



Baby, it's cool inside! A singed sun bather is invited to beat the heat inside an air-cooled Las Vegas, Nev., hotel. Next: air-conditioned streets.

GENE LESTER PHOTOS

They're Trying to Make Summer Extinct

By RUFUS JARMAN

Cars are already being equipped with air coolers. Some builders predict that in 10 years no \$10,000 house will be without filtered air. Everybody will keep cool, if the present boom goes on, because the air-conditioning boys are selling custom-made weather at retail.

THE coming summer, in the opinion of a good many wise observers, will mark the actual beginning of The Great Era of Air Conditioning—a science that started with the early civilizations of mankind, but hasn't come into its own even yet. Depending on who is talking, The Great Era of Air Conditioning can mean anything from room coolers becoming as common in homes as refrigerators are now, to a fantastic future when practically all indoor spaces and limited parts of the great outdoors, including streets of cities, will be given year-round "perfect climate" by artificial means.

But regardless of the comforts or complications air conditioning may eventually bring, right now its

principal function is to keep rooms cool in hot weather. Most Americans were put in a favorable frame of mind toward that concept of air conditioning by the events of last summer, when it got so hot that for the first time in memory, New York's streets were too warm for the feet of local pigeons, which flew away to the beaches for one hot spell's duration. A Maryland woman, seeking relief in her refrigerator, was caught there and suffered frostbite. Fourteen carnival snakes, including several sun-loving rattlers, expired of sunstroke in Texas. Dietary experts estimated that New Yorkers lost 3,200,000 pounds in two weeks because of heat-jaded appetites. The New Haven, Connecticut, County Farm Bureau

(Continued on Page 142)



Jack Toon shows Mrs. Jim Faulkner, of North Hollywood, how to adjust her new air conditioner.



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THEY'RE TRYING TO MAKE SUMMER EXTINCT

(Continued from Page 25)

reported finding baked apples hanging on the trees.

Another story in the New York press was to the effect that relations between tenants and landlords were more strained than at any time since the great dispute several years back over putting television aerials on apartment rooftops. This time landlords didn't want tenants to install room coolers in windows.

This was one of many signs that, for the first time, people were overcome with a desire for air conditioning in homes. In most cities east of the Rockies room coolers were snapped up early. Dealers formerly had leftover stock at summer's end, but last year in St. Louis they were all gone by June fifteenth. In Chicago a couple of weeks later, when the Republican National Convention came along, the Carrier Corporation had to dredge every dealer in town to unearth eight window units and a store cooler for living and press quarters of candidates Taft and Eisenhower. When the Democrats arrived a fortnight after that, no coolers were left for candidates Russell and Kefauver.

In most cities when room coolers ran out, sweltering people who had always considered air conditioning unhealthy or too expensive brought pressure upon dealers or sought black markets. Meanwhile, air conditioning was affecting social life. Bridge and cocktail parties moved from the living room into the bedroom with the room cooler. The few families owning air-conditioned homes flatly refused to go out evenings, although their houses were overrun with eager callers.

On the business front, where air conditioning had always been considered a sort of backward child, its new impact was even more striking. Financiers predicted it was about to become "America's next great industry." When the Carrier Corporation, largest in the field, announced, last fall, gross business totaling \$107,700,702 for twelve months, not only was Wall Street impressed but old-timers in the industry could scarcely believe it. Four years before, when President Cloud Wampler, of Carrier, had predicted a \$100,000,000 gross by 1955, some company officials said such wild talk might cause him to lose the employees' confidence.

About 400,000 room coolers were sold last summer by everybody before the supply gave out. This compared with 33,000 in 1941, biggest prewar year; and 237,000 in 1951. The twenty firms making and selling room coolers upped production from 30 to 300 per cent for this year. Some forty companies new to air conditioning planned to come in. These included great merchandisers such as Nash-Kelvinator, Admiral, Hot Point, International Harvester, Sears, Roebuck and "Mad Man" Muntz.

Of course this surge wasn't caused entirely by last summer's heat. Recently accustomed to cool offices, stores and restaurants, people needed only a forceful suggestion that air conditioning would be nice at home. The '52 scorcher was the suggestion. Meanwhile, manufacturers had lowered costs and cleaned out most of the mechanical bugs since the war. Average price of a half-horsepower window unit last year was \$280. A dozen years before, it had been \$350. A dozen years before that Frigidaire had built 4000 of the first

room coolers, quarter-horsepower jobs at \$800 each, and had lost a reported \$2,000,000 because nobody would buy them.

Many air-conditioning people admit the industry tried to develop a big room-cooler market in the 1930's before its equipment was ready. Only in very recent years has it been made fool-proof by hermetically sealing compressors. This prevents refrigerant leaks and makes it difficult for people to get at parts to "fix" them. The greatest mechanical troubles with coolers always had resulted from people "fixing" them, including some persons claiming to be experts. For some reason, Americans generally have never learned much about the mechanics of refrigeration.

T. H. Urdahl, of Washington, who as a Navy captain during the war had charge of air conditioning the Pacific fleet, tells that when the first landings were made on Guadalcanal, the marine in charge of mobile refrigeration units was one of the first killed. Nobody else in that force knew enough about refrigeration to get the equipment going. Food and certain medicines spoiled, but the chief cry of the men was for ice cream. Finally, a flying colonel took a bomber to Australia, picked up a load of ice-cream mix and brought it back to Guadalcanal. It was mixed with water, and the colonel took it aloft again. He flew around in the cold blue yonder until it froze, and the men had probably the most expensive ice cream ever made. If the head of radio or any other mechanical or electronic department except refrigeration had been knocked off, Mr. Urdahl says there would have been plenty of others around who understood enough about it to have taken over.

At that, Americans understand air conditioning better than Chinese do. A few years ago a theater in Nanking installed a \$100,000 system and assigned to run it a coolie type whose ideas about mechanics were vague. He was taught to stop, start and oil the machinery. But when a part broke, the Chinese, left on his own, gave it the same sort of treatment his ancestors had used for centuries to combat evil spirits. He faithfully burned incense under the stalled part night and day. A service man finally arrived in town and fixed it. But at last report, the Chinese was keeping a small vial of incense smoking under the machinery at all times, just in case.

Some thinkers believe the important field in residential air conditioning is not room coolers, but central units providing year-long perfect climate for the whole house. A St. Louis builder has scheduled this year 400 such houses to sell at \$12,000. Firms in New Orleans and Kansas City have each announced blocks of 500 new houses to sell under \$19,000 and \$17,000 respectively. Smaller developments at \$13,000 to \$60,000 per unit are projected from Texas to Westchester County, New York. A big Texas builder has said that in five years any new house built down there without full air conditioning will be "as obsolete as a house today without a plug for an electric refrigerator." Some builders say in ten years no \$30,000 house will be without it, others that no house costing over \$10,000 will be un-air-conditioned.

Servel, Inc., which has concentrated most on year-long units and has installed 7000 to date, hopes to triple 1952 production this year, then triple that in 1954. General Electric, now quantity-producing the heat pump for homes—a device that cools in summer,

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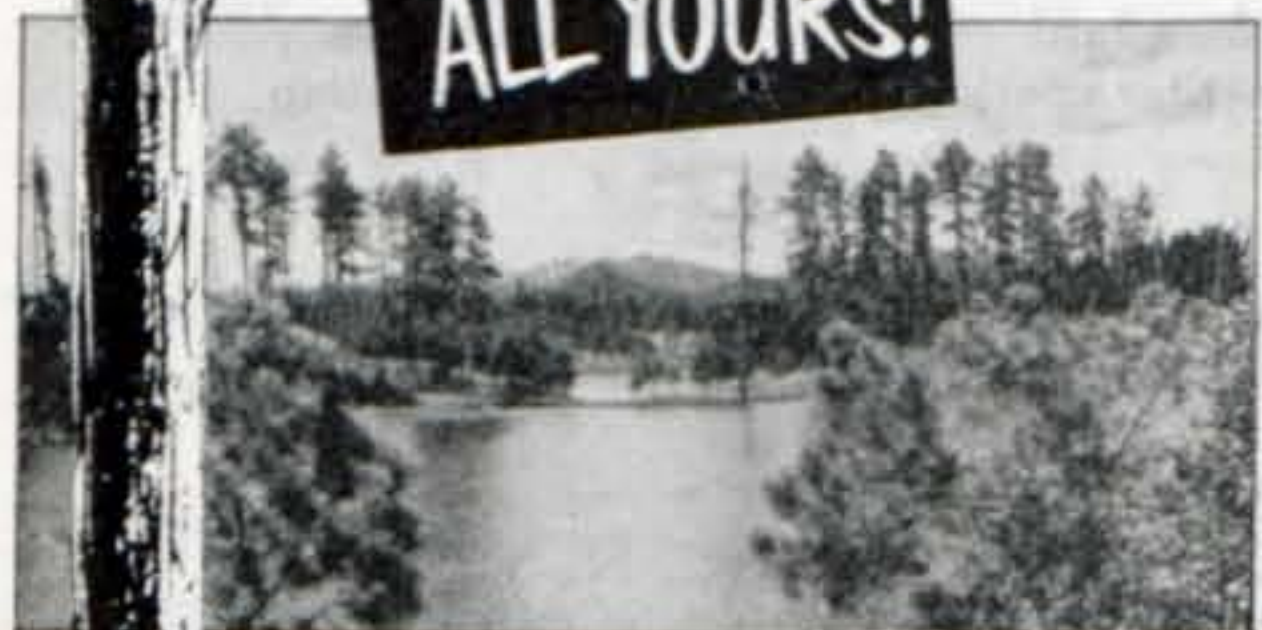


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then reverses itself and draws out cold in winter, like a refrigerator running backward—has predicted that 5 per cent of new homes will be air conditioned in five years. The York Corporation, one of the long-time air-conditioning leaders, thinks it will be more than that and sooner.

York people feel that the best market for air-conditioned homes for some years will be the 12,000,000 houses with forced warm-air heating. York's two-ton unit, capable of cooling a six-room house, can be tied into forced warm-air-heating ducts for \$750 to \$1000 in most cases. For large homes heated by steam or hot water, without air pipes, York is introducing this year a combination of two two-ton refrigerating units, one for the basement and one for the attic. They are placed as near as possible to the area to be cooled so as to eliminate installing as many ducts as possible. The units are air-cooled to eliminate the necessity of plumbing connections, and can be installed probably for between \$2500 and \$3000.

A recent poll, by the National Association of Home Builders, of 255 representative firms indicated that about 40 per cent of home-building companies will offer air conditioning in new houses this year. Last year almost none of the 104 companies in the poll that said they now plan to air-condition new homes were considering the matter seriously.

Carrier, interested particularly in new houses, has forecast 50,000 new air-conditioned homes this year, and has recommended home designs to take full advantage of air conditioning. All-year perfect climate of seventy degrees, with 50 per cent humidity, is maintained by one unit taking nine square feet of floor space, with a gas or oil furnace on one side and electrical refrigeration on the other. It distributes hot or cold air through one system of ducts. Wadsworth Homes, Inc., builders, of Kansas City, will sell their 500 three-bedroom units of this type at \$16,300, including a three-ton cooling unit. With a two-ton unit it would be \$400 cheaper. The three-ton cooling unit costs \$1230 more than the heating system would without it, but the Wadsworth people say the house is cheaper to build with cooling than without it. Building savings are made because two thirds of the windows are sealed, this being cheaper than movable sashes.

Screens, porches and attic fans are eliminated, and no provisions are made for cross-ventilating ells, wings or offsets. Electricity for cooling will probably average about seven dollars and fifty cents a month, water about the same, unless it is reused with a cooling tower, which costs \$200 to \$300 to install.

Advantages claimed for this type of home include solid windowless walls on one or two sides. These are not only cheaper to build but make the house easier to keep warm or cool, and block the sight of neighbors' garbage cans. Walls facing the more pleasant vistas are mainly glass. Bedroom windows are higher and smaller than usual, insuring privacy and freedom from outside noises. Absence of dust makes cleaning easier. The air is free of high humidity in summer, and humidity is added in cold months.

Perhaps more important than these conveniences for the housewife to the destiny of air conditioning is that big business—namely, the \$10,000,000,000-a-year home-building industry—has become mightily interested in this subject. A spokesman for the National Association of Home Builders, representing 85 per cent of builders of homes in metropolitan areas, has said that 1,000,000 homes a year must be constructed if the building industry is to remain healthy. But for the next eight years there will be fewer young married couples, because the birth rate fell off during the 1930's depression and children born in depression years are now of the age to start families. Production of new homes may fall from the 1,000,000-a-year postwar level to an estimated 550,000 a year unless some gimmick is found to make more people buy new houses. Builders are counting mainly on air conditioning for that gimmick.

Up to now, less than 1 per cent of United States homes have air conditioning in any form. No large New York hotel is fully air conditioned; few apartment buildings are, and only lately have office-building owners decided they must have it to keep tenants. Aside from a lack of big-time merchandising know-how on the small-consumer level and other tangible stumbling blocks, air conditioning has had to combat various intangible human emotional problems, including the custom of denouncing the weather, whether it is provided by God, Air-



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THE SATURDAY EVENING POST

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temp, York or whomever. Science says that 96 per cent of people are most comfortable at seventy-six degrees temperature, 50 per cent relative humidity, or would be except for numerous human variables, including different weights of clothing. The York people encountered this early in comfort air conditioning when they put cooling in the new wing of the Senate Office Building in Washington in 1927. Some senators wore high collars and even long-tailed coats. Temperatures had to be a frosty low for them to feel the cooling through all that haberdashery. And so the female office workers, in flimsy garments, turned interesting shades of blue and probably became lifelong enemies of air conditioning.

The same problem is encountered each time air conditioning is installed in large offices occupied by both men and women. Of course, many people are convinced that the slightest encounter with air conditioning gives them colds and pneumonia. Air conditioners maintain it prevents colds. Some years ago the Metropolitan Life Insurance Company kept records of respiratory ailments among 5385 of its employees working in an air-conditioned building as compared with 5120 in a not air-conditioned building. After a year of study the company found the number and severity of colds among employees in the two buildings had been almost exactly the same.

Few people can remain comfortable in artificially cooled surroundings while looking at a thermometer. During the sweltering summer of 1936, the St. Louis Statler became the first large air-conditioned hotel. Lines of people formed all the way into the street seeking relief in a cool room. Those who got rooms proceeded to complain dismally about being too hot or too cold, until the management deliberately broke the thermometers with which each room's outlet was equipped. After that, everybody was able to sit back and enjoy the air conditioning.

When the United States Senate Chamber in the Capitol was being air conditioned in 1928, the engineers were dismayed to learn that the senators had decided each member should have a thermometer on his desk. They knew this would cause more argument than the protective tariff. A Capitol engineer solved the problem by getting ninety-six off-gauge thermometers. Some registered a few degrees above, the rest several degrees below, the actual temperature of seventy-two degrees. High-registering thermometers were put on desks of older members, since aged people like it warmer. Younger members got the colder-registering thermometers. Thus, air conditioning, which had promised to be one of the most controversial issues ever to confront the upper house, passed without a dissenting vote.

The "fresh-air complex" causes air conditioners much woe. Vincent P. Black recalls that when the Continental Oil Building at Ponca City, Oklahoma, was conditioned by Chrysler Airtemp some years back, he had to stay out there three weeks to listen to gripes of employees, who maintained that windows should be left open because it was summer. Black was kept busy jerking down windows, although the outside temperature reached 114 degrees four straight days, and hit 117 the fifth. This is especially exasperating to air conditioners, who claim there is no such thing as "fresh air," except maybe that filtered through a conditioning plant. To them, the limpid breezes playing over the meadows in

spring are just some tired old gases that have enveloped the earth since the beginning, and are full of all sorts of unwholesome objects.

Human quirks and phobias help to make air-conditioning of places used by large crowds one of the most baffling matters known to science. To these are added scientific problems, such as figuring the amount of heat entering from outside and that generated inside by lights and machinery, including human beings. To science, a human being is a machine that generates as much heat as a 125-watt electric bulb when the person is at ease. He generates twice that while eating, three times that when dancing or when he becomes angry or excited. Body heat given off by occupants causes the large theaters to use the cooling instead of the heating plant when filled on most winter days.

The job of air conditioning the Chicago convention building last year for the two major political conventions involved all these problems in concentrated amounts. The parties decided to use that hall after the owners agreed to spend \$350,000 cooling it. Some former delegates can recall how hot they got

IN A MEADOW

Children, I have brought you
here
To hear the sounds the heart
must hear,
To see the sights the heart must
see,
To teach the heart eternity.
—MARY SCOTT HAVERSTICK.

at past conventions more clearly than they remember the nominees. No wonder, because most presidential candidates and party platforms have been chosen by delegates who were running a fever. The body cannot hold normal temperature when exposed at length to high temperature and humidity. In a hall at ninety-five degrees, 65 per cent humidity, a normally active delegate's temperature, after three hours, would climb to a degree and four-tenths above normal, which may explain a lot of politics.

The Carrier Corporation figured that on a ninety-five-degree day when all 12,000 seats were taken, the refrigeration must combat the following amounts of heat from these sources: Enough sun heat would penetrate the roof every day to keep one three-bedroom house warm for two months of a hard winter. About the same amount would generate from floodlights. Twice that much must be removed from ventilating air pulled in from outside. But the crowd itself would produce enough heat each day to keep the three-bedroom house warm for three whole winters, or enough heat every hour to cook 16,000 sixteen-ounce steaks or a string of hot dogs fourteen miles long. Furthermore, delegates and visitors would sweat 15,000 quarts a day, adding to the humidity.

All this was offset by two centrifugal refrigerating machines of 1000 tons' total capacity, producing the cooling effect of 2,000,000 pounds of ice melting every twenty-four hours. Thermostats caused the machinery to work harder to keep an even temperature of near seventy-two degrees when the crowd became excited and produced

more heat. Therefore, some Carrier engineers decided they could tell ahead of time what candidate would be nominated by the extra amounts of electricity the equipment consumed to offset excitement heat at various strategic moments. They noted that the machines shot up to making an extra eighty tons of cooling when Former President Hoover spoke; ninety extra tons of cooling were used when General MacArthur gave the keynote address.

But on nomination night, the crucial time, the heat test failed. Senator Taft's nomination and demonstration came first. The crowd was fresh and enthusiastic then. The indicator shot up to an extra 100 tons of cooling. But when General MacArthur's nomination came about three A.M., the audience was worn out, and the indicator barely stirred. Three hours earlier, when General Eisenhower had been nominated, the heat load advanced a bare twenty tons in the weary crowd. This established that excitement at convention demonstrations is an unreliable index.

While Republicans and Democrats were depending on air conditioning to make Chicago more pleasant, Mohammedans were leaning upon the same thing to inspire renewed zeal among the faithful to make the pilgrimage to Mecca, great holy city of Islam and birthplace of the Prophet. The number of pilgrims visiting that holy place had been diminishing alarmingly in recent years, perhaps due to the 120-degree temperatures that had killed thousands of them by sunstroke. So last summer the Ministry of Health of Saudi Arabia commissioned Carrier to build at Mecca a large ice plant and cold room for treating sun-struck pilgrims. These new comforts may have been an important reason last summer why so many pilgrims undertook the journey that the United States Air Force in the Near East instituted a "Pilgrim Air Lift" to ferry some of the thousands into the holy city in time.

Once they've felt air conditioning, rich Near Easterners are not happy until they get it at home. Installing it in their dwellings, with twelve-foot-thick walls, is bad enough, but service crews are plagued with even more baffling situations peculiar to the region and its people. Not long ago, David Armbruster, service man for Servel International, put a system in the home of Emir Saud Ibn Juluwi at Hofuf, an ancient walled town complete with guards at the gates and located at a large oasis in the desert. The day after it started working, Armbruster noticed that the condensers on the roof were behaving queerly. They were emitting clouds of bubbles. It turned out that the water evaporating from the condenser was replenished from a well supplying the palace drinking water. It was also the outlet for electric washing machines in the harem. The emir had another well dug for the air-conditioning apparatus at once. Apparently he had not objected to the taste of soap in his water, but was taking no chances on its ruining his new cooling system.

Armbruster's experience was rather mild compared with what Mike Waldy, a Carrier service man, endured in a war lord's stronghold somewhere in the wilds of Western China. The equipment, which had to be sent by small boats up some narrow rivers and portaged around rapids, took a bad beating during the three-month trip and parts were lost here and there along the way. When Waldy arrived by air to install it, he was put under house arrest. The war lord said if he didn't

produce cooling in a reasonable length of time, he would be shot.

This was disquieting to Waldy. Not only had the machinery been shaken up in travel but among the lost parts were vitals of the starting apparatus. The service man rigged a rope around a flywheel, and pulled on it, the way people start outboard motors. Happily, the machinery did start and did produce cooling, and Waldy was released. He left hurriedly, wondering how the war lord would restart it when the machinery stopped or was turned off, but he never went back to see.

Air conditioning began at least five centuries ago in the Near East and India, where mats were hung in breezeways and kept wet. Constant evaporation produced cooling. The same system was used in Assyria by wetting flagged courtyards. Egyptian Pharaohs used roof ventilators, and one caliph of Baghdad had the hollow walls of his palace filled with mountain snow. In 1500, Leonardo da Vinci built a water-driven fan to ventilate his patron's wife's boudoir, and 250 years later Dr. J. T. Desaguliers, a French inventor, designed a man-powered fan for the British Parliament. The coming of artificial-ice manufacturing 100 years ago brought many cooling schemes, such as blowing air through pipes imbedded in ice to cool a Staten Island restaurant, or cooling New York's Madison Theater in 1880 by blowing air over four tons of ice each evening. A Frankfurt, Germany, private home got the first modern concept of home cooling two years later. Refrigerated air from coils in the attic was fed by gravity through ducts to rooms below. Yet apparently none of this had much public impact, for it was in 1890 that Charles Dudley Warner wrote in the Hartford Courant: "Everybody is talking about the weather, but nobody is doing anything about it"—a line often attributed erroneously to Mark Twain.

The United States Navy was first interested in air conditioning during the fatal illness of President Garfield in July and August, 1881. Some Navy engineers rigged fans to blow across ice into the sickroom, melting 436 pounds an hour. The Navy reported later: "Humidity is recognized as the principal and most disturbing factor" in cooling. At the time, cold air was fed into rooms without properly mixing with warm air, causing condensation in the room and clamminess. Nowadays a proper humidity is as important as temperature in air conditioning. Excess humidity is squeezed out as air enters through conditioning equipment. At Macy's in New York, on a hot, humid Thursday, when the store is open twelve hours, some 10,000 gallons of water are squeezed from incoming air. A central air-conditioning system in a small home will take out about a gallon of moisture an hour on a humid day.

Modern air conditioning—meaning temperature and humidity control—was originated mainly for industrial products instead of people and to control humidity instead of temperature. The term itself was coined in 1906 by Stuart W. Cramer, textile manufacturer of Charlotte, North Carolina, to describe cotton yarn spun under proper moisture conditions. Many industries, particularly textiles, which require a fairly high, steady humidity, had long been plagued by air-moisture variances. Early in this century, Cramer, the late Dr. Willis Carrier and others perfected moisture controls.

The system of Doctor Carrier worked like this: fans pulled air into a factory

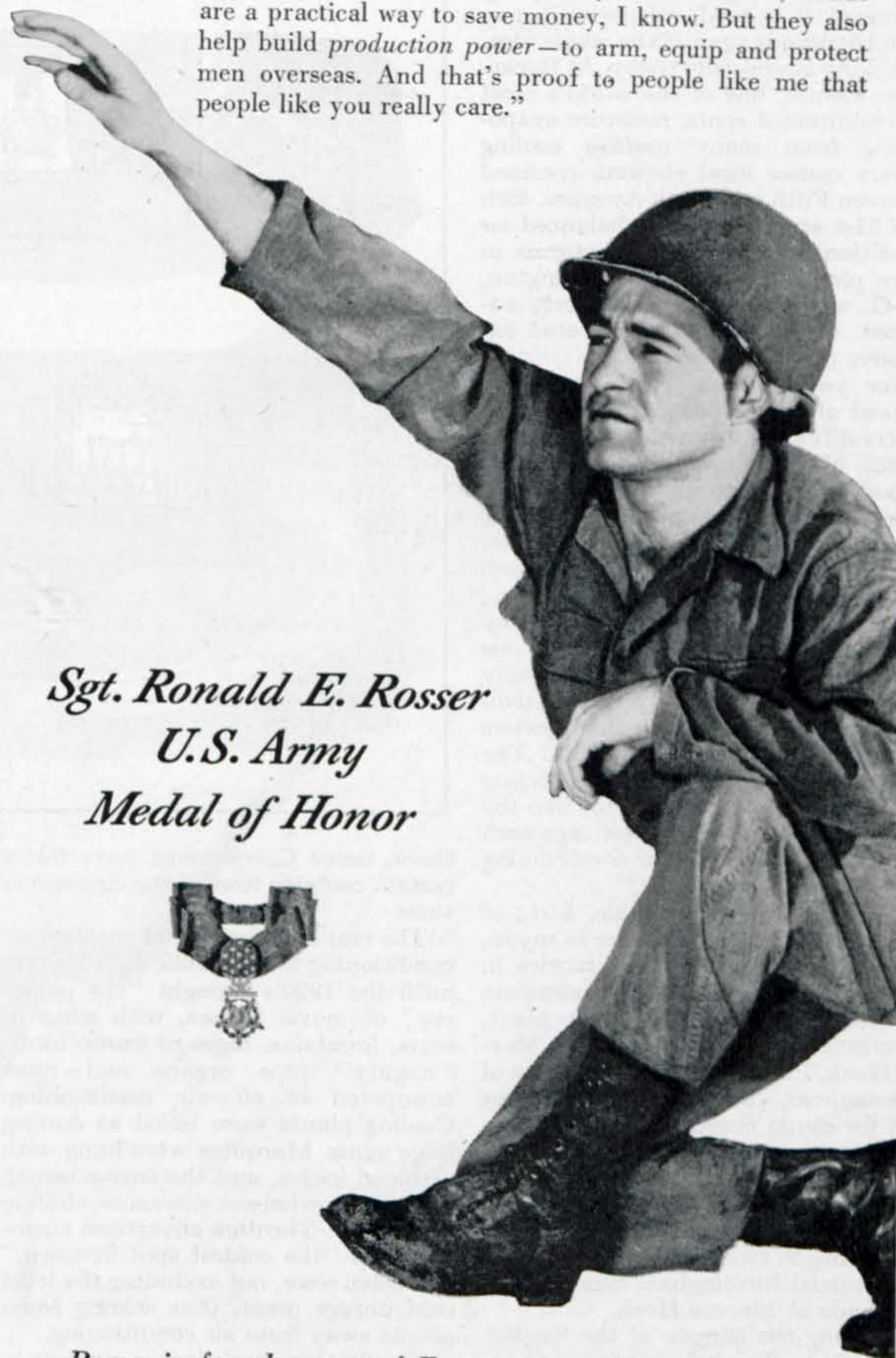
A Score Settled...

WHEN HIS BROTHER was killed in Korea, Sergeant Rosser re-enlisted. Several months later he, too, was in Korea—pinned down on a hill near Pongil-li by surprise Red fire. He saw it cutting up the platoon.

Suddenly he jumped to his feet. Alone, and armed only with a carbine and a grenade, he charged a Red bunker and cleaned it out. He dropped into a trench and dispatched five more enemies. Twice, under heavy fire, he returned for more ammunition, then renewed his attack.

His one-man fight was furious—and short. It ended with 13 enemy dead, the American platoon saved, and a score settled for Sergeant Ronald Rosser.

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through a spray of water, which was heated or cooled to any desired temperature. Air passing through a spray immediately takes the water's temperature, and absorbs as much of it as air at that temperature will hold, which is always exactly the same amount of moisture for any given temperature. At eighty degrees, for instance, air will hold twice as much moisture as air at sixty degrees. Thus, on a cold day outside when air was dry, Doctor Carrier's spray water was heated to the proper degree for the air passing through to absorb the moisture wanted. On a hot day outside, when air contained too much moisture, spray water was chilled. That squeezed from the air, through condensation at the intake, the desired amount of water. All air conditioning today works like that, except that in most cases the spray has been replaced by refrigerated coils.

Air conditioning, then, is mainly an engineering matter. If it is properly balanced, it is good; otherwise it may turn thousands against the whole idea. Humidity is especially tricky. At Rockefeller Center, one of the world's most air-conditioned spots, moisture evaporating from many rooftop cooling towers causes local showers confined between Fifth and Sixth Avenues, 49th and 51st streets. Some unbalanced air conditioning causes thunderstorms in large plants. In one big Washington, D. C., apartment house a poorly adjusted, new-type system sweated expensive paper off the walls.

For years, manufactured products instead of people benefited most from air conditioning, from old art treasures in the Metropolitan Museum, conditioned in 1907, to candy, bread and beer. Air conditioning prevented spots in photographic film, which had caused the old movie flickers; treated tobacco leaves to allow machine-made cigars, and simplified the manufacture of many drugs and pharmaceuticals. In one rare instance, Merck and Company had trouble maintaining a certain temperature and humidity in the quarters of some experimental animals. The trouble, as it turned out, was a certain monkey that obviously didn't like the climate. He escaped from his cage each night and reset the air-conditioning controls.

When Samuel Courtaulds, Ltd., of Coventry, England, pioneers in rayon, decided to make synthetic fabrics in America, they hired Carrier to simulate in their American subsidiary plant, American Viscose Corporation, at Marcus Hook, Pennsylvania, the climate of Birmingham, England, regarded as best for rayon manufacture. It turned out that the artificial Birmingham climate was better than the real thing, as air conditioning never varied. So the Courtaulds people then asked Carrier to recreate in their Birmingham plants the artificial Birmingham climate they had made at Marcus Hook.

Bringing the climate of the English Midlands to Pennsylvania was not accomplished without incident. The Marcus Hook plant, an immense one-story structure, had a flat roof and no windows, since ventilation was to be artificial. But nobody had thought of a sufficient egress for excess air. The air conditioning began operating on a very hot day. As the cold air rushed in along the floor, turbulent hot air was forced up, until finally, before anyone realized what was going on, the tarpaper roof blew off.

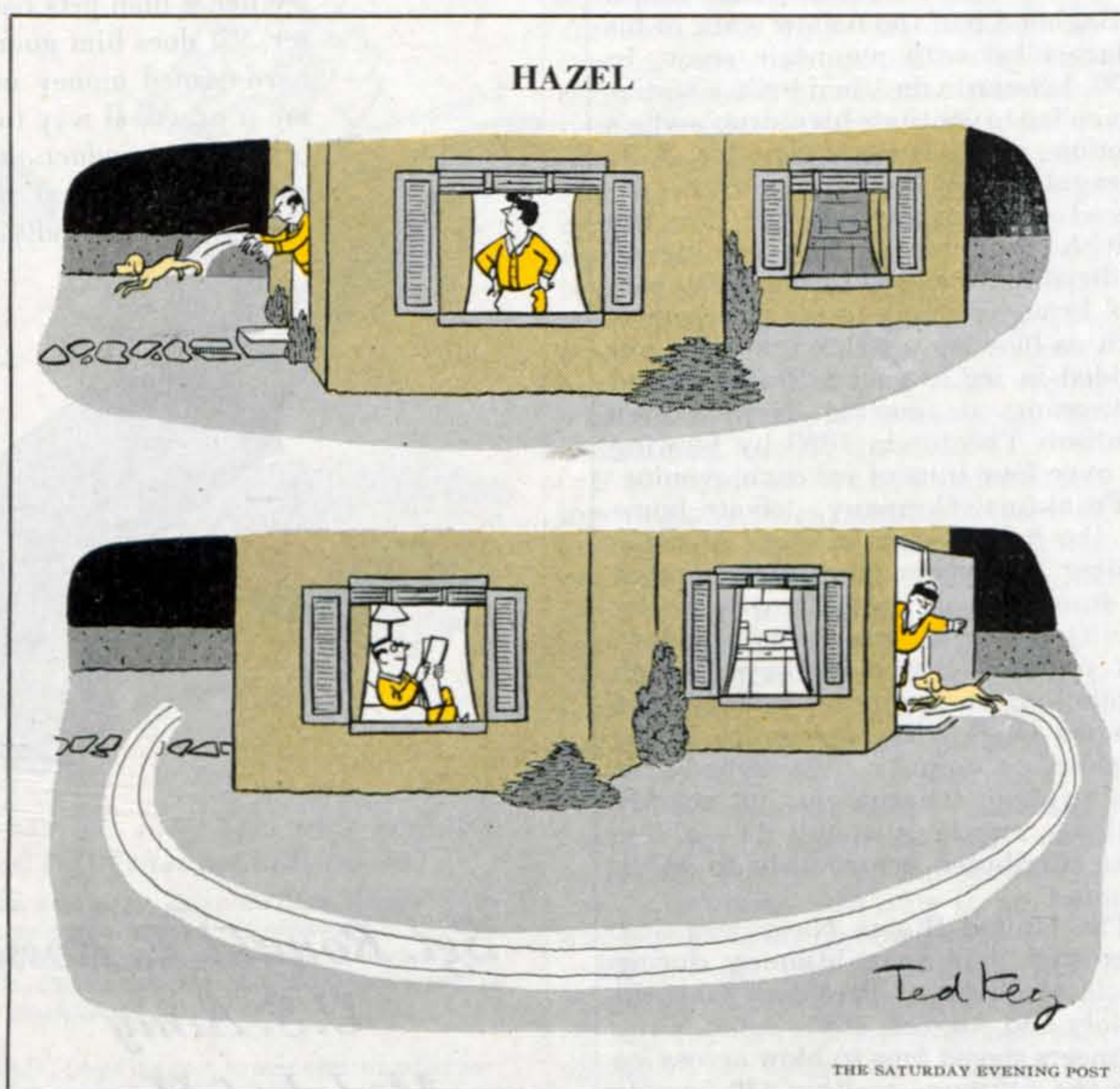
Carrier engineers' greatest humiliation, perhaps, was the case of the late Gargantua's cage. The cage of the

circus' great gorilla, built of half-inch steel and enclosed in thick plate glass, contained one of the most perfect air-conditioning systems ever built. Carrier's engineers, believing the great beast would expire immediately if his temperature or humidity varied a fraction, designed this equipment with more care than they had given the system for Buckingham Palace's bomb shelter or the boudoir of the Queen of Siam. They even installed auxiliary equipment to take over at once, if the regular machinery should fail.

Then one winter it came to their attention that Gargantua had been taken on a trip to Europe. His fine air-conditioned cage, too bulky to handle on shipboard, was left behind. Not only that but the engineers were shocked upon hearing that the beast was allowed to play in the snow over

and also recirculated already-chilled air in amounts depending on the house count.

This made theater air conditioning comfortable and practical. The first theater to have this system was Grauman's Metropolitan in Los Angeles in 1922. Five years later every movie palace worthy of the name had it. Managements' motives were more commercial than humanitarian. Theaters used to close in summer, but conditioning made summer business better than winter, as in the case of the Rivoli, first New York movie house to get air conditioning. The management in 1925 agreed reluctantly to install a \$150,000 system when a manufacturer offered them three years to pay. Crowds swarmed the theater in such droves that the management gleefully paid off in three months.



there. Some Carrier men have felt a certain coolness toward the circus ever since.

The real introduction of comfort air conditioning to the public didn't arrive until the 1920's brought "the palace era" of movie houses, with acres of seats, fountains, cages of exotic birds, "mighty" pipe organs and—most trumpeted of all—air conditioning. Cooling plants were billed as costing huge sums. Marquees were hung with artificial icicles, and the frosty breath of winter howled out entrances, chilling passers-by. Theaters advertised themselves as "the coldest spot in town," and often were, not excluding the local cold-storage plant, thus scaring some people away from air conditioning.

The first air-conditioning systems in movie palaces were not resounding successes. Cold air was piped through holes in the floor, chilling the feet of patrons. Cold air forced warmer air up from the floor, laden with dust, dirt and lint, which settled on faces of movie-goers. Another weakness was lack of a system to recirculate slightly used cool air, and the refrigerating plant had to run full blast whether the house was full or nearly empty. In 1927, Carrier and Walter Fleisher, veteran New York ventilating engineer, each patented "by-pass" systems that allowed air to settle from the ceiling

In 1924, J. L. Hudson's basement in Detroit became the first big department-store air conditioning. The office-building field was broached with six floors of Detroit's Penobscot Building four years later. A couple of years after that, The Martha Washington, a B. & O. diner, became the first air-conditioned railroad car. Santa Fe's Chief became the first air-conditioned train, after dust storms had cut visibility to zero in all cars except the air-conditioned diner. The Navy began conditioning submarines late in the 1930's, and the Pacific Fleet sub commander said after the war that air conditioning allowed United States subs to cruise twice as long as those of other navies. Now the Navy is having all its ships air conditioned. Air lines recently began installing it, and both General Motors and Chrysler have announced that air conditioning will be available in their higher-priced cars this year. A spokesman for Chrysler said his company expects at least 10 per cent of its 1,000,000 cars a year output will soon be air conditioned, costing the owners around \$700 extra.

Until the mid-1920's, Carrier and a few smaller operators, such as Fleisher, were the only firms much involved, and they had to adapt to air-conditioning materials made for general refrigeration. Then the York Corporation,

manufacturers of much of this equipment, set up a department to build and install air conditioning, and has vied with Carrier for industry leadership ever since. Meanwhile such companies as Trane—now third largest—and Worthington Pump have become manufacturers. All air conditioning was large installation work until the invention, in 1930, of that versatile refrigerant, Freon 12. That brought in other companies: Frigidaire, General Electric, Westinghouse, Philco, Chrysler Airtemp, Fedders-Quigan. Freon 12 made possible smaller cooling units, but the first room coolers—console models—didn't reach volume production until 1935. About that time Airtemp made and promoted the first store coolers, used in drug and other medium-sized stores and restaurants. The familiar window units were not produced in volume, at first mainly by York, until the late '30's. Servel went after all-year conditioning of entire houses, but had sold only 292 units when the war arrived. Other companies were in and out of the field, except Carrier, which, unhappy with the slow going of comfort air conditioning, stuck mainly to big jobs. With more invested in air conditioning than others, Carrier was in constant financial hot water until the company perfected an efficient sales program.

But now, after more than twenty years of unsatisfactory progress, it appears that the star is rising on comfort air conditioning. Visionaries in the business do not stop with forecasting a room cooler tomorrow for every house with an electric refrigerator today. They're now talking of someday somehow even regulating the climate of whole nations and peoples.

Writing for the journal of the American Association for the Advancement of Science three years ago, Dr. Clarence A. Mills, of the University of Cincinnati, maintained that climate has these effects upon people and animals: A steer in Iowa will reach 1000 pounds in twelve months, but requires some three years in Louisiana, five years in Panama. White mice raised in a ninety-degree temperature are dull compared with those raised in seventy-degree climate. Students at the University of Cincinnati score only 60 per cent as well in aptitude tests in summer as in winter. A cool era of temperature coincided with the glories of Greece and Rome, followed by 1000 years of heat and the Dark Ages; and no nation in the tropics is progressive, even today.

With these data in mind, one company official who retired last year intends to spend the rest of his days "correlating all known data on effects of climate upon mankind, with the hope that someday we can make lush backward tropics such as Central Brazil more like Nebraska."

Cloud Wampler remarked recently, "Ten years ago when I heard Doctor Carrier predict the day when we would have air-conditioned streets, I rolled my eyes and said, 'Oh my!' Now I think this: I'm fifty-seven years old, and plan to retire when I am sixty-five. . . . I firmly expect to see air-conditioned streets before then."

A few days later, Wampler received a letter from some consulting engineers in New Orleans, who said they already had on paper plans for two proposed shopping centers down there that would have air-conditioned streets—or rather, big malls between rows of stores. The malls will be seventy-five feet wide, 1100 feet long, air-conditioned and roofed over, with automobile parking space on top. THE END