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BASIC RESEARCH AND THE EGG SHELL FACTORY

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The shell of the average chicken egg weighs about 0.18 ounces. Therefore, a hen that lays 250 eggs in a year produces about 2.8 pounds of shell annually, 98 percent of which is calcium carbonate, or calcite, the same mineral that is in limestone.

The hen obtains the calcium for the shell from two sources: (1) directly from the feed and (2) from reserves in the bone. However, because the bone restores its reserve from the feed, in the end the total amount of calcium comes from that which is consumed.

The proportion coming directly from the feed or from the bone reserve depends on how long it has been since the bird has eaten. During the second half of the night, as the intestine begins to empty, a greater proportion of the calcium of the eggshell comes from the reserves in bone.

What is the mechanism by which bone calcium is made available for shell formation?

Dr. Carol Gay, a researcher in

poultry science and molecular and cell biology at Penn State, is investigating the manner in which calcium is removed and replaced in the bones of hens during the shell-making process. Gay is studying the activity of a microscopic cell type called the "medullary bone osteoclast."

It has been shown that the activity of this cell is synchronized with the egg-laying cycle. During the 10-12 hour period when the eggshell is being calcified, a part of the osteoclast called the "ruffled border" appears; it is not seen at other times.

At the edges of this ruffled border are projections that contain a calcium dissolving substance. As the activity of the osteoclasts proceeds, calcium in the blood of the bird increases, making more of it available to the shell gland for deposition on the eggshell.

It is important to note that calcium turnover is more rapid in the bird's skeleton than it is in mammals (rats, rabbits, humans, etc.). Part of this difference in turnover rate is due to the fact that a bird's osteoclasts are more aggressive than those of the other animals.

These basic studies on the avian osteoclast will further our understanding of shell calcification and improve the management of flocks for best shell quality.

HARRISBURG (Dauphin Co.)—Cambria County 4-H horse members received 20 awards at the 31st annual state 4-H Horse Show held October 26-28 at the State Farm Show Complex.

County winners in 4-H horse performance classes were:

- Grooming & showmanship 13-15 years: Daron Murton, Mineral Point, fourth.

- County team: Sherri Balzano, Ashville; Ginger Bender, Carrolltown; Courtney Buchan, Conemaugh, second.

- Pole Bending Pony: Jeffrey A. Varner, Portage, third.

- Pole Bending Horse: Gregory Dishong, Mineral Point, fifth.

- Raised Box Keyhole Pony: Troy Bracken, Nanty Glo, fourth.

- Raised Box Keyhole Horse: Angie Buck, Ebensburg, seventh.

- Saddle Seat Equitation Jr. Div.: Kim Balzano, Ashville, fourth.

- Saddle Type Pleasure Ponies: Erin Giblock, Lilly, seventh.

- Draft Horse Single Cart: Kelli Wright, Summerhill, second.

- Obstacle Trail Course: Amanda Loncar, Johnstown, third.

- Walk-Trot Equitation: Amanda Loncar, Johnstown, second.

In 4-H horse production classes members breed and raise their own project animal. Local winners were:

- Ginger Bender, Carrolltown, third, Arabian Yearling and 2 yr. old Colts.

- Melissa Grow, South Fork, first, Hunter Type Pony Colts and Fillies of this yr.

- Christie Smith, Ebensburg, second, Paso Fino Yearling and 2 yr. old Colts.

- Trin Smith, Ebensburg, second, Paso Fino Filly of this yr.

- Michael W. Grow, South Fork, first, Quarter Horse Colt of this yr.

- Kelly Lynn Layton, Johnstown, third, Quarter Horse Yearling Filly.

- Christopher Horn, Ebensburg, second, Stock Type Horse Yearling Filly.

- Richard Waterhouse II, Johnstown, fourth, Stock Type Pony Colts and Fillies of this yr.

- Christopher Horn, Ebensburg, first, Stock Type Pony 2 yr. old Geldings.

Several other county horse club members competed in the state contest and received recognition. They were Melissa Mitchell, Candy Davidson, Justin Sowalla, Julie Farabaugh, Jennifer Balzano, Lesley Suppes.

Jerry McCammon, youth extension agent, pointed out that competition gave 4-H'ers an opportunity to display their horsemanship skills.

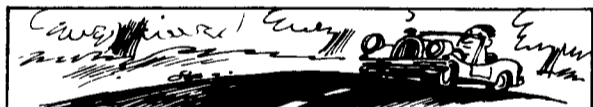
The primary purpose of the state 4-H horse program is to develop skills in horse management. Through competition, the 4-H'ers develop riding skills, gain self-confidence, and learn proper care of animals.

The state show culminates the year for more than 6,000 Pennsylvania 4-H members enrolled in horse and pony clubs.

More than 650 winners in county and district competitions from all over the state vied for awards. Cambria County had 26 4-H'ers entered in the competition. Events tested skills in showmanship, equitation, pleasure, jumping, driving, and timed events.



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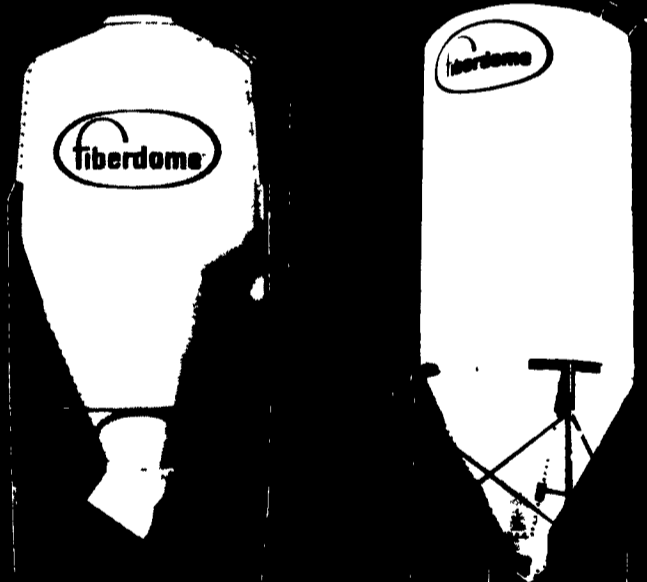


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