

Kentucky FARM AND HOME *Science*

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Volume 6

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Summer 1960



READ—

**Dairy Cattle
Stop Eating**

**Keeping Cool
Under Roof**

Short Reports

**Fried Chicken
Tops in Kentucky**

**Foreman's
Tenure at
Greenville**

Kentucky FARM AND HOME Science

Vol. 6, No. 3 Summer 1960

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KENTUCKY AGRICULTURAL EXPERIMENT STATION

FRANK J. WELCHDirector
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Kentucky Farm and Home Science

JOSEPH G. DUNCANEditor
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The Cover



Hundreds of Central Kentucky farmers interested in beef production, swine-raising, and sheep production attend the U.K. Agricultural Experiment Station's annual Livestock Field Days every year to get the latest information on feeding and management practices. This picture shows a wagonload of such visitors listening while Dr. Neil Bradley (foreground, with back to camera) explains some experimental work on beef steers. This particular Livestock Field Day was held this summer at the U.K. Coldstream Farm on the Newtown Pike. The animal husbandry department's many research projects in beef, swine and sheep were explained or demonstrated at this session. (Photo by R. C. May.)

Blood Substance Stops Dairy Cows From Eating

By DON DOWDEN and DON R. JACOBSON
Department of Dairy Science

The substance either acetic or propionic acid is normally produced in the cow's rumen and is absorbed into the blood stream as an energy source. Except for this observation, very little is known about the processes through which food intake is regulated in the dairy cow.

Factors such as kind of pasture, temperature, water availability and stage of maturity all affect intake but do little to explain how intake is regulated. How appetite is controlled is of considerable importance since economical animal productivity may be limited by the amounts and kinds of feed consumed.

Work with laboratory animals has indicated that there is a "feeding center" in the brain. This feeding center may receive messages from other parts of the body which cause it to initiate the act of eating or cause the animal to seek food. At other times it may cause the animal to quit eating.

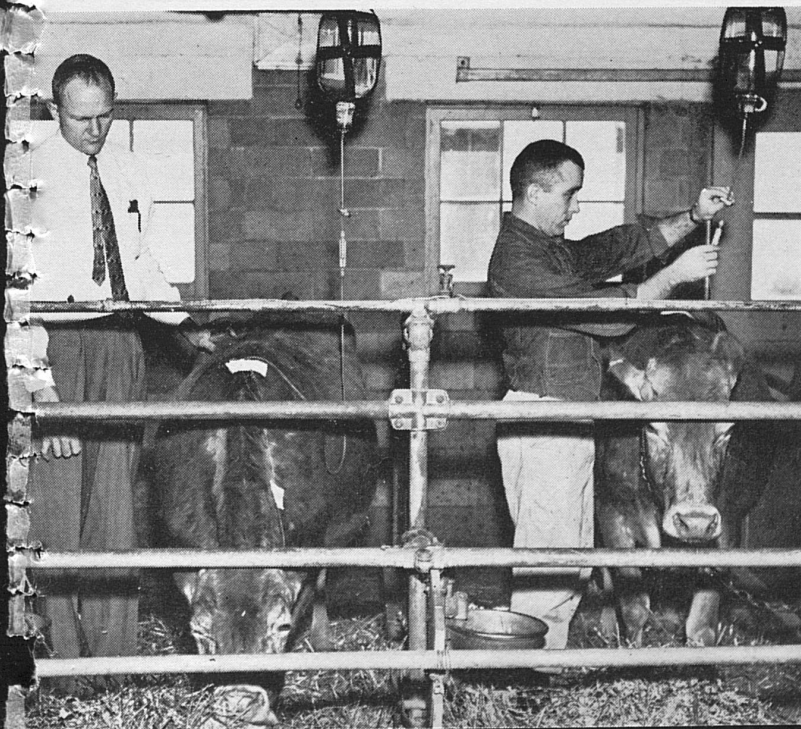
A major portion of the diet of dairy cows is made up of carbohydrates. Carbohydrates in the diet of

Identical twin cows used in study to determine effect of adding materials into blood stream

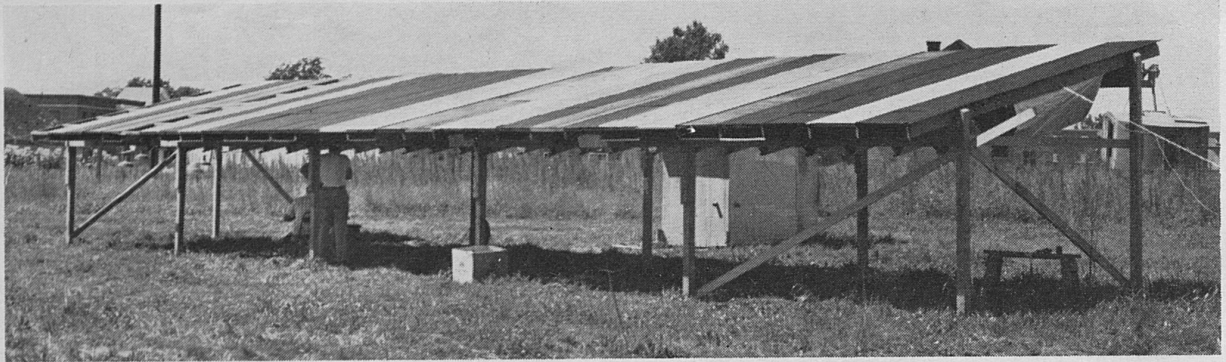
ruminants are absorbed to some extent as glucose and, to a much greater degree, as volatile fatty acids. Volatile fatty acids are produced in the rumen from the break-down of carbohydrates by the rumen bacteria. One possible way by which the feeding center may be regulated is by changes in the amounts of glucose or fatty acids in the blood.

Identical twin cows were employed in a study at the Kentucky Agricultural Experiment Station to determine the effect of adding several substances directly into the blood stream. Glucose, sodium acetate, and acetic, propionic, butyric, caproic and lactic acids were injected by continuous intravenous drip to determine their effect upon consumption of chopped alfalfa hay. All of these substances, or metabolites, are normally found in the blood of dairy cows. In each trial one twin received the metabolite under study in saline, and the other twin received saline only. The injections were made for 8 hours on each of 3 consecutive days. The amounts of hay consumed were obtained daily and for the 8-hour injection periods.

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The cow on the right is receiving acetic acid in saline by constant drip into the blood stream at a rate approximately equal to that normally absorbed into the blood stream after a heavy meal. Though the cow is hungry, this material causes her to stop eating. The identical twin mate on the left goes on eating as though unbothered. She is receiving only saline. The polyethylene tubing visible at the withers leads directly to the jugular vein.



The outdoor test model was designed to get information concerning 14 types of roofing materials. The effects of structural arrangements, such as a double-layer roof, were also studied.

U.K. agricultural engineering study of various types of roof materials and structural arrangements reveals ways by which summer heat can be reduced

Decreasing Heat in Farm Buildings

By **FRANK B. BORRIES, JR.**
Department of Public Information

Excessive heat in farm structures, a big problem in hot summer months, can be reduced by use of certain roof materials coupled with certain structural systems. That's the opinion of the U.K. Agricultural Engineering department based on an extensive study on roof materials and structural schemes.

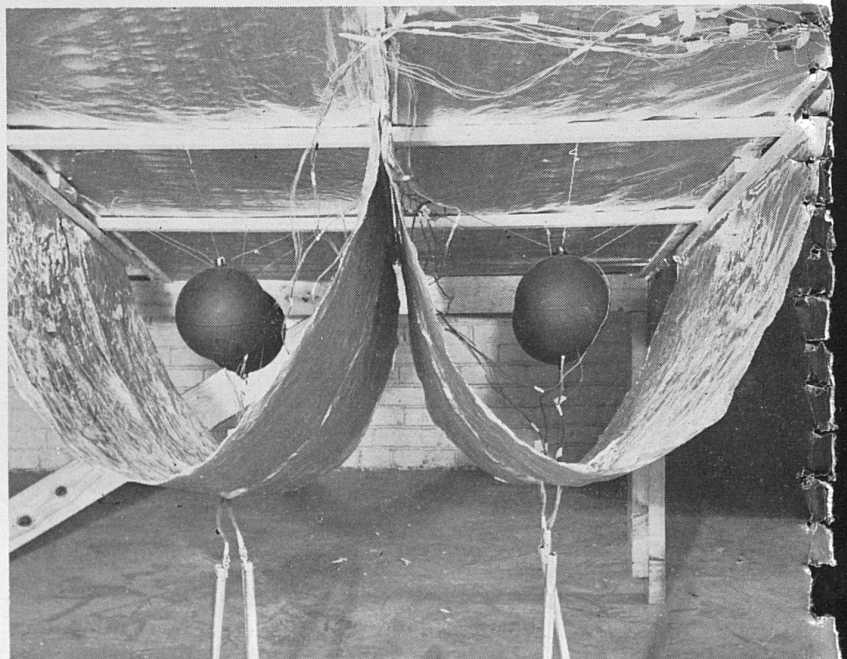
For instance, says Blaine Parker, department head who conducted the research: Sloped roofs that had a double layer—one atop the rafters and one below, with the ends of the rafters open for ventilation—

were much superior to roofs which had the top layer only. This was because heat transfer through double roofs was much less.

He constructed his double-layer roofs so the rafters would form ducts (troughs) from the bottom to the peak for air circulation. The space between the rafters of these slope roofs was left open so that the air could circulate through these ducts. The ducts made a virtual self-cooling roof. Fourteen roofing combinations were tested. Thermal radiation and heat transferred from the inside layer of the roofs were used for roof comparisons.

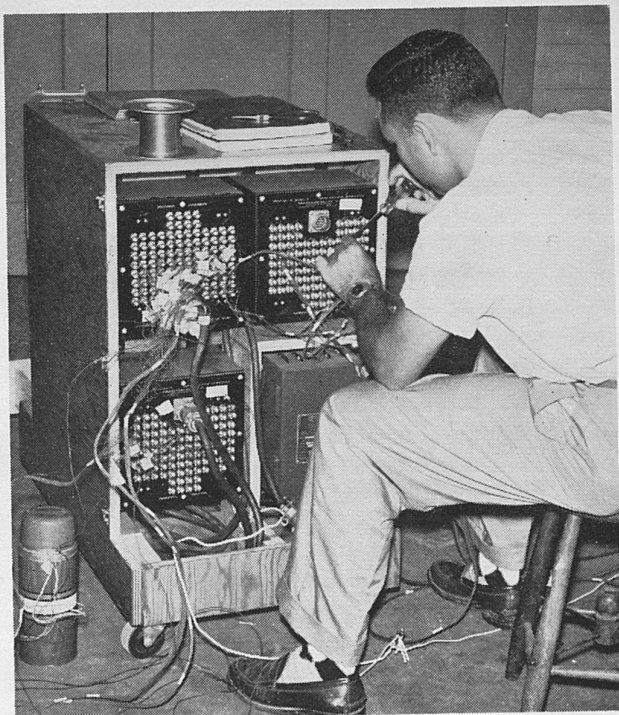
This is the set-up used in the calibration of the black globes designed for thermal radiation measurement. The difference between the temperature of the spheres and that of the air is used in determining the thermal radiation.

(The three photographs illustrating this article were made by Earl Young, Department of Agricultural Engineering.)



It also was found that when the roof's bottom layer (underneath the rafters) was either aluminum foil (a good reflector of radiant heat) or half-inch-thick insulation board, there was very little difference made by the material put on the top (outside) roof. This is because air circulating between the top and bottom layers kept the bottom layer cool.

Several materials were used in the test, aluminum, galvanized iron and plastic, for the outside covering. For the bottom (inside covering) he used fiber board, plastic, aluminum foil, and in combin-



Agricultural Engineer B. F. Parker makes electrical connections to instrument for measuring temperature and thermal radiation.

ations. He also tried rock wool bats 4 inches thick to fill up space between the rafters. The rock wool was not so effective as the double layer roofs.

Parker tried a scale model in the laboratory, to check air circulation, etc., before he built his outside mock-up roof. The lab model showed that velocity (movement) of air in such a double "ducted" roof would reach 80 feet per minute. This is very close to one mile an hour speed. Heat lamps were used in the laboratory testing to produce something nearly equivalent to sunlight.

In this test, he found that black galvanized roofing, which absorbs heat, produced the 80-foot a min-

ute air movement. When the roof covering was changed to aluminum sheets, a reflector, the velocity slowed to 55 feet per minute.

It was found that when the bottom layer of material was omitted, the heat transferred from the bottom side of the roof, both by thermal radiation and by convection, increased. This, of course, was simply because the under-layer acted as an insulator, rejecting heat transfer from the roof. Removing the bottom layer also removed the trough (duct) arrangement between the rafters, and part of the cooling effect from air circulation was lost.

Parker said the test enabled the department to draw up plans for a gabled roof building where the cooling "effects" would be of value. Right now it is being used in a poultry house plan (No. 727-17). (Ky. Misc. Pub. 165 dealing with poultry houses also contains the roof plans and a resulting ventilation design.)

Parker says the experiment has led them into other fields of study on ventilation and air circulation patterns in closed animal structures and heat-transfer through roofs.

Varied Research Projects Reported

By FRANK B. BORRIES, JR.
Department of Public Information

Here are capsule reports on recent research conducted by various departments of the Kentucky Agricultural Experiment Station and substations:

BEEF STEER FEED—Kentucky farmers finishing beef steers in dry lot might think about using pelleted or flaked corn in the ration. Steers on either produced more gain than did control steers eating regular ground corn.

Animal science researchers said the pelleted corn in the ration increased average daily gain 0.36 pound over the control group, and the "pelleted-corn" steers used 148 pounds less corn for each 100 pounds of gain. The flaked corn in the ration increased the average daily gain 0.41 pound over the controls, and the "flaked corn" steers used 134 pounds less feed than the controls for each 100 pounds gain.

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It's Fried Chicken First in Kentucky, Say Results of Poultry Consumption Survey

**Data indicate that Kentuckians
eat 10 percent more poultry
meat than does rest of U.S.**

By **JOHN B. ROBERTS**
Department of Agricultural Economics

Ready-to-cook poultry is available to almost every Kentuckian. In city markets the choice is between tray-pack and whole broilers, stewing and roasting chickens and turkeys, and between fresh frozen and ready-to-eat packages.

Out of the 527 families interviewed in a study of poultry consumption, 99 percent used poultry. Seventy-five percent served fried chicken often, or at least every other week. Turkeys were used by two-thirds of the families, but only once or twice a year. Stewing and roasting chickens were used by two-thirds of the families. Hens were served by one family in five as often as once a month.

The families sampled consisted on the average of 3.5 persons each. During the year, the amount of poultry used by the 527 families combined exceeded 18,000 pounds. This was enough to serve every family member 23 pounds of fried chicken, 6 pounds of stewed or roasted chicken, and 5.5 pounds of turkey. At these rates Kentuckians consume 10 percent more poultry meats per person than the national

average. Almost all of the difference was consumed as fried chicken.

Attitudes Expressed

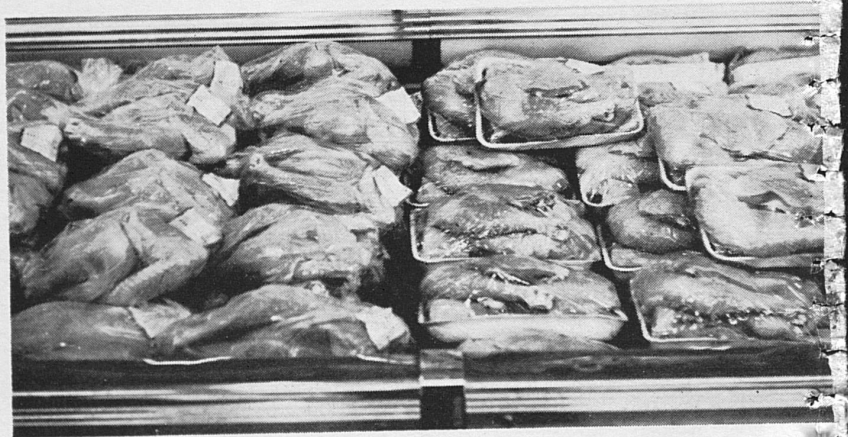
When asked about the sizes, quality, and availability, most homemakers commented favorably. Enough criticism was expressed to warn suppliers that continued diligence in processing and merchandising is a must. Any complacency that would destroy the confidence of the homemakers in the wholesomeness and quality of poultry meat could reduce consumption. There were some objections to pin feathers not being removed and some dissatisfaction with the way the pieces were cut.

When asked the type of package each homemaker wanted, two-thirds favored "tray-pack friers." This package was liked by those in the higher income brackets and by the younger age groups. Many of these groups of housewives either did not know how to cut chicken into pieces or found the job distasteful. Some older women seemed to take pride in the fact that they had the skill to cut up friers and could please their families by doing it some special way. Most of the respondents felt that the most economical way to buy was to purchase whole birds. The larger, more meaty parts, legs, thighs and breasts were liked better than such parts as necks, gizzards, livers, and wings. Some higher income groups solved this problem of preference by purchasing only the pieces they liked most or

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¹ Contribution University of Kentucky Project SM-13.

A counter display in a supermarket of whole and cut-up broilers. Tray-pack friers, as shown on the right, were favored by two-thirds of the homemakers interviewed in the Kentucky poultry consumption study.





(above) General view of the Greenville Field in 1956. The tobacco barn was built in 1950. (below, right) As the same site appeared in 1922.



Lovell's Tenure at Greenville Field Is Longest of U.K. Field Foremen

By EUGENE R. DOLL
Department of Agronomy

The span of years since the Greenville Soil Experiment Field was established and those of Foreman C. R. Lovell's period of service are identical. This is because he has served continuously in that role since the Field was established in 1913 near Greenville by the late Prof. George Roberts, long-time head of the U.K. Agronomy department.

Mr. Lovell's tenure is the longest of any experiment station field foreman in Kentucky and may well be the longest in the United States.

Since about 1918 Mrs. Lovell has been keeping the record of plot yields and fertilizer applications, and making general notes that are needed in the successful operation of an experiment field. The results obtained from work conducted at this Muhlenberg county field have been invaluable in formulating fertilizer recommendations not only for the Western Coal Field Area but for the entire state. Experiments are presently being conducted on the fertilization of burley tobacco, corn, wheat, and grass-legume hay.



Mr. and Mrs. Lovell compiling a fertilizer and seeding record for experimental plots in 1960.



Mr. Lovell with burley tobacco in 1956.

(below, left) Mrs. Lovell in a clover-grass hay plot in 1922. (below, right) Mr. Lovell in a plot of dark tobacco in 1914.



Blood Substance

(Continued from Page 3)

Sodium acetate, acetic acid and propionic acid had a very dramatic effect on intake. The twins that received these metabolites immediately stopped eating and actually consumed only very slight amounts of hay during the injections. After the administration was stopped, normal consumption was maintained during the remaining 16 hours of each injection day. The administration of saline to the control twins' substances had no effect on intake, indicating that the reduction in consumption by cows receiving sodium acetate, acetic acid or propionic acid was not due to the manipulation involved in administering the metabolites.

These results suggest that the feeding center is more sensitive to acetate or propionate than to any of the other substances examined. It may be possible to increase substantially the feed consumption of cows. However, these studies are only a beginning in terms of learning how to feed cows for increased intake and efficiency of milk production.

Fried Chicken First

(Continued from Page 6)

threw away some parts. For the ordinary homemaker the problem was one of finding ways to get all of the chicken eaten once it had been bought.

Methods of Preparation

Fried chicken was the most popular among the homemakers interviewed. Next in order in cooking preference was roasting, broiling and stewing in the order named. Everybody liked fried chicken. In general, simpler dishes characterized the every-day meals. Dumplings, gravy, biscuits, stewing and the use of extenders were most common but not limited to the lower income consumers.

Specialty dishes—including barbecue, roasting, broiling and baking—characterized the preparation by the middle and higher income groups. These

same groups were less price-conscious and were more aware of newspaper, magazine and other special articles on food preparation. Generally, families in the higher income groupings were more willing to try out new ways of preparing and serving chicken. This may have been a factor encouraging greater consumption among the higher income families since variety prevented them from getting tired of chicken.

Varied Research Findings

(Continued from Page 5)

CORN TOPPING—Does topping corn pay? Not on the basis of yield, agronomy researchers say, after conducting a topping test last season. Untopped corn crops outyielded topped crops from 5 to 10 bushels an acre.

* * *

INSECT RESISTANCE—The long-time breeding program undertaken a few years ago by Experiment Station entomologists to develop insect-resistant tobaccos is progressing. But the process is slow and a "good many years" will elapse before results can be determined.

* * *

CLOVER COLLECTION—More than 350 clovers representing 90 species from all over the world now are growing on the Agricultural Experiment Station's farm at Lexington in a project to develop new clovers for Kentucky. The collection of clovers may well be the largest of its kind in the U.S.

* * *

BALBO FOR SOWS—Mature sows placed on good Balbo rye pastures last season produced "excellent litters" with a minimum of feed. A group of such sows, getting 2 pounds a day of concentrate to supplement the pasturage, used \$67.80 worth less feed than did similar sows on dry-lot.

Kentucky Agricultural Experiment Station
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Frank J. Welch
Director

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