AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

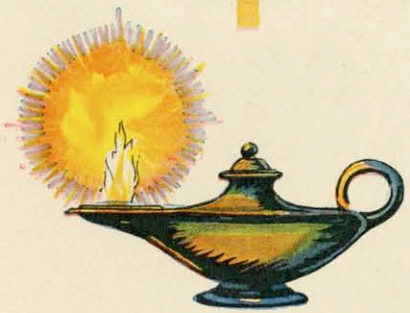
Exhibit—Century of Progress Exposition

CHICAGO, 1934

Heat and the Span of Life

The Egyptian Symbol of Life

THE CROSS, SYMBOLIC OF THE BEGINNING OF LIFE, APPEARS IN EARLY EGYPTIAN ART, IN CONNECTION WITH NEITH, DAUGHTER OF THE SUN AND GODDESS OF LIFE



AMERICAN RADIATOR COMPANY

HEAT *and the* *Span of* LIFE

DURING the last two centuries the span of life has increased twenty years. While no exact figures exist before 1687, it is certain that the people of medieval Europe and Elizabethan England lived still shorter lives.

The lengthened span has come from scientific enlightenment on healthful living. And the improvement in systems of heating and ventilation has done quite as much toward this end as the advance in prevention and cure of disease.

The severity of epidemics depends less on the presence of contagion than on the resistance of the person exposed; and this fighting power is governed largely by the air we breathe. This in turn depends largely on the heating systems in our homes.

Life began where heat and moisture united in the right degree; and the ideal heating system is that which yields a genial warmth without depriving the air of its moisture content. Of all known types of heating systems, radiator heating most closely approaches this ideal.

The years from 1900 to 1920—the beginning of ascendancy for radiator heat—saw relatively the greatest gain in the span of life. During this period the average lifetime increased more than five years.

In pointing out these facts it is hoped that *Heat and the Span of Life* will be helpful in raising still further America's standards of health and living comfort.

THERE must have been a moment when prehistoric man first perceived fire as a phenomenon; when curiosity gained over fear, and man felt the desire to approach fire instead of fleeing.

Perhaps he happened on a charred clearing, still smoking, or found embers in dry moss, which flamed as he touched them cautiously with a stick.

At any rate, it is certain that man used fire before he understood how to produce it artificially. Perceiving that animals feared it, and that proximity produced a genial sensation within himself, he employed it first for protection and comfort.

At last man learned to get fire by rubbing dry pieces of wood together

THEN, in working with wood he may have caught the twinkling of a spark or detected a trace of the smoke odor. In some such way he discovered that he himself could produce fire. At last he learned to get fire systematically by rubbing dry pieces of wood together, or twirling a solid stick in a hollow one.

The difficulty of kindling fire, and its importance to human life, gradually introduced a new social element. An official fire keeper became necessary—the first delegated office.

Man learned to hunt with fire, to cook his food, to clear land, and to mold clay and metal. By its aid materials could be prepared for a house, and for a boat that would bear his weight on the water.

Because of fire man dared for the first time to wander from his original warm habitat into colder climates. At night he saw fire-light reflected in the eyes of wild animals held at bay by their fear of the flames; and the warmth of his campfire melted the cold which hitherto had driven him back into warmer lands.

AND so mankind moved down the dark years, guided by the flame and heat of his fire and his torch. At the dawn of history we find the Egyptians burning a fire of dried vegetable matter or a pan of live charcoal on a hearth in the middle of the floor to keep warm. The smoke ascended through a hole in the roof.

This form of heating was passed without important variation to the Hebrews and Greeks. Since there was no chimney, the rooms were filled with smoke and gases; and aromatics were used to disperse the fumes. Kings and noble families burned costly gums, spices and odorous woods. Thus the fame of the luxury and perfumes of the east was to spread over barbarous Europe.

The Egyptians burned a fire of dried vegetable matter on a hearth in the middle of the floor

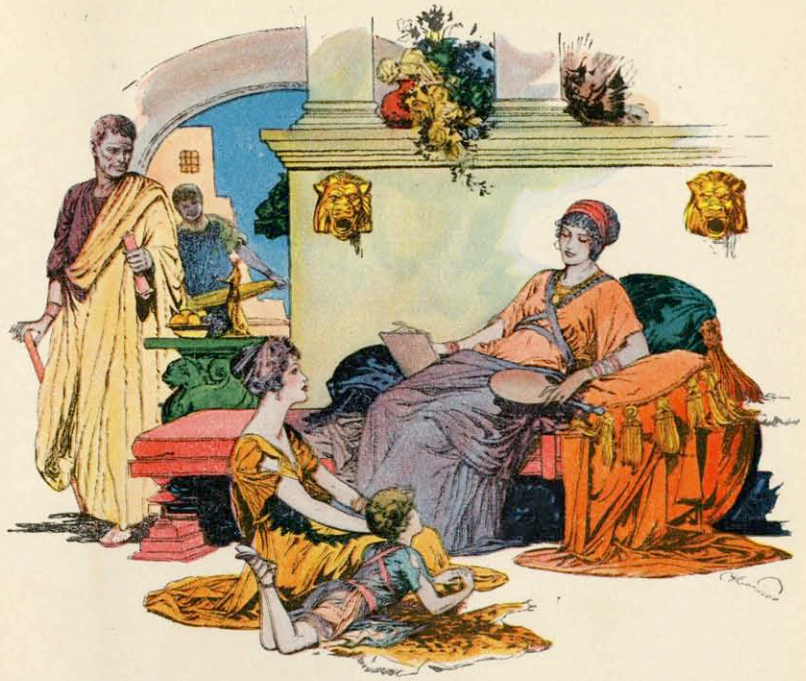
EVERY Greek city had a *prytaneum*, or public building which contained the official hearth of the city. Whenever a colony was established, in Asia Minor or the islands of the Aegean, the leader of the expedition carried flame from the hearth fire of the mother city, to kindle a sacred center in the new settlement.

This perpetual fire was a symbol of hospitality, and remained a close politico-religious bond between the mother city and the colony.

THE ROMANS, in their luxury-loving civilization, took a tremendous step forward in the heating of houses.

At first the *hypocaust* was used to heat only the sweating rooms of the great public baths. Later it was taken over by private dwellings. The *hypocaust* was a chamber underneath the rest of the house, where a fire was kept burning. From here pipes of baked clay ran throughout the house, and decorative openings in the walls admitted the heated air to every room.

The leader of a Greek expedition carried flame from the mother city, to kindle a sacred center in the new settlement



Lion heads were the common ornament through which the heated air flowed into the rooms from the hypocaust below

THE Romans used also portable braziers of charcoal, which marked the first removal of fire from its natural place, the hearth.

To heat water they placed small brass pipes, or dracones, in the fire, in serpentine form.

Both the central hearth and the hypocaust were carried to Britain by the Romans. The latter, however, did not long survive in a barbarous country.

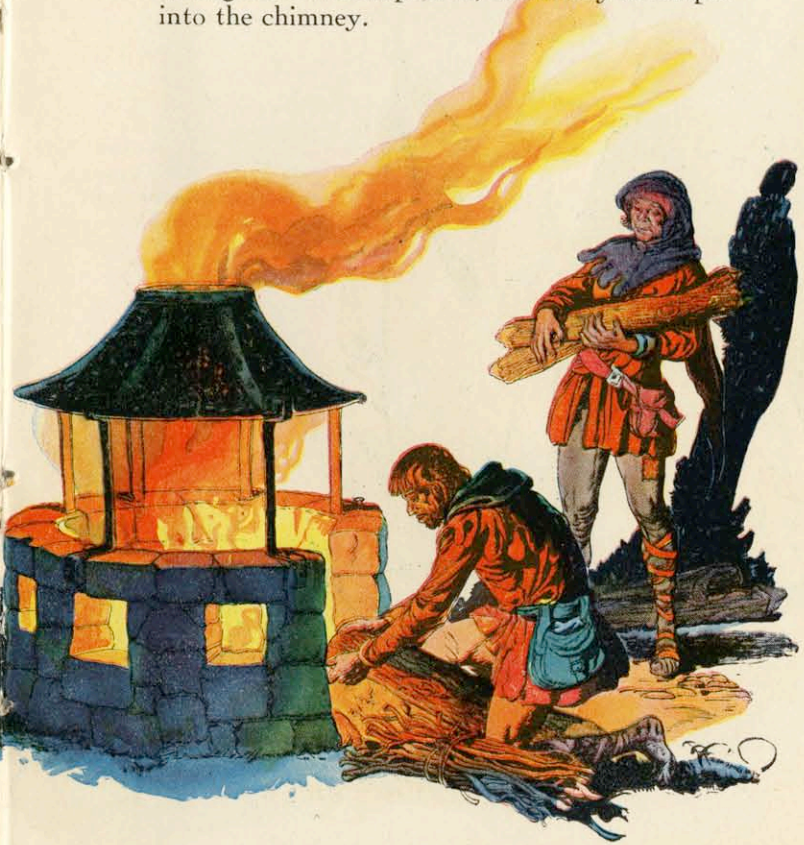
IN ENGLAND the hearth fire became the center of social life. It was placed in the middle of the great main halls of castles, where its warmth could be best diffused. Over the hearth, a covered pyramid carried the smoke through the roof, and with it, incidentally, most of the heat.

About its roaring log the household gathered. In noble castles the lords and their guests feasted and passed the cup through the night, while wandering minstrels sang of gallant feats and fabulous combats. Even the servants, to the youngest scullion, crept up to the circle of warmth with wide eyes and open mouths, to hear the songs.

In England the hearth fire became the center of social life

THESE halls at first had only eye-holes for windows, and the opening in the roof was wholly inadequate for ventilation. This fact of itself would account for the virulence of diseases that devastated whole countries during those ages, sweeping out life like a tidal wave.

The invention of the chimney did not take place until the Norman Conquest. By this time the fireplace had been moved away from its traditional position in the center of the room, and was located in the wall. At first a hole in the wall served as exit for the smoke; but in time this arrangement was improved, and finally developed into the chimney.



ON THIS side of the ocean, the American Indians held fire the greatest of all forces. They connected the heat of their open campfires with the life-giving warmth of the sun.

The campfire was the center of tribal life. Around it the warriors danced their dances of hate or triumph and celebrated the change of seasons with weird festivities. There they conducted their solemn councils, and passed the pipe of peace.

The Indians connected the heat of their open campfires with the life-giving warmth of the sun

THE PILGRIMS tried to warm their sturdy log houses with fireplaces—the method they brought from England. If the fire went out it was rekindled with the tinder box, a small metal case containing linen fabric burned black. A steel circlet rubbed against an Indian arrowhead sent a shower of sparks into the tinder, which with patience could be blown into a blaze.

When the tinder box method was too slow someone went running to a neighbor, to borrow a panful of live coals.

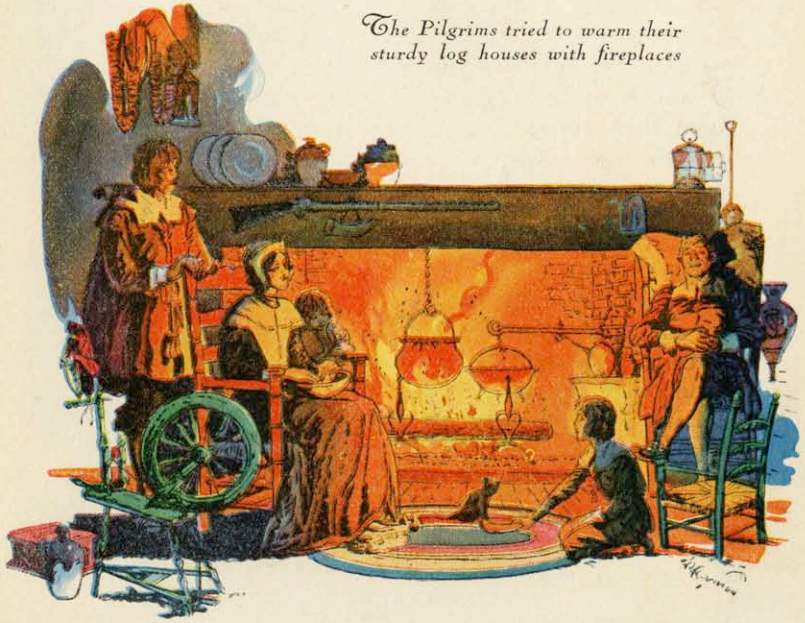
It was more than two hundred years before the mere scratching of a match would bring flame leaping from its head.

To the long and tedious church services on Sunday the Pilgrims sometimes carried small iron foot-stoves, for churches were unheated.

Half their number died, that first winter at Plymouth.

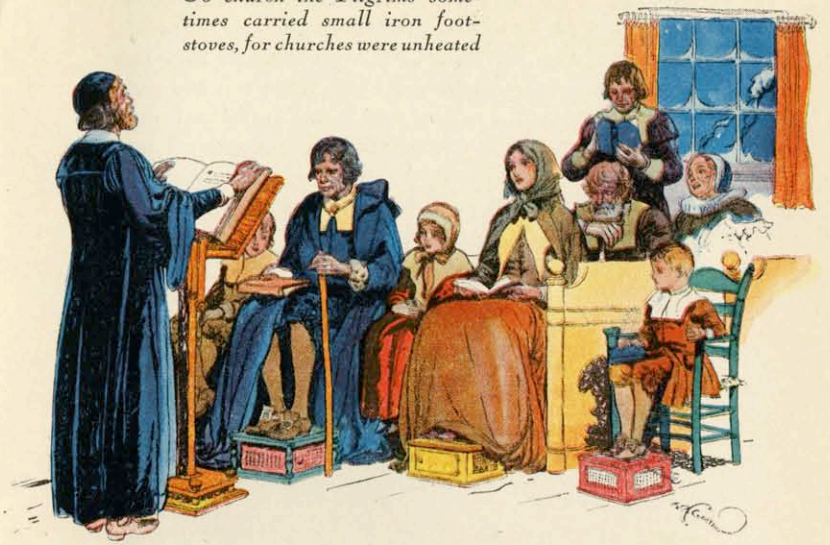
FIREPLACES were cheerful to look at and produced a healthful circulation of air. But they were draughty and scattered much dust about. Moreover, from seventy-five to ninety per cent of the heat went up the chimney. To receive any comfort from the fire, one had to come very close. Then his face burned while his back felt the chill.

So when Benjamin Franklin in 1744 produced the first American stove, he heralded a tremendous advance. The amazing Dr. Franklin—whose brilliant diplomacy won us the aid of France during the Revolution, who demonstrated the identity of lightning with electricity, and who founded the first library in America—brought about also a revolution in heating.



The Pilgrims tried to warm their sturdy log houses with fireplaces

To church the Pilgrims sometimes carried small iron foot-stoves, for churches were unheated



FRANKLIN'S little cast-iron heater was unsightly and hard to keep clean. But it warmed the room throughout, and effected great saving of fuel, through controlled combustion.

Franklin stated that his stove warmed his room twice as efficiently with one-fourth the wood required by a fireplace!

The stove, like the fireplace, heated by *radiation*, the same principle by which the sun warms the earth. Radiant heat is transmitted through space in a straight line, but does not warm the atmosphere through which it passes. Only when striking a solid body does it become perceptible. The stove could heat only one room satisfactorily, because its warmth did not penetrate walls, and very little air current was created.

NEVERTHELESS, in slightly varied forms, Franklin's stove was used for a hundred years, in this country and Europe.

The next significant step came early in the nineteenth century, when stoves were moved into basements and became warm-air furnaces.

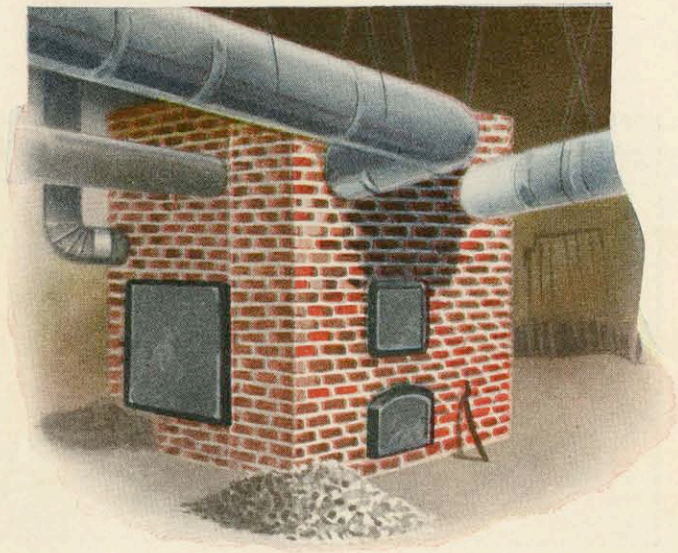
This marked the beginning of a new epoch in home heating. The stove was encased in a brick or iron jacket. This served to intercept the radiant heat waves coming from the stove so that the air in the space between the stove and the jacket became quite hot. It is a well known law of physics that when a volume of air is heated, it expands and becomes lighter in weight than an equal volume of cooler air. Being lighter in weight, it rises, in accordance with the law of gravity.

That is the principle on which this new type of heater operated. The heated volume of air between the stove and the jacket rose, and cooler air from the cellar flowed in to take its place. The process was continuous.

Franklin stated that his stove warmed his room twice as well with one-fourth the wood required by a fireplace

THE warm air flowed upward, through pipes, to the rooms above. And so the heat from ONE fire now did the work that before had required several stoves.

But important as this advance in heating systems was, several limitations became apparent. The force that circulated the warm air from the cellar furnace to the rooms above depended upon the difference in weight between the heated air and an equal volume of the cooler air in the home, and this force was not great. A slight adverse pressure easily stopped the flow of warm air, and on the windward side of a house the rooms were invariably left cold because of the pressure of outside cold air blowing in through the cracks around windows and doors. One never could be assured of steady, even heat in every room.



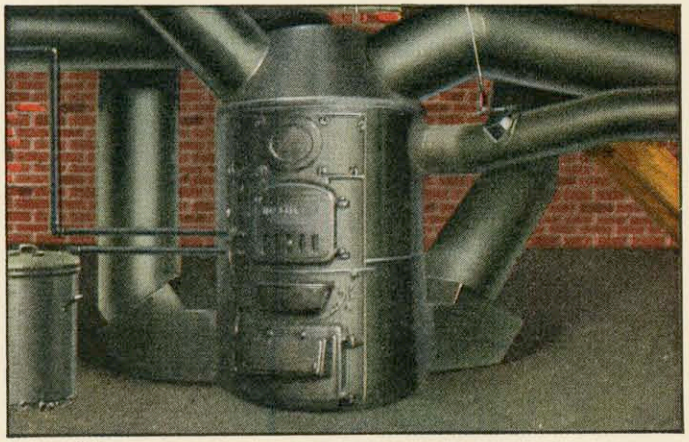
One of the first warm air furnace installations

AGAIN, the necessity of heating the air to high temperatures at one source, greatly increased its capacity for absorbing moisture. Despite the use of water pans, in most cases the air in the home was deprived of its natural humidity; a condition frequently causing severe colds and other ailments.

Added to this was the fact that dust and gases from the furnace were swept along with the circulating air and carried to the rooms above.

And with the era of towering office buildings and apartment houses came the need for a heating system that would carry to the topmost turret the same warmth it supplied the ground floor. The warm-air furnace could not fill this need because the heated air could not be made to travel long distances.

Steam and hot water, with which men had experimented now and again through history, came to the fore.

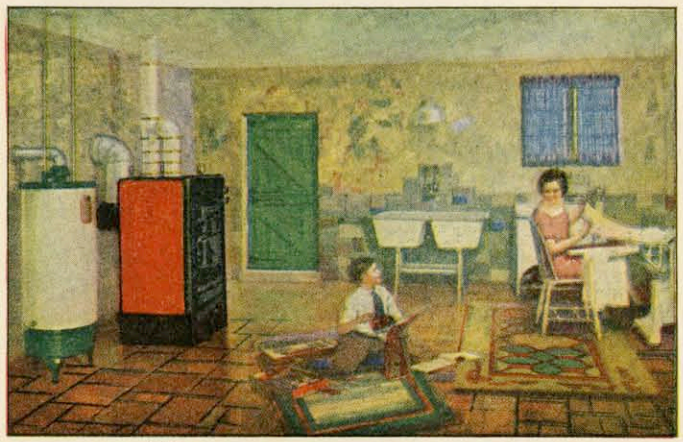


Another type of hot air furnace. The heated air flows to the rooms above through the flue pipes on top

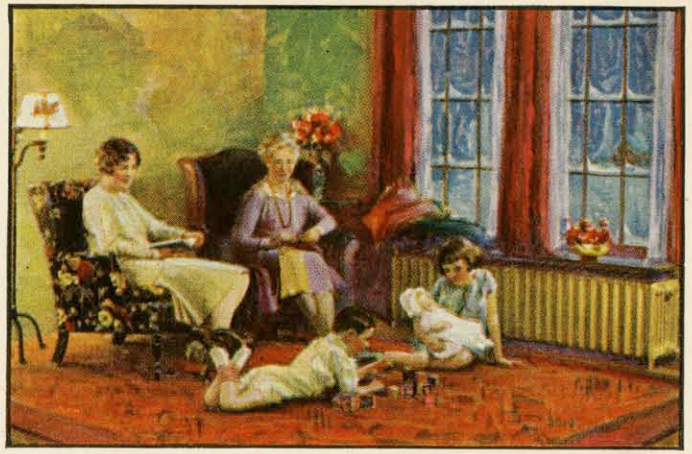
AT FIRST this heat was circulated only in pipes, but in the latter part of the nineteenth century radiators appeared.

In the radiator heating plant a boiler is set in the basement connected to radiators upstairs. The fire in the boiler generates heat, which is absorbed by a body of water in the boiler surrounding the fire. In a steam radiator system the heated water in the boiler is converted into steam, which flows through a system of piping to the radiators. In a hot water system the hot water itself rises from the boiler and flows through the radiators.

The radiators in turn give up their heat to the respective rooms in which they are placed. The flow of heat through the enclosed system of piping and radiators is positive. Outside gales cannot stop the steady flow of warmth, and every room in the home is warmed evenly.



A modern cellar, made clean and livable through the use of an Ideal Redflash Boiler



In a good radiator heating plant the heaviest gale cannot stop the flow of warmth to every room

IN THE radiator system it is impossible for dust from the cellar to find its way to the rooms above. And because of the lower temperature of the radiators, the air preserves its normal moisture content to a far greater degree. Radiator heating is the cleanest, most healthful and most comfortable home heating system known to scientists today.

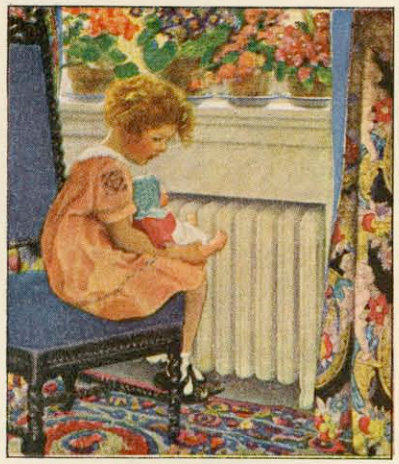
Withal, a good radiator plant operates more economically than any preceding form of heating and its life is longer. It serves efficiently during a lifetime.

Thus radiator heating, approaching more closely than any previous system the ideal of perfect heating, hastened the flowering of the great civilization of our day.

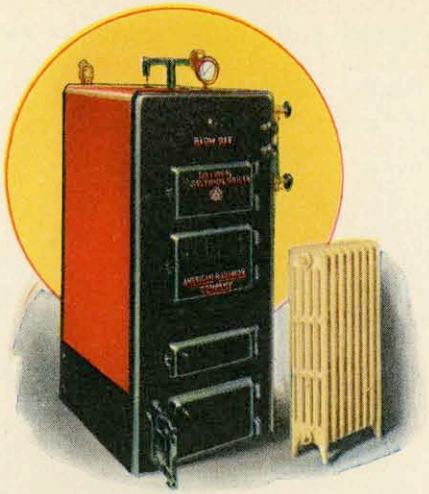
THE tremendous activity of modern cities, with their giant office buildings, elaborate apartment houses and improved working conditions, only became possible with the healthful conditions attendant upon radiator heat.

Great hotels and department stores arose when warmth for patrons and employees was achieved. Modern factories developed, requiring heat not only for their workers but for processes.

Consolidated schools in place of the isolated little school-house. The clustered buildings of universities. Laboratories. Great libraries. Incredibly delicate operations in mammoth hospitals. How could these do their work except for freedom of the workers from chilled brains and bodies, and safety against exposure.



So—beginning far back with the spark that first stirred some dim, prehistoric imagination—each type of heating has given way to one better. And the greatest civilization of all times, finding expression in our towering cities and gigantic enterprises, has been made possible through the development of radiator heat.



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An Ideal Redflash Boiler and American Corto Radiators are the best guarantee of 70-degree healthful springtime warmth in every room, all winter long, year after year.

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