



The University of Georgia Cooperative Extension Service

College of Agricultural and Environmental Sciences / Athens, Georgia 30602-4356



Radiant Brooders



BY:

MICHAEL CZARICK
EXTENSION ENGINEER

MICHAEL LACY
EXTENSION POULTRY SCIENTIST

JANUARY 1991

Radiant brooders, also known as infrared brooders, have really never been fully accepted by the poultry industry as a way to supply heat to broiler houses during brooding. Probably the biggest reason for this is that it is difficult to understand how they work, and therefore, they are susceptible to mismanagement. A forced air furnace is simple to understand. Just turn it on and warm air comes out. The radiant brooder is more involved because it provides both air heat and radiant heat.

Bird Heating

Think about providing heat to a chicken house the same way you would about supplying water or feed. Everybody knows that each chicken requires a certain amount of feed and water. If the bird receives the specified amount of water and feed he will grow. What people don't realize is that each bird requires a specific amount of heat. The smaller the birds the more heat they require. Just like feed and water, if you don't give them enough, they won't produce.

Heat can be delivered to the birds primarily by two methods: air heating (furnaces) and radiant heating (brooders). Forced air furnaces heat the birds indirectly. The furnaces heat air which in turn heats the birds. Radiant brooders do some air heating but are designed to provide heat directly in the form of radiant heat.

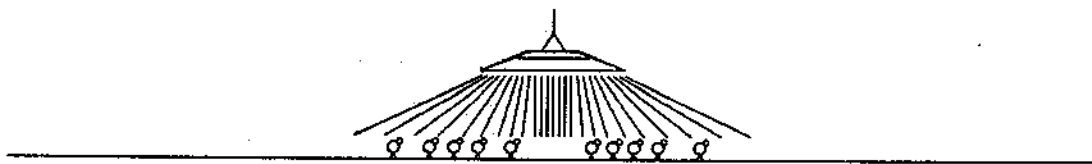
Radiant Heat

Radiant heat is misunderstood by most people. Basically, radiant heat is a type of light. You can't see this type of light, but you feel its warming rays. Hot objects put off this form of invisible light (infrared light) in addition to the form you can see (visible light).

An example of this type of heat is a camp fire on a cold night. The fire does not do much air heating around the area of the fire because the warm air produced by the fire quickly rises. But when you stand facing the fire, you feel warmth. This warmth is from radiant heat not air heat. You can tell that you are being exposed to radiant heat because only the portions of your body facing the fire will feel warm. Only the

PUTTING KNOWLEDGE TO WORK

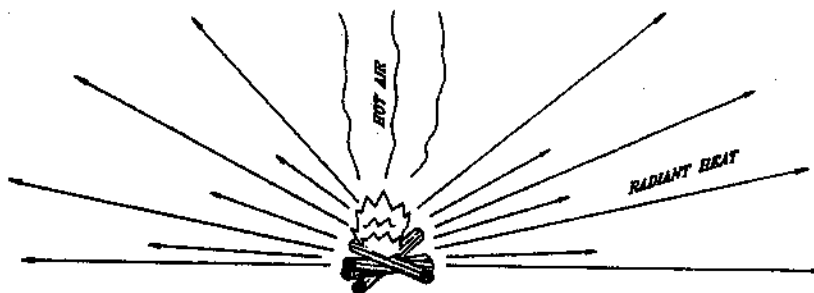
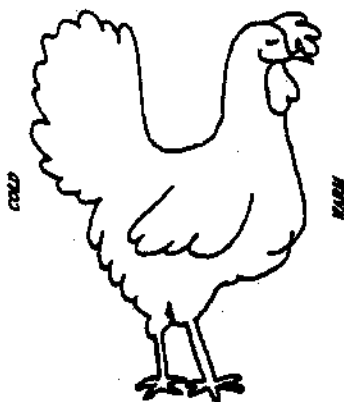
portions of your body facing the fire are being exposed to radiant heat. If the fire was heating the air near the ground, your whole body would feel warm. Basically only those surfaces which are exposed to the visible light would be exposed to the infrared heat.



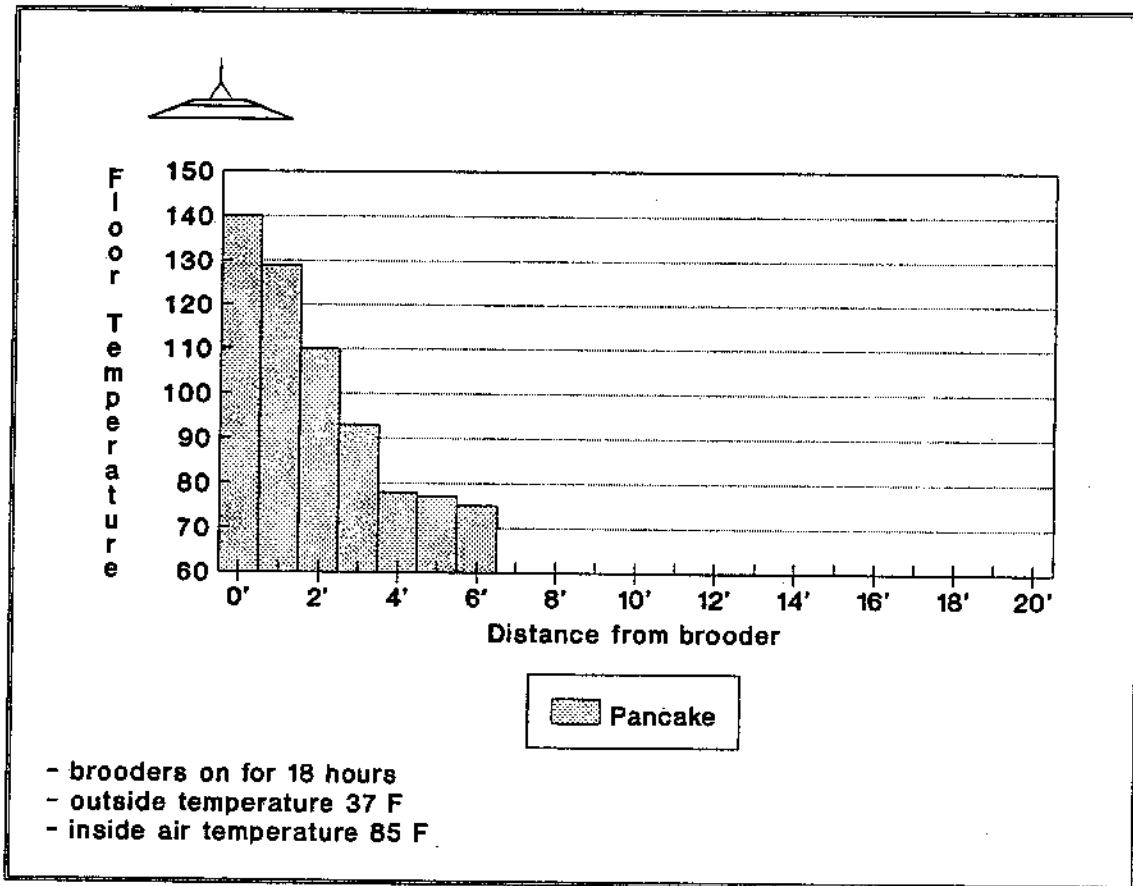
Radiant Brooders

One of the advantages of a radiant brooder is that birds have some ability to control the amount of heat they receive. The closer they move to a brooder the more radiant heat they receive. As they move away from the brooder they receive less heat. You have probably noticed this tendency in houses with one of the most popular types of radiant brooder, pancake brooders.

Birds in a house with pancake brooders benefit from radiant heat. The small ceramic disk underneath the brooder is heated by the flames and then puts off radiant heat. If the house is too cold, the chicks move closer to the pancake brooder to warm themselves with radiant heat, just like you would if you were standing near a fire. If they are too warm, they move away from the brooder.



The small radiant zone size of the pancake brooder is a definite problem. Originally the pancake brooder was designed for 500 chicks or less. With 500 chicks per brooder all of them could fit comfortably near a brooder. But in many houses today we have more than 1,200 chicks per pancake brooder. This makes it impossible for all of the chicks to fit comfortably near a brooder. On cold mornings birds can pile underneath brooders in an effort to stay warm.



Fuel Savings

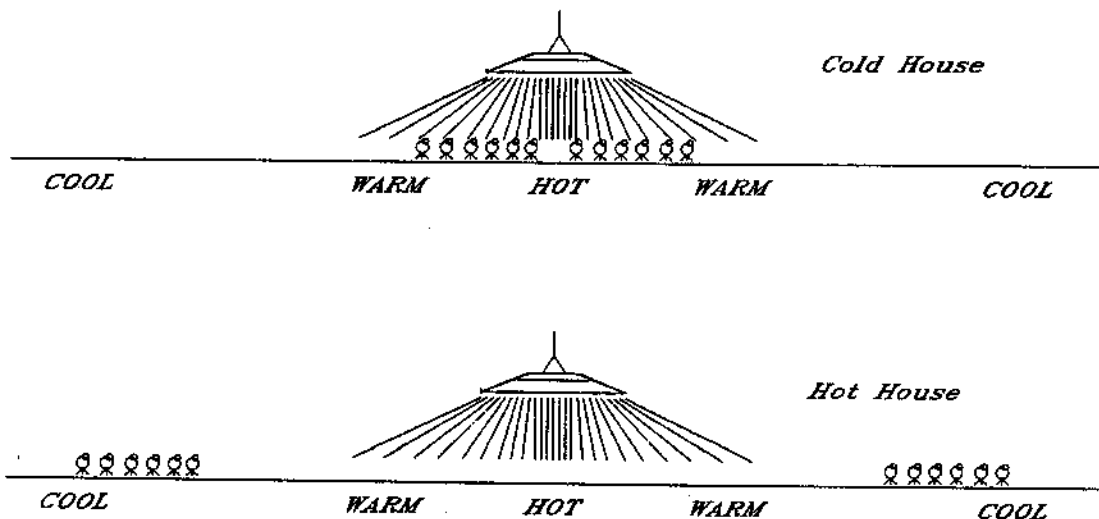
Radiant brooders are "theoretically" the more efficient method of providing heat during brooding. Houses using radiant brooders can and should be kept at slightly lower temperatures than those using furnaces during brooding. Lower house temperatures lead to decreased heating costs since less heat is lost through the ceiling and sidewalls.

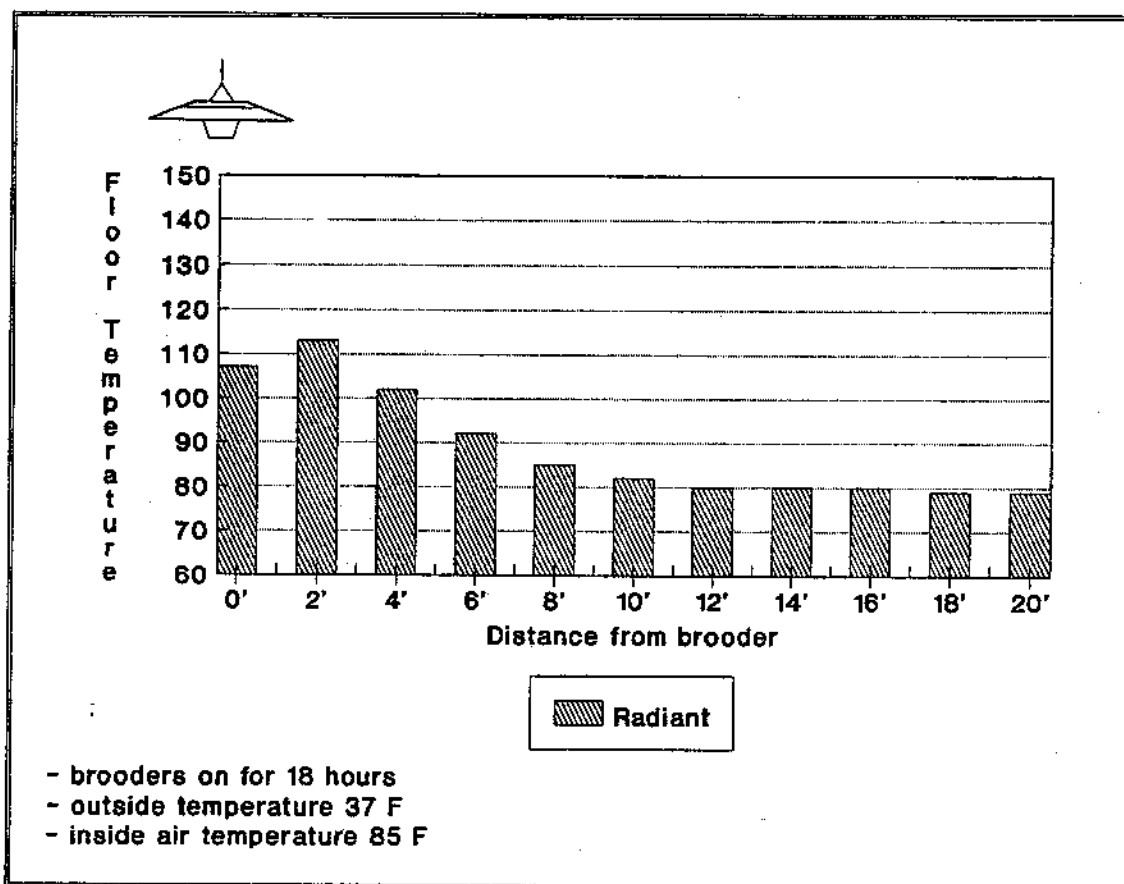
Further energy can be saved later during the growout. With radiant brooders a significant portion of the heat produced is delivered directly to the floor. This accomplishes two tasks. First, floor heating helps to dry out litter, keeping ammonia levels low. Secondly, the heated floor acts as a thermal reservoir, trapping valuable heat. Because it is being stored in the floor, heat isn't lost as quickly when the timer exhaust fans come on.

Radiant Zones

The key to operating radiant brooders efficiently is realizing that all the birds in the house must be able to get into a radiant zone of one of the brooders. The radiant zone is the area surrounding the brooder which receives radiant heat from the brooder. To get a rough idea of the radiant zone of a specific brooder, imagine that the radiant surface, ie. the ceramic disk on a pancake brooder, is a light bulb. Any place in the house that would receive light from the light bulb would be exposed to radiant heat. The brighter the light the greater amount of heat the birds in that specific area would receive.

As you can imagine the radiant zone from a pancake brooder 2' off the floor would not be very large. If you have pancake brooders, you have probably noticed the size of the zone by the size of the "doughnut" the chicks form on cold winter mornings. The reason there are not very many birds directly under the brooder is that the radiant heat immediately under the brooder is very intense. In fact, floor temperatures directly under a brooder can be as high as 150°F.



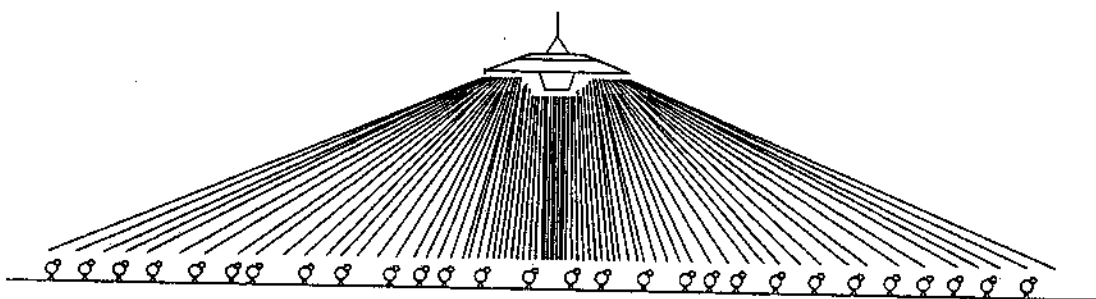
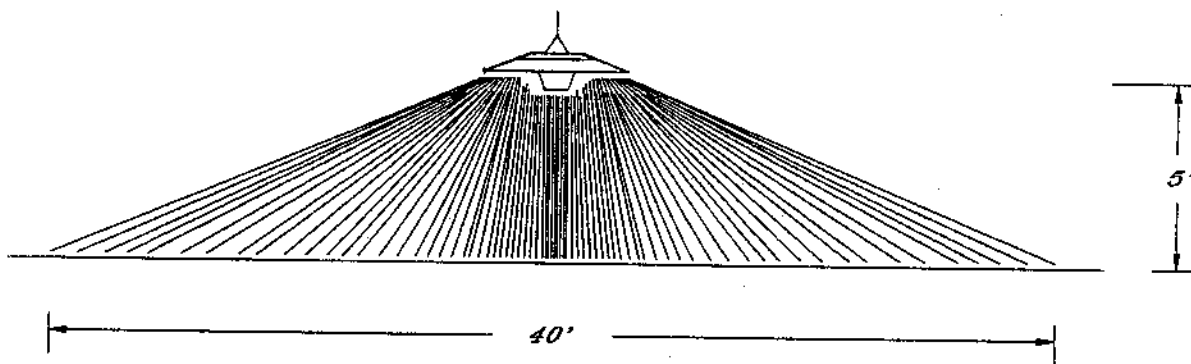


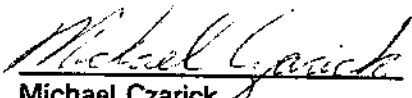
The Sierra™ and Space Ray™ brooders are just a couple of examples of radiant brooder that are on the market. There are many different types, each with its own distinct characteristics. Some have smaller, but more powerful, radiant elements and some are controlled by a single thermostat.

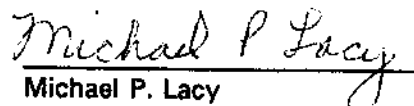
There are many effective ways to brood chicks. The important point to remember is to use the brooder as it was intended.

In an effort to reduce piling problems, producers have been forced to maintain high room temperatures so that the birds that cannot fit within a radiant zone of a pancake brooder will not be cold stressed. In this situation the pancake brooders are being used as air heaters and not radiant brooders. Pancake brooders will heat air, but this can result in higher fuel usage because the pancake brooders are not the most efficient method of providing hot air for warm room brooding. The bottom line is that most pancake brooders are being used as air heaters and not radiant brooders.

There are a few true radiant brooders on the market. These units are specifically designed to provide heat to the young chicks in the form of radiant heat and, as a result birds can successfully be brooded at room temperatures well below 90°F. One of the big differences between these brooders and pancake brooders is the size of their radiant zones. The radiant brooders have larger radiant zones because they have a larger radiant element, "light source", than typical pancake brooders. Good examples of a large radiant light source are the Sierra™ and Space Ray™ brooders. The radiant element in these brooders is in the shape of a cone with the top cut off. It is approximately 1' tall and 1' across and glows a bright red color. Other than that, these brooders look a lot like typical pancake brooders. Since they have such a large radiant element, and emit a large amount of radiant "light" they can be mounted high off the floor (5' to 6') creating a large radiant zone. The heating zone is approximately 40' in diameter resulting in large, loosely packed, circles on cold winter mornings.




Michael Czarick
Extension Engineer
(404) 542-2154


Michael P. Lacy
Extension Poultry Scientist

Trade and brand names are used only for information. The Cooperative Extension Service, University of Georgia College of Agriculture does not guarantee nor warrant the standard of any product mentioned; neither does it imply approval of any product to the exclusion of others which may also be suitable.

Publication made possible by U.S. Department of Energy Oil Overcharge Grant through the Georgia Office of Energy Resources.

