Commercial Egg Production and Processing

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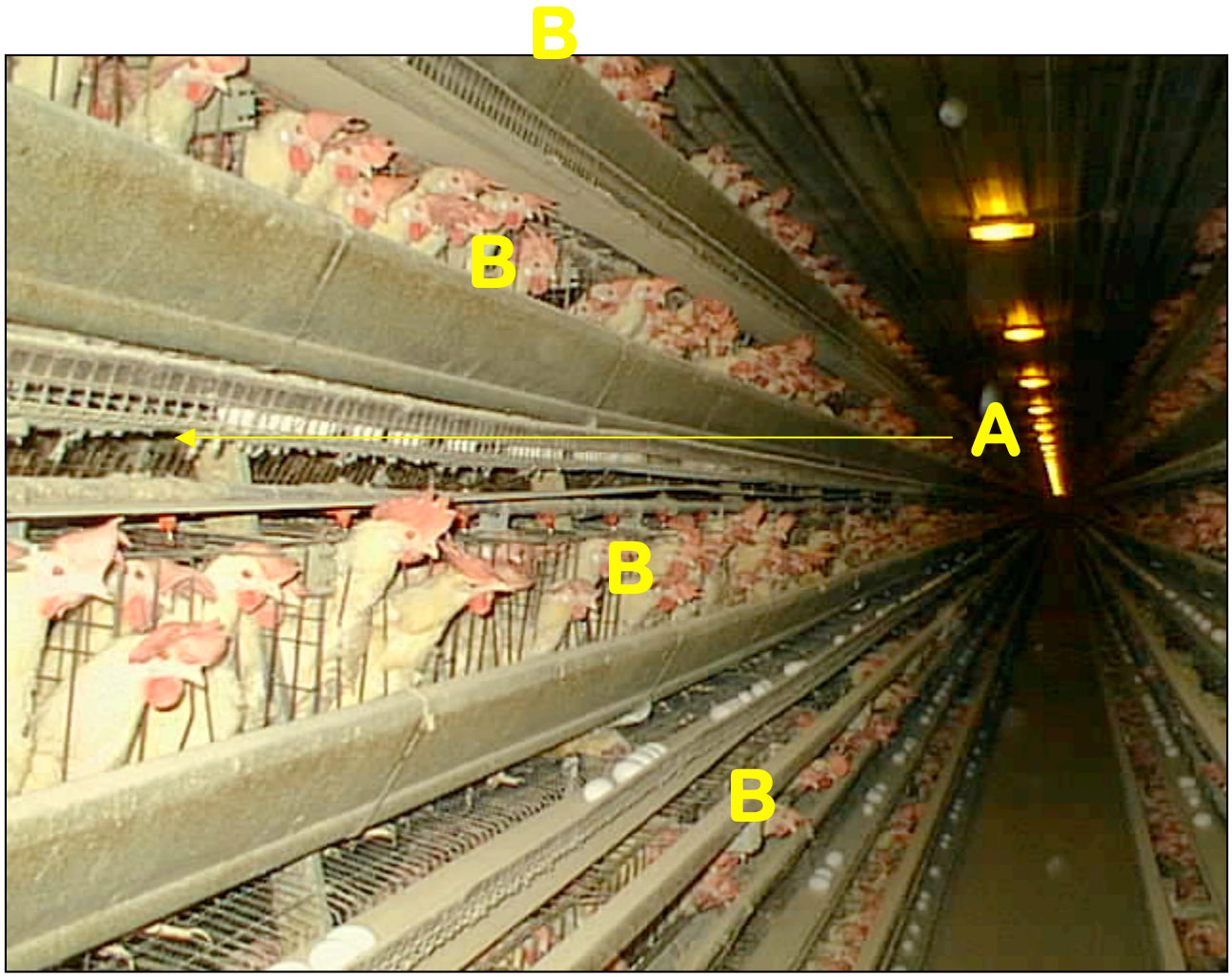
Egg Production

- The objective of this presentation is to provide a general overview of commercial egg production and processing.
- The slides are ordered in a sequential series as they occur in the production cycle.
- This particular egg production facility is considered an “in-line” operation. This means the eggs are produced and packaged for shipping to retail markets on the farm. There are also many “off-line” operations that produce eggs in one location and transport them to another location for processing.

On the horizon is an in-line commercial egg production facility. This facility is vertically integrated or self-contained, i.e., the company owns the feed mill, hens, buildings, egg processing facility, and transportation vehicles.

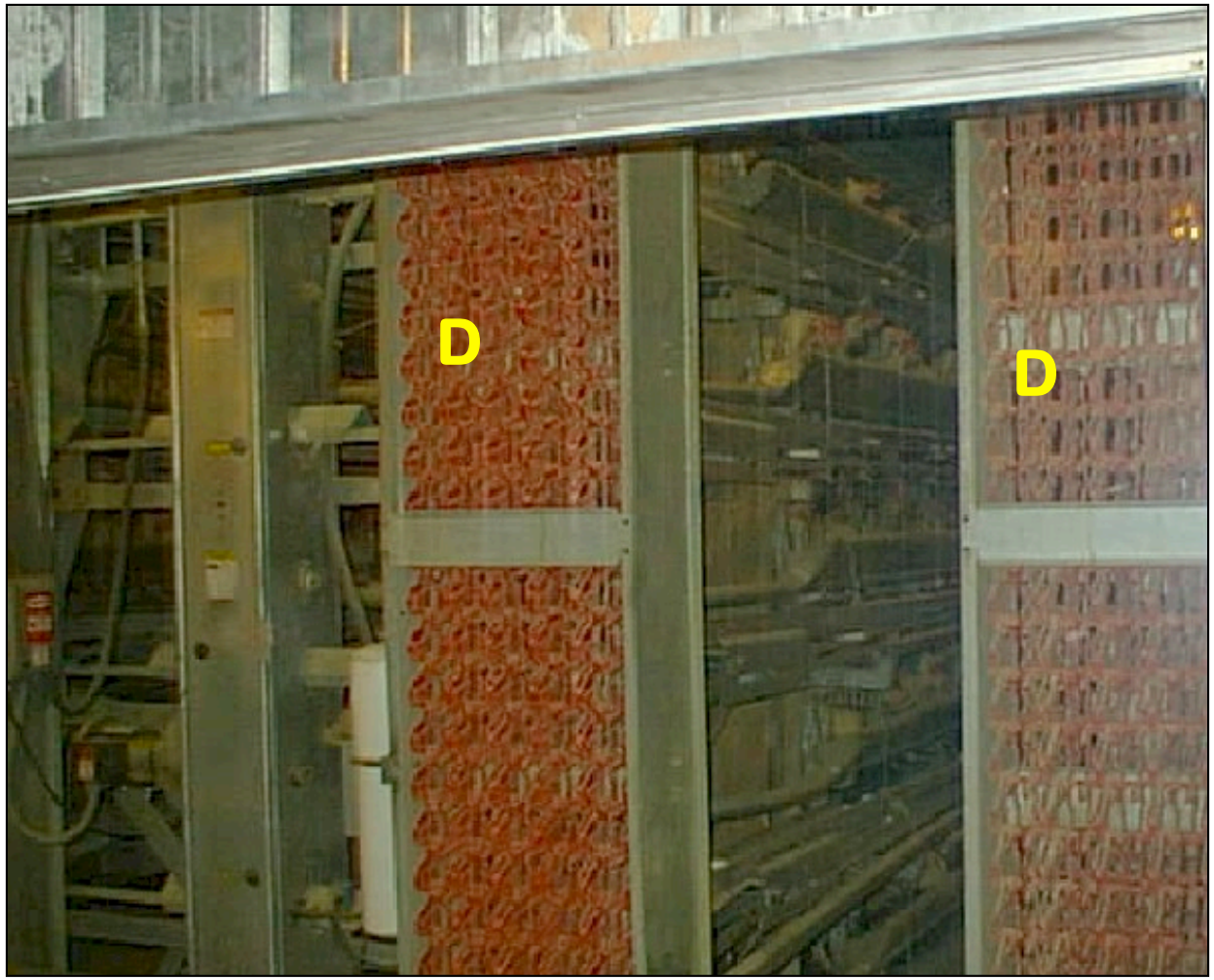
This facility represents one level of vertical integration, the feed mill. Based on demand, raw grains (from bins "A") are mixed into designated poultry rations and augured ("B") to the layer houses.

The auger system delivers grain into high-rise layer houses (“C”). These houses are approximately 500 feet long and may contain as many as 150,000 laying hens.



This is a view of the inside of a layer facility. Hens are housed on slanted wire-mesh floors. Nipple waterers (“A”) serve as the hen’s source of water and the feed is transported through the house via an auger system in feeders (“B”).

This is another view of the egg transporting mechanisms within a layer house. The use of advanced mechanical engineering has greatly reduced the occurrence of human egg handling to the point that eggs are rarely touched by human hands.



As the eggs reach the end of each level, automatic collectors place the eggs into plastic egg handlers (“D”). Plastic egg handlers carry the eggs directly to the egg processing facility via a large overhead belt.

These eggs are traveling to the egg processing/breaker facility.

Eggs are mechanically washed with a mild detergent and sanitized (“E”). Eggs are washed in 120°F water.

Here the eggs are entering the first stage in the egg grading process. The eggs are evaluated by an automated computerized detection system. Eggs are graded into categories of AA, A, B, and Loss Quality Standards.

Table I. Interior and Exterior Measures of Egg Quality				
Interior Appearance			**Exterior Appearance**	
Albumen	• clear & firm • reasonably firm • weak & watery		Shape	• oval shaped • ridges or rough areas
Yolk	• distinctness & visibility • size & shape • defects		Shell Soundness	• thin spots • leaks
Aircell	• overall size		Shell Cleanliness	• cage marks • stains • dirty

Overall grade is a combination of internal (albumen, yolk, and air cell size) and external consistency (shape, shell soundness, and cleanliness).

Table II. Official Egg Sizes

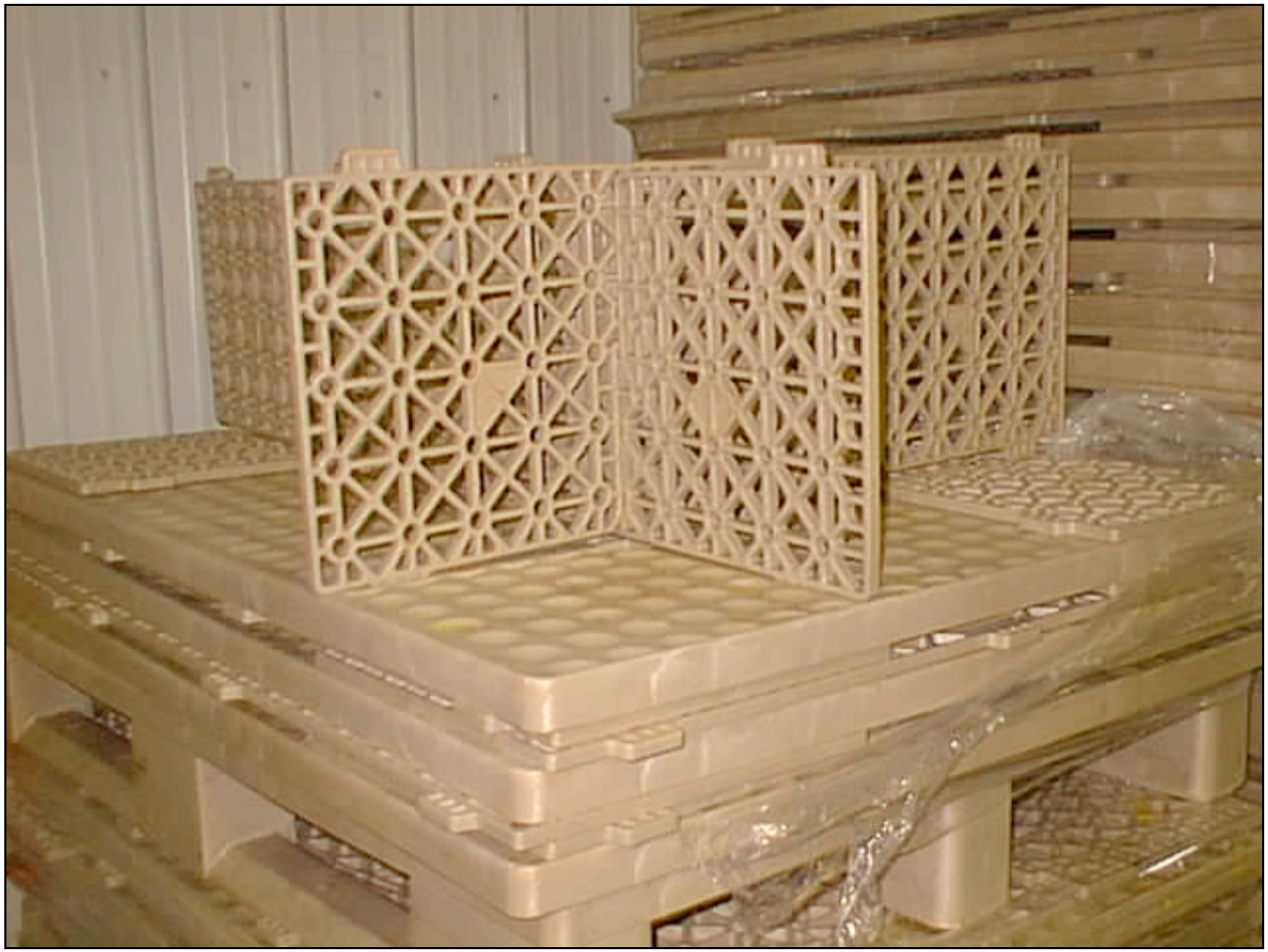
Size	Weight	Size	Weight
Jumbo	30 oz./dozen	Medium	21 oz./dozen
Extra Large	27 oz./dozen	Small	18 oz./dozen
Large	24 oz./dozen	Pee Wee	15 oz./dozen

** These weights represent the minimum sizes for each category.

Brushes transport eggs away from the egg graders to the packaging area of the plant. It is at this point that eggs will either be placed into cartons or be sent to the breakers.

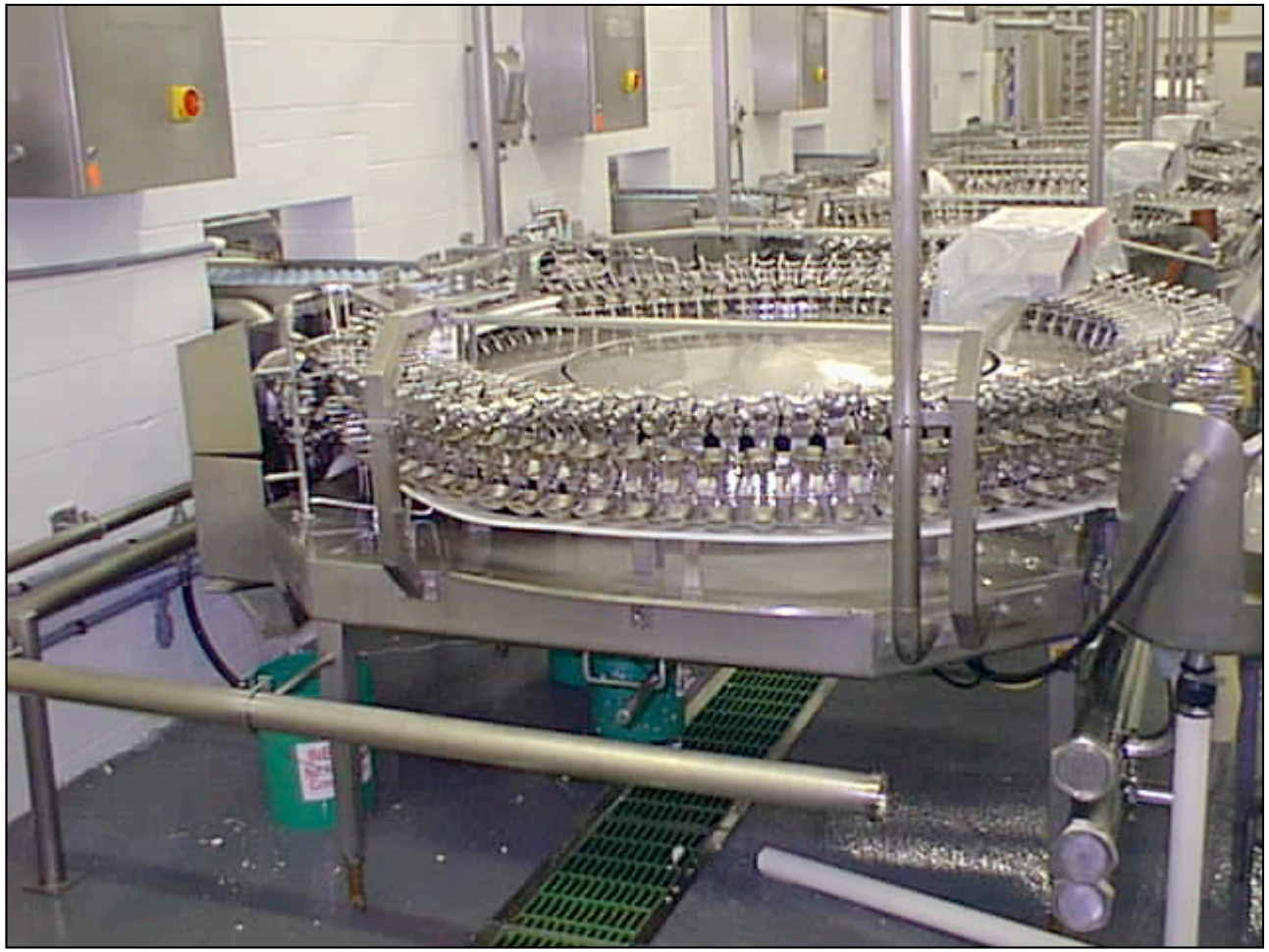
This is a view of the entire “carton line.” Each stack of cartons (blue, white, yellow, pink) represents a different egg size.

Eggs are mechanically placed into cartons for shipping to the grocery market.



Eggs awaiting processing within the plant are placed on plastic skids. These skids are washed and sanitized on a daily basis.

On the left, eggs are stacked in cardboard flats for shipment to the retail market. Eggs on the right are stacked in plastic flats and are awaiting transfer to the egg further processing (breaker) room. Again, plastic is used inside the plant for sanitation and recycling purposes.



This is an egg breaker machine. This machine cracks the egg shells and separates the yolk (yellow) from the albumen (white). The separation process works exactly like a household egg strainer. This machine will process 18,000 eggs per hour.

This is also egg breaker machine. However, this machine will process 500,000 eggs per hour.

These are bulk bins full of pasteurized egg yolks awaiting shipment. Egg pasteurization occurs at 145°F for seven minutes for 3,000 pounds of egg.

Processed egg products leave the facility via 1/2 gallon "milk" cartons, bagged product, and bulk semi-trailers. Processed egg products also include hard-boiled eggs.

Eggshells are processed in the plant. The shells have been dried and ground for use in animal feeds and other products.

Conclusions

- **Many companies in the egg production and processing industry are vertically integrated.**
- **Preparing table eggs and processed egg products for the retail and institutional market is a complex process involving many steps and employing many people.**