THE STORY OF AIR CONDITIONING
ON 365 days of the year—and nights, too—the air is ridden by four demons who do their best to make your life miserable. Did you ever wonder why you are so much more comfortable in air conditioned surroundings? Ever “look under the hood” of an air conditioner to see what makes it tick, or listen in on some engineers discussing its technical phases? Unless you are an engineer yourself, these explorations are not likely to be very enlightening.

In this booklet we take off our engineering spectacles and create four hypothetical characters who personify the four properties of the air that have to be synchronized by an air conditioning system. Thus, temperature is represented by Tempy*. Humidity, or moisture in the air, is represented by Drippy*. Air movement, or circulation, is portrayed by

* If you insist on being technical, this metaphor can be justified by considering Tempy as one British Thermal Unit (BTU) of heat; and Drippy, one grain of moisture per cu. ft. of dry air.
a lad named Stirry. And cleanliness is represented by the very antithesis of clean air, a disreputable character called Dusty. Let's follow the air through the fans and coils of an air conditioner, and see how these four rascals are thoroughly refurbished and refashioned to make the air better for human life. After all, that's about all any air conditioner does—discipline temperature, humidity, and cleanliness (Tempy, Drippy, and Dusty to you), while Stirry distributes the revitalized air to those fortunate enough to have air conditioning.

First, let's examine Tempy, who personifies temperature. In winter when your back porch thermometer drops down around zero, it simply means there aren't enough Tempies in the neighborhood. In summer when the thermometer sneaks up around 100, there are altogether too many. Tempy is the lad who plays havoc with your comfort in both summer and winter. Fortunately, Tempy is a compliant soul. He readily submits to treatment in an air conditioning system.

Drippy (humidity) is not so agreeable. He is nothing more than water in the air, but he's
Introducing Drippy

completely invisible and can't be detected on the ordinary thermometer. A mischievous imp, he never behaves as he should unless he's under strict discipline.

You've probably seen drops of moisture collect on a glass of ice water in the summer. That's Drippy being condensed out of the air by a cold surface, the same method of drying used in most summer air conditioners. What you haven't seen, and won't see, is how a great number of Drippies often saturate the air in summer. You can't see them, but you know they're there when hot, humid weather robs you of your energy, comfort, and ambition. Without your realizing it, Drippy is then getting in his worst licks.

So Tempy and Drippy are a team, a nefarious pair continuously plotting against our comfort. Engineers measure them in degrees of temperature and in percent of relative humidity (which is the proportion of moisture actually present, to what it would be in the air if the air were completely saturated). Calling Tempy and Drippy a team is not merely fiction either; because if one of these imps stays within
Get Into That Comfort Zone

reason, you can be fairly comfortable. Air conditioning engineers have charted this relationship between Tempy and Drippy in the so-called Comfort Zone, from which they can tell with amazing accuracy just what should be done to the air to make you feel comfortable. When Tempy and Drippy both go prowling up into the high temperature and humidity zones (as they do for several months of each year) they cause great discomfort. They must be disciplined, with air conditioning.

Business men were the first to grasp the opportunities of comfort air conditioning. Today the restaurant, theater, railroad, or department store is sadly behind the times if it hasn't an air conditioning system. And you know how you favor their more progressive competitors who have air conditioning.

Tempy and Drippy, by the way, team up against us not only in summer, but also in winter. Tempy goes South for the season, leaving us to shiver and suffer as much by his absence as we did
Follow the Air Through This Summer Air Conditioner

Raw, non-conditioned air entering a summer air conditioner is hot, damp and dirty—i.e., over-laden with Tempies, Drippies and Dusties. First step, above, is CLEANING, accomplished by a filter which removes all Dusties from the air stream.

Next, the air moves across a cold coil (colored gray). This COOLS the air by absorbing the excess Tempies, who go right into the coil and are carried out the top to a refrigerating machine (not shown). At the same time, the air is DEHUMIDIFIED or dried, as Drippies obligingly cling to the cold outer surface of the coil, and are drained off below.

Here Stirry pumps vigorously at his fan to CIRCULATE the conditioned air, now delightfully comfortable because all Dusties, and most of the Tempies and Drippies, have been removed.
Winter Enemy No. 1—Over-Heated, Dry Air

by his overwhelming presence during the summer. At the same time Drippy also skips off to parts unknown, leaving the air in our homes far too dry. With the old-fashioned heating system, the air may be adequately heated, but in the process it becomes so devoid of moisture that it is actually dryer and thirstier than the air in the Sahara Desert. To quench this thirst, the air steals Drippies wherever it finds them—from your skin, from your nose and throat, even from your furniture, rugs, and draperies. This drying action of parched air is one of the basic laws of physics. The most harmful result of over-dry air is its habit of stealing moisture from the human nose and throat, opening an easy pathway for malignant germs. Prevalence of the common cold and other respiratory disorders of winter is largely attributed to lack of moisture in the air. Chapped hands and cracked lips are other indications of too-dry air. Cracks in the plaster of your house are another. To relieve this condition by injecting Drippy into the air is one of the simplest jobs performed by an air conditioning system, and at the same time one of the most beneficial.
**Don’t Impose on Your Body**

The human body is an infinitely sensitive mechanism, a machine with an automatic control system more exact than anything devised by man. Engineers are proud, and justly so, when they design controls which maintain temperatures within the comfortable range of only one or two degrees. Yet the healthy body adjusts itself to a normal temperature of 98.6° F. *without any variation*, despite weather changes ranging over more than a hundred degrees. Even a single degree variation from normal is so serious a matter that you call a doctor.

To maintain such delicate regulation, your body is continually surrendering Tempies to the air through evaporation of Drippies from your skin. This flow of Tempies from your skin to the air should always be a “one-way street.” If it is reversed, you develop a fever. Even Stirry plays a part in this intricate relationship—you know what a cooling effect a slight air movement has when you’re perspiring.

If the air is already so overloaded can’t take any more from you, you with Tempies and Drippies that it become uncomfortable. That’s what
Stirry

happens in the “dog days” of midsummer. When the air temperature is somewhere between 65° and 85° F. and humidities are reasonably low, this discharge of Tempies into the air is just about right. The further Mother Nature’s weather departs from these limits, in either direction, the greater is the strain on the body’s control system and the more uncomfortable you become. An air conditioning system brings both Tempy and Drippy within the proper limits, thereby relieving the nervous tension in your body for constructive work or pleasure, and making you pleasantly comfortable.

Then there is Stirry, or air circulation, who must be controlled along with Tempy and Drippy. If Stirry is lazy, the air surrounding the body becomes hot and humid and uncomfortable. He must stay on the move, constantly bringing you a fresh supply of air. But he must not move too fast or he will create a disagreeable draft.

You know how a hot, humid, summer day becomes more bearable if Stirry brings even a slight breeze. A mild winter day will seem severe if he is moving too fast, is conditioned, Stirry is moving at just the right speed to assure comfort to all of us.
And Now Dusty

Dust and dirt in the air have become such an accepted by-product of modern industrial life that we are largely reconciled to them. Only when we spend a vacation in the mountains or aboard ship, or when we pay particular attention to cleanliness of air that has been conditioned, do we realize that clean, healthy air adds zest to living.

Dusty, the fourth member of our quartet, is a totally undesirable character. Unlike Tempy and Drippy, who have some praiseworthy traits and who can be persuaded to adapt themselves to our comfort, Dusty has nothing whatsoever to recommend him. Poor fellow, he has no friends at all. So an air conditioning system takes no halfway measures with Dusty, but eliminates him almost completely, with an air washer, air filter, or electrostatic precipitator. Consequently, an air conditioned building is a vastly cleaner place. Its occupants do not have to cope with Dusty on their furniture, Dusty on their clothes, or Dusty in their lungs.
Follow the Air Through This Winter Air Conditioner

Raw, cold air entering a winter air conditioner is even dirtier than in summer because of smoking chimneys. So, as in summer, the first job is to CLEAN the air by trapping Dusty. Note the absence of Tempies and Drippies.

Cold, parched air is sadly deficient in both Tempies and Drippies. Hence, the gray-colored coil of a winter air conditioner is hot, adding great quantities of Tempies to HEAT the air. However, the air is still parched, and will steal Drippies wherever it can find them—even from you. To HUMIDIFY the air, a fine spray of water from above injects Drippies.

Stirry CIRCULATES the conditioned air, finally made comfortably warm and healthfully moist for human beings by supplying the necessary Tempies and Drippies.
Conquering Another Plague

As a result of Dusty's banishment, many hay fever sufferers are enthusiastic supporters of air conditioning, for it brings them welcome relief from miserable sniffles when pollen (one of Dusty's many forms) is filtered out of the air. Pleased, also, are housewives whose homes stay cleaner, store managers whose wares are protected from soilage, and libraries and museums whose priceless possessions no longer lose their value, under the destructive action of air-born dirt.

With Tempy, Drippy, Stirry, and Dusty all well-disciplined to your wishes, air conditioning automatically tames one more nuisance of city life—noise. Shouting newsboys, honking horns; the roar of motor buses, trucks, and street cars—all are quieted in air conditioned surroundings, because doors and windows are always kept closed.

Now that we have an acquaintanceship with the four knaves that become so obnoxious, let's examine the air conditioning process, which makes for better living by controlling these demons.
What Is True Air Conditioning?

Some manufacturers have taken the liberty of designating as “air conditioners” products that do only part of the complete air conditioning job. In this gadget class are humidifiers, fans, and heating systems which neglect either Drippy or Tempy or both of them. To clarify the situation, the United States Department of Commerce and the National Better Business Bureau recently approved these definitions:

A “summer air conditioner” must at least cool, dehumidify, and circulate the air. A “winter air conditioner” must at least heat, humidify, and circulate the air. A “year-round air conditioner” must at least cool and dehumidify in summer, heat and humidify in winter, and circulate the air at all times.

Cleaning of the air, not included in these minimum requirements because in a few rare cases it isn’t necessary, is a function of practically all air conditioners worthy of the name. Ventilation, which means drawing in sufficient fresh air from the outside to replace stale air and dilute odors, is another important adjunct of satisfactory air conditioning.
There's a Difference

So when you decide to buy an air conditioner, check to see that you’re really getting what you should have. Humidifying devices, ventilating fans, and filtering outfits are desirable for certain purposes, but they fall far short of true air conditioning. Likewise, a “winter air conditioner” (which every home should have because it costs little more than an ordinary heating system) does not provide cooling in summer. Don’t expect summer air conditioning without a cooling system.

Remember that true air conditioning requires control of all four factors in the air (Tempy, Drippy, Dusty, and Stirry):

In summer—cooling, dehumidifying, cleaning, and circulation.
In winter—heating, humidifying, cleaning, and circulation.
Year-round—all operations, as required.

Incidentally, the nerve center of the air conditioner is its control system. Manufacturers are now providing instruments that regulate the operation of air conditioning systems to a fine degree of accuracy, and the buyer who fails to take advantage of these instruments is indulging
Weather Control—Health Control

in false economy. Sometimes, in summer, a theater owner turns the temperature control of his air conditioner so low that he almost chills his patrons, simply to “show off” his air conditioning. Fortunately, the public is registering complaints to such operators, who are usually prompt in adjusting automatic controls to more reasonable temperatures.

Wide variations of weather impose a decided strain on the heart and nervous system. One evidence of this is the frequency of heat prostrations in hot weather when both Tempy and Drippy get out of hand. And in winter, the dry air of heated, non-conditioned homes is closely related to the prevalence of colds. In office buildings that have air conditioning, there is generally a minimum of absences due to sickness. Hospitals have found that surgical operations performed in an air conditioned environment have a vastly improved chance of success, as do treatments for certain diseases.

Experience—gained through the use of thousands and thousands of air conditioning systems in normal daily life—is enabling industry, business, and home owners to make a full evaluation of the health benefits of air conditioning.