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and got such relief I kept right on until I had used three bottles and was completely relieved of my trouble. Now, I can eat anything I wish without having any bad after effects."

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R. ARTHUR OPTOMETRIST

The Development of Heating And Ventilating in Canada

Dealt With by Prof. L. M. Arkley of Queen's University—Interesting Details About Heating Development in Kingston.

The following is part of a paper on "Development of the Art of Heating and Ventilating in Canada," read before the recent semi-annual meeting of the American Society of Heating and Ventilating Engineers at Lexington, Ky., by Mr. L. M. Arkley, professor of Mechanical Engineering in Queen's University, Kingston:

The subject of heating and ventilating divides naturally into two sections, first the heating and ventilation of comparatively small dwelling houses and the same applied to large buildings, factories and shops. They will be treated in this order.

The method of heating small dwellings probably progressed in the following order:

- a Heating by open fires, without ventilating flues;
- b Heating by open fires with ventilating flues;
- c Heating by open fire place with chimney attached;
- d Heating by box stoves;
- e Heating by box stoves bricked into form a kind of hot-air furnace;
- f Heating by the standard type of hot-air furnace;
- g Heating by hot-water systems;
- h Heating by low pressure steam.

One of the first references to this subject may be found in the Proceedings of the Royal Society of Canada (1905) where it is stated that, in 1627, Champlain built chimneys in his "abitation" or combined dwelling house and fort, for ventilation purposes. These chimneys were not connected to the fire places, but served to remove some of the smoke and soot from the rooms.

About this time it is recorded that Louis Herbert and Guillaume Couillard, two of the earliest settlers in Quebec city, built smoke escapes in their homes similar to those of Champlain. They also fitted ashes in the window frames and hung doors, and arranged them all to open and close.

In 1670, is found the following description of a typical dwelling which has some bearing on the heating question: "The four walls were made of logs that would hew to about one foot square, these were fastened securely at the corners, and the seams calked with moss and plastered with clay." This construction should give a coefficient of heat transfer of less than 0.1 B.t.u. per sq. ft. per degree difference of temperature, which is better than some of the fancy modern wall construction that exists today.

The kitchen had a special fire place for cooking and "two or three chimneys heated the main part of the house." Double windows and doors were also used about this time. The white population of the whole of Canada was less than 10,000, so that the field for heating engineers was rather limited, and as near as the writer can gather there was no controversy on between the advocates of window ventilation and those who favored the mechanical system.

It must be remembered that wood was the fuel used at this time and it is recorded that the inhabitants did not realize the advantage of having it dried before using and the result was much sickness, due to the fumes and smoke in the unventilated house. Wood was first sold publicly for fuel in 1647 at Montreal and brought 1 shilling and 3 pence per cord. It held the field as fuel in Canada until about 1875 when the old Grand Trunk Railroad began to use coal.

The Fire Place.
The next development, the large open fire place built of stone with chimney attached, came in about 1675 and was the standard method of heating and ventilating for years. One of the best examples of these fire places can be seen to-day in the Chateau de Ramessy of Montreal, which was built in 1705. In the vaults of this old building with its walls of solid masonry four feet thick are two fire places, 5 ft. wide by 4 ft. high by 3 1/2 ft. deep, in practically as good repair as when they were used over 200 years ago. In the side of one fire place is a large oven which was used for cooking purposes. The building is now heated by means of steam coils, which according to the best available information were put in about the year 1885.

The Stove.
The next development was that of the stove. These came into use about the middle of the 18th century and the first ones made in Canada came from the Forge St. Maurice, Quebec, which began to operate in 1737. These stoves were cast iron double deckers with furnace below and bake oven above.

iron pot or tank for a boiler fitted with drop tubes eighteen inches long which were tapped into the lower sheet and hung over the fire. This boiler was bricked in with a furnace long enough to take a four foot stick of wood. The radiators were made of pressed iron sheets riveted at the edges and held apart 1-2 inches by stay bolts. The Kingston Custom House was heated in the same way about the same year 1855.

Hot Air Heating.
In 1858 hot air furnaces were used to heat certain bank buildings. These furnaces were made by bricking in the old cast iron stove leaving an air space around from which the warm air was taken by ducts to the different rooms.

Another interesting hot air installation that was installed in 1870 in the old stone building at the Royal Military College, used at one time for training midshipmen for boats on the lakes, but now used as a dormitory for the Cadets. In each end of the building was placed a large box stove mounted on wheels on a track. These stoves were bricked in and space left around the sides and top for heated air which was taken in ducts to the walls in the upper floors; there was no attempt made to ventilate with this system of heating. The object of the wheels and track was to provide a way for cleaning and repairing the furnaces.

Hot Water Heating.
Perhaps the first building to be heated by hot water was the old Commercial Bank building located at the corner of King and Queen streets where Angrove's foundry now stands. Box coils were used for radiators with cast iron screens to cover the coils and marble slabs on top to improve their appearance. The furnaces instead of the cast-iron sections now in use and the furnace was built to take the regulation four foot stick of cord wood. The grate of this type of furnace was often made of pipe through which the hot water circulated. Among the first buildings heated in this way were Dr. Betts house on Union street, Mr. James Macneil's house at the corner of Bagot and West streets, and the Court House.

Cast iron furnaces for hot water heating came into use about 1876 and were made by Warden King, of Montreal, among the first residences to be heated in this way were those of Mr. Alexander Gunn and Mr. John Carruthers.

Of the larger building a unique system was installed in Rockwood Hospital in 1866, this might be described as the vault and steam coil system: Narrow halls or vaults were built in the basement, and in these vaults were placed twenty-eight thousand feet of one-inch pipe arranged in long coils with return bends and headers. These were supplied with live steam from a boiler plant situated at a lower level so that the condensed steam from the coils drained back to the boilers by gravity. Air from the heating vaults was led to the different rooms in the building, above through tin lined ducts built in the walls. Outside air was taken to the vaults by similar ducts. This system was similar to that employed to heat the first Parliament Buildings at Ottawa in 1860, and both contracts were probably carried out by the same engineer, Mr. C. Garth, of Montreal. This system is still in use in Rockwood.

The first attempt at combined heating and ventilating of large buildings was that of the Old Arts Building of Queen's University in 1875. The halls and some of the rooms were heated by direct radiation, the radiators being made with a cast iron base with short pieces of pipe screwed into the top of the base and capped at the other end. In addition to this there were tin lined boxes in the basement in which were placed box coils made of pipe. The air was taken from outside passed over these coils then up through tin lined ducts to the rooms above. It was one of the duties of the janitor to regulate the inflowing air to this box. The system was the old style two pipe system, the boiler being placed in a pit in the basement.

Schools were first heated by steam about 1890 and fans for ventilating were first used about 1895.

The Parliament Buildings.
Perhaps no better contrast between heating and ventilation of early and modern large buildings can be cited than that of the Parliament Buildings at Ottawa.

In 1859, notices were issued inviting tenders for heating and ventilating the main Parliament Building and two large Departmental Buildings. The successful bidder was C. Garth of Montreal and the following description of the system he employed is taken from the report of a Commission printed in 1863.

"The mode of heating embraced by Mr. Garth's contract is a combination of the steam coil and vault system, in the system vaults or chambers are built underneath the building in which coils of iron pipe are placed, in this way all the air used is heated and then conveyed through flues in the walls to the rooms. The boiler room is outside the building to be heated and placed 10 ft. lower than the steam coils, in order to save heat and to make it possible to get the returns back to the boilers by gravity. Ventilation is provided as follows: external air is supplied to the heating vaults through long underground ducts, in this way it is tempered and does not cause trouble from excessive condensation in the pipes first coming in contact with the air. Circulation of the air is secured by placing two 24 in. iron smoke pipes from the boilers inside a ventilating shaft 15 ft. square by 123 ft. high. The heat from the smoke pipes rarefies the air in the shaft and causes sufficient suction to remove the vitiated air from the Legislative chambers and the library to which the ventilating shaft is attached. The heated air is introduced overhead and the vitiated air drawn off near the floor which is known as the 'downward method of ventilation'."

Modern System.
The modern heating and ventilating system designed by Mr. M. F. Thomas of Toronto, for the new Parliament Buildings in 1917, may be described as follows:

The whole building except the Commons and Senate Chambers and several corridors is heated by direct radiation. There are 886 radiators aggregating 44,341 sq. ft. of heating surface operated as a forced circulation hot-water system. For warming the rooms in the tower where the elevator is too great for the hot-water system, about 2,000 sq. ft. of steam radiation is installed. To assist in the control of the temperature of different sections of the building under varying conditions, groups of rooms having the same exposure are served by one branch main fitted with a diaphragm valve under the control of a thermostat located in a typical room.

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Instead of soda hereafter take a little "Phillips' Milk of Magnesia" in water any time for indigestion or sour, acid, gassy stomach, and relief will come instantly.

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For fifty years genuine "Phillips' Milk of Magnesia" has been prescribed by physicians because it overcomes three times as much acid in the stomach as a saturated solution

of bicarbonate of soda, leaving the stomach sweet and free from all acids. Besides, it neutralizes acid fermentations in the bowels and gently urges this souring waste from the system without purging. It is far more pleasant to take than soda.

Insist Upon "Phillips"
Each bottle contains full directions. Any drug store.

Most of the data regarding Kingston came from Mr. J. J. Druce of the firm of McKelvey & Birch (founded in 1854), and Mr. David Hall, a former employee of the firm also contributed.

LETTERS To The Editor Of The Whig

Amherst Island Questions.
Sir:—In your issue of the 29th ult., I see that a writer informs us that she has discovered a panacea for the ferry troubles and instead of the all water cure she will now treat us in the future to a little electricity with the aid of her good friend, A. M. Rankin, M.P.P.

Is Miss Boyle aware that Mr. Miller made the remark on the platform sixteen months ago that he wished to be reeve for six months only, and in that time he would have the ferry in operation. I wish to say that a man with business ability would have had everything in shape months ago, and given the electors a vote on it. Why the delay? For the simple reason that things are not working so smoothly as "he" wishes and are not likely to. I wish to say that Mr. Miller has made the remark that he does not intend to give the electors a vote on the ferry question. This I can verify. What assurance is there that our next reeve is going to carry out the little role of Mr. Miller in a manner as satisfactorily to him as Mr. Patterson did in the past? What assurance is there that this \$6,300 will ever be used towards the building of a ferry? What assurance is there that this grant from the provincial government, will be given in the future if not used as designated.

Miss Boyle gives me the advice to get out of the rut. I wonder if she means the ruts and holes created on our roads for the crying lack of \$6,300 in an imaginary trust fund, instead of being used as designated, and we wouldn't have been treated to the spectacle of three autos and a load of hay being mired on our main travelled road in a radius of one mile, not speaking of the rest of the island which is in a similar condition and shouldn't be if that 1,500 odd dollars kept back yearly for the past four year, had been wisely expended.

However we look for a remedy in our road construction gang, who are expected to run true to form and in consequence we can look for the grader coming along any day, with our road overseer manipulating the wheel on top accompanied by two men driving four horses, who will pass along, gather in the cobwebs on the outer edge, squeeze up a little dirt in the centre, put in the day in some manner, present their bill to our worthy council. Two dollars please, for the operation.

I think Miss Boyle is quite inconsistent when she expects the fare on the steamer Brockville to be reduced under \$1.00. It is quite true that Mr. Campbell could withdraw said steamer from the route at any time, but your Mr. Campbell, as a gentleman, has assured us of a boat service for this season and did some accident unexpected or unavoidable take place that said steamer be withdrawn. Mr. Campbell would see that we were given transportation on some other boat.

Stella, June 2.

GEORGE T. HOWARD,
R. R. No. 2.

SHARBOT LAKE WEDDING

The Armstrong-Chambers Nuptials on the 2nd of June
Sharbot Lake, June 5.—At high noon on Wednesday last, the home of Mr. and Mrs. Harry Chambers, Sharbot Lake, was the scene of a spring wedding when their second youngest daughter, Margaret Elsie, became the bride of Mr. Russell Armstrong, youngest son of Mr. and Mrs. Samuel Armstrong. Rev. H. Coleman officiated. The charming young bride entered the parlor to the strains of Mendelssohn's wedding march with her father, who gave her in marriage. She was beautifully gowned in white silk sat crepe, with touches of georgette and pearls. She carried a lovely bouquet of Ophelia

roses and maiden-hair fern. She wore the groom's gift, a handsome three-strand pearl necklace. She was attended by Miss Helen Chambers, her sister, who wore pale sand crepe de chene and carried a lovely bouquet. Mr. William England supported the groom. The bridal couple stood under an arch of evergreens, decorated with streamers and bells. The music was rendered by Mrs. William Armstrong.

Following the ceremony, the guests assembled to the dining room, where a dainty lunch was served. The room and table was tastefully decorated with streamers and flowers. The groom's gifts to the bridesmaid and organist were gold bar pins, with black onyx and pearls, and to the groomsmen a gold watch chain. The newly-weds received the esteem in presents showing to the esteem in which they were held.

Mr. and Mrs. Armstrong later motored to Sharbot Lake, and departed on the train for eastern points, and showers of rice and good wishes. The bride travelled in a sandalwood colored fat silk crepe dress, with navy blue coat and hat to match. On their return, they will reside at Toronto, where the groom is an employee of the C.P.R.

The out-of-town guests included Mr. and Mrs. D. Bustard, Mr. and Mrs. R. Grimshaw and daughter Lillian, Mr. and Mrs. D. Andrews, Mr. James Andrews, Misses Jessie and Emma Sharp and Mr. Leslie Sharp.

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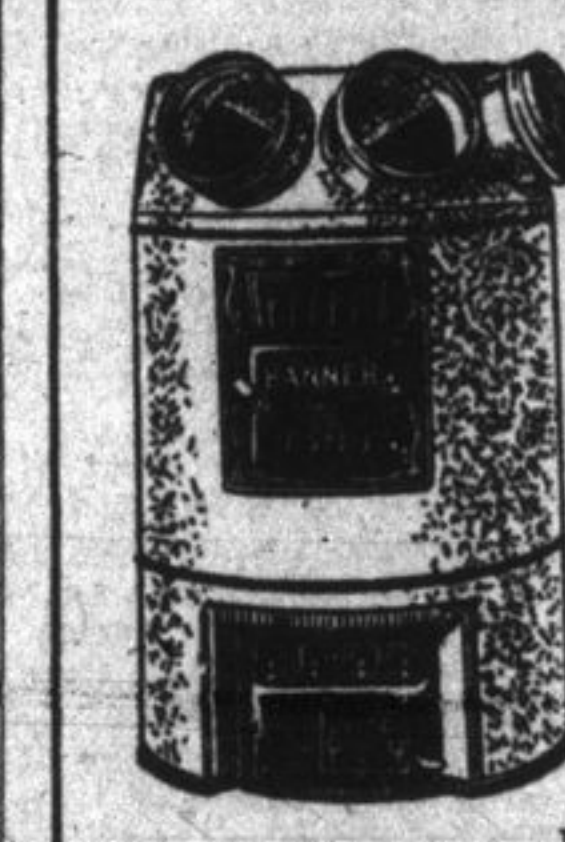
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E. LAWRENSON, 387 Princess Street.

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Children Cry For Fitcher's CASTORIA

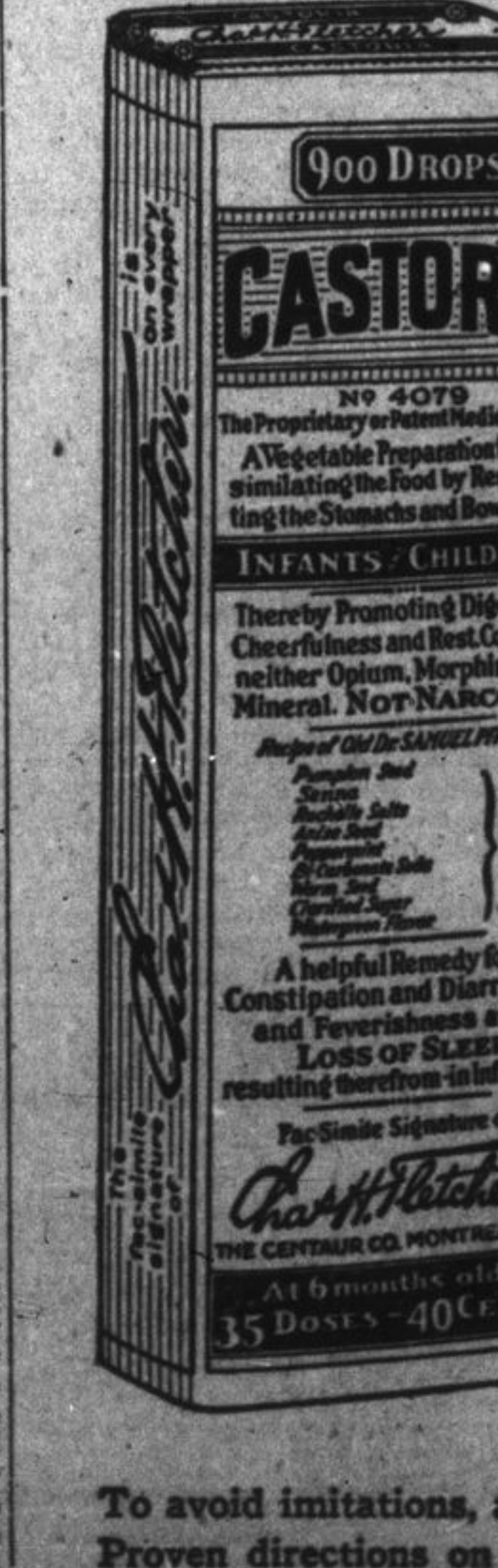
When Baby Complains.

There are many ways a baby has of expressing any pain or irregularity or digestion from its normal condition of health and happiness. A short sharp cry, a prolonged irritated cry, Restlessness, a constant turning of the head or of the whole body, fretful. In these and other ways a baby tells you there is something wrong. Most mothers know that a disordered stomach, or bowels that do not act naturally are the cause of most of baby's sufferings. A call for the doctor is the first thought, but in the event of any delay there should be ready at hand a safe remedy such as Fitcher's Castoria.

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