said districts, consisting of steam-supplying apparatus, street mains having heavy expansion-junction service-boxes, service-pipes, having connecting pipes and meters. Connected with these several appliances are a boiler-house and stack, four boilers with heaters for feed-water, 2,900 feet 4 inches, 4,600 feet 3 inches, 4,400 feet 2½ inches, 7,310 feet 2 inches, 1,700 feet 1½ inch, and 1,300 feet of 1½-inch wrought-iron pipes or street mains. These pipes or mains are first coated with asbestos and covered with a jacket of cow-hair felting or other non-conducting substance, which is protected with hard-wood strips secured with copper wire, and the pipes thus prepared are inserted in logs of wood bored so as to leave an air-chamber around the pipes, and then the whole structure laid to a grade over well-constructed tile-drains. At intervals of about 100 feet the junction-boxes, with hoods and service-pipe connections and nickel-plated movable joints, are inserted in a well of masonry 2½ feet square, which give ready access at all times to their portions of the structure. The longest single stretch of pipe is 1½ mile.

The boiler-house in Lockport is constructed for six boilers. Three were put up, but only one or two used at a time the first winter. Two were horizontal, 5 by 16 feet in dimensions. The consumption of coal was 2½ to 3 tons daily. The total length of pipe through which the steam was conveyed was 3½ miles. The largest main, 6 inches in diameter, branches into two 4-inch pipes a short distance from the boiler, and these are divided after running some distance into two 3-inch pipes, and they again into the smallest pipes of 1½ inch diameter. The junction-service boxes, placed along the whole line of the mains at a distance of 100 feet or more, provide for the longitudinal contraction and expansion of the pipes, and at the same time afford a space for the apparatus for distributing the steam. A hood on the head of the service-pipe in the junction-box collects the water of condensation, and conveys it into the house to a valve, where it is wiredrawn, and by such reduction of pressure, at its temperature, which corresponds to a pressure of 50 lbs. per square inch, is reconverted in great part into steam and conveyed into the radiators. The pressure of the steam as served to the radiators is 2 or 3 lbs. per square inch.

The combined meter and regulator both registers and measures out the supply in the houses. A valve, of the character of the slide-valve in a high-pressure engine, admits the steam from the street main into a short pipe, at the end of which is a similar valve, which admits it into the radiators. The pressure on both sides of the valves is shown by steam-gauges. Connected with this regulating apparatus is the indicator, which records the consumption in figures, showing its value in dollars and cents.

Mr. Holly estimates that 15,000,000 cubic feet can be warmed with ten boilers, 16 feet long and 5 feet in diameter, with 54 tubes 23 inches in diameter. This would make the total heating surface 11,860 cubic feet, giving 1,300 cubic feet as the space to be warmed by every foot of heating surface. Experiments made regarding the loss by condensation showed that it amounted in 1,600 feet of 3-inch pipe, with a pressure of 18 lbs., to 9 lbs. of coal per hour; in an ordinary city street that length of pipe could furnish 100 consumers, giving 2½ lbs. of coal per day as each one's share in the loss from this cause. It was found that when the supply was cut off from the boiler, it required 18 minutes for the pressure to fall from 60 to 45 lbs.; 28 minutes for it to decline from 45 to 30 lbs., or from 4 to 3 atmospheres; 40 minutes for it to fall to 15 lbs., and 54 minutes longer for it to sink to the pressure of the atmosphere; or 2 hours 20 minutes to condense the four atmospheres of pressure. The comparison of the different sizes of pipe with respect to their capacity for conveying steam and their loss by condensation shows that the latter increases in a direct

ratio with the increase of diameter, while the former increases sixfold when the diameter is doubled. A pipe of $1\frac{1}{2}$ inch diameter will deliver steam only 1,000 feet from the boiler; a 3-inch pipe will conduct it 3,000 feet; a 6-inch pipe, 9,000 feet; and a 12-inch pipe, 18,000 feet. The Holly system has been introduced in Auburn, N. Y., Springfield, Mass., and other cities. The apparatus is furnished from the workshops of the Lockport company.

HONDURAS (REPUBLICA DE HONDURAS), one of the five independent states of Central America. The territory of the republic, with an area of 58,168 square miles, is divided into thirteen departments. The population is estimated at 400,000. The capital is Tegucigalpa, with about 12,000 inhabitants. The President is Dr. Marco Aurelio Soto, elected in May, 1876, for a term of four years. The sole minister of the Republic is Dr. Ramon Rosa, general adviser of the President. Honduras has thirty-seven representatives, but no senate, in lieu of which latter ten counsellors are appointed by the Government to act as advisers, and convened at the President's pleasure. The judicial authority is vested in two chief justices, one of whom resides in the present capital, and the other in the former capital, Comayagua; a district judge in each of the departments; and a justice of the peace in every town, these last being elected by their respective municipalities for the term of one year, while the higher judicial dignitaries are elected for life by the Government. The actual strength of the standing army is set down at 1,500, and that of the militia at 20,000.

The national revenue, which under former administrations rarely exceeded \$300,000, is now reported to reach \$800,000. In regard to the national debt, it has been stated on trustworthy authority that the terms of the Chatfield-Cruz convention have been ratified in a contract made between the representatives of England and Honduras. The debt of \$50,000 which it recognizes is to be paid off at the rate of \$10,000 per annum. Drafts on the four principal custom-houses for \$2,500 are to be given to the representative of Her Britannic Majesty's Government in January of each year. For the year 1878 the drafts had already been given. Should any deficiency in the amount occur at any of the ports, the Honduras Government makes it good. During the five years, and while the terms are being complied with, the claim is to bear no interest. Should the Government of Honduras fail in its annual payments, interest on the balance due is to be charged at the rate of 5 per cent. per annum.

To the already mentioned significant indications of financial prosperity may be also added that of a combination set on foot in the United States for the purpose of establishing a North American banking, exchange, and commission business in the capital of Honduras. With the facilities to be derived from such an enterprise the chief impediment to the extension of com-

merce between the two countries would be speedily removed.

The railway is now in operation from Puerto Cortez, on the Atlantic coast, to San Pedro Sula, a distance of about 90 miles. The value of the rolling stock is estimated at \$500,000, and the entire cost of the road is given at \$2,000,000. There are at present about 750 miles of telegraph, and 500 miles additional are in process of construction. There is also a report of an arrangement having been entered into between Honduras and San Salvador for the establishment of telegraphic communication between the five Central American republics. Should the project be carried into execution, dispatches from Guatemala to Costa Rica will, it is presumed, be transmitted at the rate of \$1 per ten words, and from Nicaragua to Costa Rica, or from Honduras to Guatemala over San Salvador lines, at 50 cents.

No official returns of the foreign commerce of the republic have been published. With steam communication between the Atlantic ports and New Orleans, the fruit trade already existing might be developed to a scale of considerable importance. Although the service is at present confined to sailing craft, chiefly schooners, shipments of the value of \$400,000 were made in 1877, by 180 vessels, with an aggregate of 14,143 tons. Exquisite fruits abound throughout the northern coast region and adjacent islands, and could be landed at New Orleans at an expense not exceeding those of gathering, packing, and freight. From 30,000 to 40,000 head of cattle are annually exported to the island of Cuba alone.

"Honduras is in the midst of her task of establishing schools," writes a newspaper correspondent; and indeed schools are now to be found in every town and village of the republic. In 1878 the Government organized a national college and a seminary at the capital, both of which are under the direction of American teachers. The aggregate attendance at school in the republic was 20,000.

Honduras has fairly entered on the career of civilization in the highest sense of the term. Peace reigns undisturbed, the last ringleader of discord, José Maria Medina, having been shot in the course of the past year. Both government and people have discovered that their chief happiness is to be derived from industry and the enlightenment of the masses, and manifest the utmost zeal in their endeavors to attain it by these means. Highways, bridges, and other facilities for internal transport are planned or constructed in the more important sections; postal and mercantile intercourse with other countries extended and encouraged (a contract was signed in 1878 for a line of bi-weekly steamers to Cuba), and extensive concessions of land to North Americans for the cultivation of coffee, cacao, and other staples, on a scale hitherto unthought of in those regions. Nor are the elements of health and material comfort left unheeded, as attested