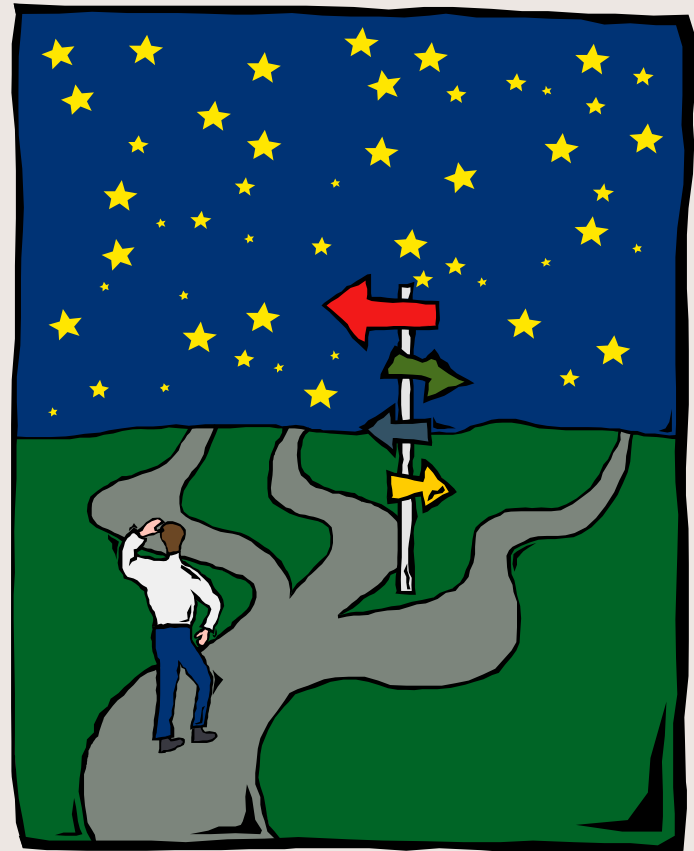




# Equipment Needs

# Getting Started

- Decisions
- Decisions
- Decisions
- Decisions
- Decisions
- Decisions
- Decisions



# Decisions... Raw or Pasteurized?

- Raw
  - Growing demand from health-conscious consumers.
  - 60-day aging required
    - Rules out fresh or short-aged cheeses
  - Simpler plant – no pasteurizer needed.
  - Proven to be safe when aged.

# Decisions... Raw or Pasteurized?

---

- Pasteurized
  - Allows for the production of fresh and short-aged cheeses.
  - Gives you the flexibility to manufacture other products.
    - Fluid milk
    - Cream products (if you are standardizing your milk before cheese-making)

# Decisions... Batch pasteurization or HTST?

- Batch
  - Choose this method if you are small – the equipment costs less and there is less waste with small batches.
    - Definitely if you will process less than 4500 Lbs (500 Gal) per day.
    - Works pretty well even up to 8000 Lbs (900 Gal) per day.
    - Can work for larger operations – get ready to pay the utility bill!
  - Works well with single vat operations.

# Decisions... Batch pasteurization or HTST?

- HTST
  - Choose this method if you are larger or plan to grow large soon – costs more to buy the equipment and watch out for wastage.
    - Pays for itself in energy savings at around 8500 lbs (1000 gal) per day.
      - Regeneration section heats up the cold milk while cooling down the hot milk.
    - Labor savings with larger batches.
      - Faster output in gallons per hour.
    - Will you have multiple vats to keep the short time running?

# Decisions... How big should my plant be?

- Which end shall we start with – the cows or the consumer?
  - Cows... tells you the maximum capacity (perhaps)
    - They produce milk seven days a week. You will process ?? days a week.
    - You might plan to sell some milk to the Coop while you grow.
  - Consumer... how big is your market?
    - At what level will you expect to start?
    - At what level do you plan to be in one year? in three years? in five years?
    - This is really the way to size your plant.



# Decisions... How big should my plant be?

---

- How long do you want to operate your plant each day?
  - Family labor
    - Get in and get done so that you can do other things.
    - Maybe the plant is oversized to gain speed.
  - Hired labor
    - Get the most out of your investment.
    - Keep the plant efficient.



# Decisions... How big should my plant be?

---

- Growth plans
  - Purchase equipment sized to accommodate the growth of the next 1 – 3 years.
  - I wouldn't recommend sizing equipment for growth beyond 3 years.
    - Your product / market / goals may change
    - Upgrade at a later time – saves interest expense
  - You might want to consider sizing the building larger and/or designing the building for expansion.



# Decisions... How big should my building be?

---

- Plant layout is a subject all its own...
  - Remember the rooms that are easily forgotten.
    - Lab area / Office
    - Dry ingredient storage
    - Packaging storage
    - Staging area
    - Large enough mechanical room

A decorative spiral binding on the left side of the slide, consisting of a series of dark, circular loops.

# Decisions... How big should my building be?

---

- Areas in the building where space requirements mushroom...
  - Packaging Storage
  - General Storage
  - Cooler
  - Aging Room

Maybe you should plan your building to be able to expand these areas.

# Decisions... What energy source should I use?

---

- Options – think outside the box
  - Electric
    - \$2.93 Per 100,000 BTU's (\$.10 per kWh)
  - Fuel
    - \$1.69 per 100,000 BTU's (\$2.35 per gal)
  - LP Gas / Natural Gas
    - \$1.78 Per 100,000 BTU's (\$1.70 per gal)
  - Coal
    - \$.85 Per 100,000 BTU's (\$209.00/ton)
  - Wood
    - ??

# Decisions... Steam or Hot Water Boiler?

---

- Steam Boiler
  - It's gets your product up to temperature quickly
  - It provides steam for air space requirements
  - It's expensive to install
    - The boiler is expensive
    - The piping is expensive
  - It's inefficient to operate
    - 85% efficiency at best

# Decisions... Steam or Hot Water Boiler?

- Hot Water “Boiler”
  - It is less expensive to install
    - Boilers are smaller and less expensive
    - Piping is simpler and less expensive
  - It is more efficient to operate
    - 92% - 96%
  - It might take longer to get your product up to temperature – depending on system design
  - Separate steam generator needed for air space heat – if you have a batch pasteurizer in your system.

# Decisions... New or Used Equipment?

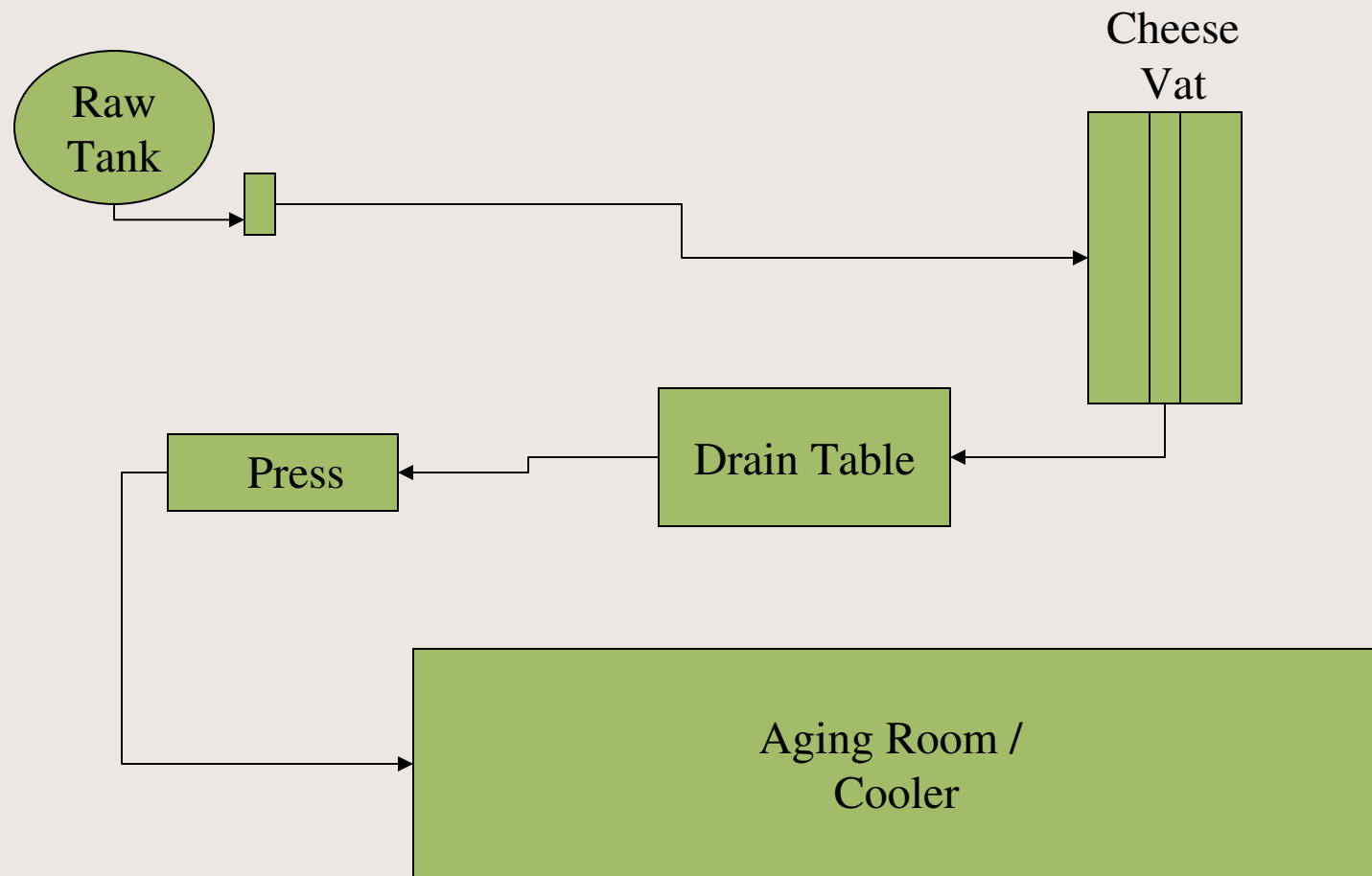
- New
  - Some things you just can't find used any more.
    - Cheese vats
    - Small batch pasteurizers
  - Some new items are much more efficient.
    - HTST systems
  - Some used equipment doesn't pass current regulatory requirements
    - Ask before you buy

# Decisions... New or Used Equipment?

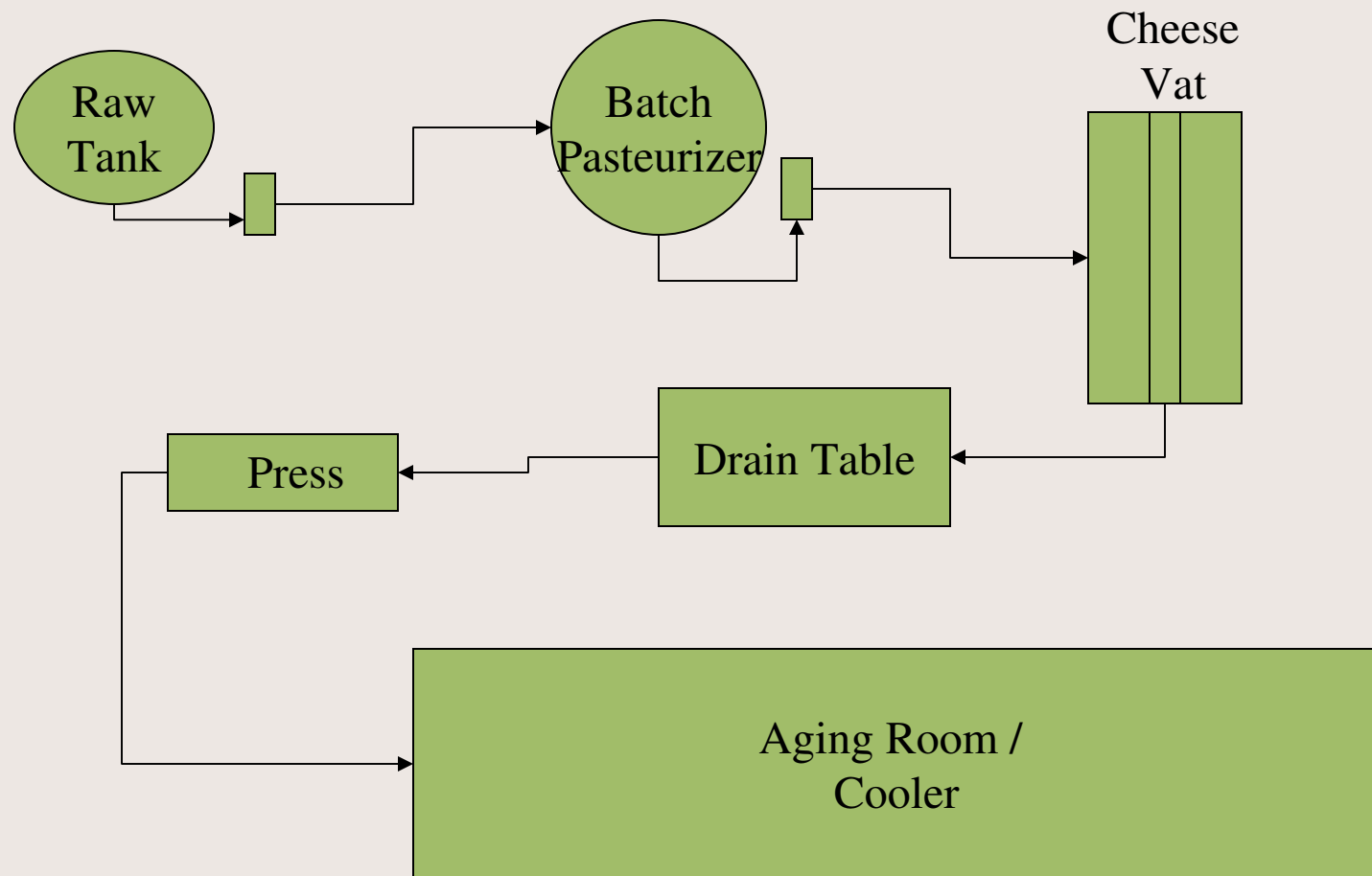
- Used
  - Often is a great option.
    - Lowers up front costs
    - “They just don’t build things like they used to.”
  - Make sure you know what you are getting
    - Demand has exploded and many buyers lack experience – some sellers don’t have the integrity that they should have.
  - Decide what level of involvement that you want to have in the process...
    - Of the hunt
    - Of the purchase
    - Of the rebuild



# Example Plant Flowchart – Raw Milk Cheese



# Example Plant Flowchart – Pasteurized Milk Cheese





# Selecting equipment -Tanks

---

- Round verticals are in high demand and are more expensive.
- Use a old farm tank if you can.
- Can you use one that is a “leaker?”
- Avoid an “over purchase”... for example...
  - Buy a batch pasteurizer for a storage tank.
  - Buy an insulated tank when a single shell will do.
  - Buy a tank “good for milk” if all you need is an insulated storage tank.



# Selecting equipment -Tanks

---

- Always inspect for condition
  - Look for the obvious internal damage – dents, scratches, chemical burns
  - Agitator drive – gearbox leaking? good running condition?
  - Is it “good for milk?”
    - Insist on pressure testing
  - Compressor condition (if needed)
  - Tank Washer
- CIP is not all that hard – save yourself some elbow grease and time
  - Sprayballs can be installed on older tanks

# Selecting equipment - Pumps


- What kind of pump do you need?
  - Centrifugal (the standard pump)
    - General pumping
    - Washing
  - Positive displacement (Jabsco)
    - Goat milk
    - Gentle movement of curd
  - Diaphragm pump
    - Goat milk
    - Gentle movement of curd
- Small centrifugal pumps are in high demand
- New ones aren't that expensive – don't pay a lot of money for a pile of junk



# Selecting equipment - Pumps

---


- Inspect for condition
  - Motor – does it run?
  - General appearance
  - Seal plates cost money
- Is it a popular brand? Will parts be readily available?
  - Triclover or Ampco
  - Fristam
  - A farm milk pump (DeLaval, Boumatic, Westfalia-Surge)



# Selecting equipment – Batch Pasteurizers

---

- Research carefully or deal with a reputable dealer.
- What are you getting for what you are paying?
  - Just the shell?
  - Is it atmospheric or pressure wall?
  - With good agitator? (sweep?)
  - Leak detect valve? (in good condition?)
  - Thermometers? (indicating & air space)
    - Mercury ones are no longer available new
  - Recording thermometer? (wind-up or electronic?)




# Selecting equipment – Batch Pasteurizers

---


- Atmospheric – water must flow through without generating any pressure
  - Spray ring / Water bath
  - Could require a braze plate heat exchanger and/or an extra pump.
  - Older and less efficient
- Pressure wall – water can be pushed through under pressure and returned to heating or cooling source
  - Newer & more efficient



A decorative graphic on the left side of the slide, resembling a spiral binding of a notebook, with a series of dark, rounded shapes connected by a thin line.

# Selecting equipment – HTST Pasteurizers


- There are a lot of components to an HTST system – what's included in what you're buying?
  - Balance Tank
  - Pump(s)
  - Plate pack
  - Recorder-Controller with all the sensors
  - Holding Tube
  - Flow Diversion valve (and leak detect valve)
  - Flow Diversion panel (or old-style Taylor controls)
  - Sight glass, vacuum breaker, test ports, pressure differential control, etc.



# Selecting equipment – HTST Pasteurizers

---

- There are old & nearly worthless systems out there for sale.
  - Leaking or low pressure plate packs with old Taylor controls, cracked balance tanks, and bevel seat joints in the holding tube.
- There are very few newer style used systems available.
  - Newer higher pressure plate packs with electronic controls
- There are a few older systems that still have some life in them.
  - Plate packs in good condition that can be upgraded to new style controls – now or later.



# Selecting equipment – HTST Pasteurizers

---

- Key areas to watch out for...
  - Plate Pack
    - Brand?
    - Pressure capability?
    - Has it been sitting? Plan to have it inspected and regasketed unless in use and/or recently rebuilt.
    - Size? Too large? Too small?
    - Efficiency of regeneration section?
      - Older units are often around 80% or even less
      - Newer units can be 90% or higher

# Selecting equipment – HTST Pasteurizers

- Key areas to watch out for...
  - Control / Flow Diversion Valve
    - Taylor single stem controls – all mechanical / no leak detect valve
      - Still allowed in some states
      - Obsolete and will become a problem to repair soon
    - Alfa-Laval (or other brand) flow diversion panel with separate flow diversion & leak detect valves. Anderson AV9900 recorder-controller
      - The current model



# Selecting equipment – Cream Separators

---

- Cold milk or Warm milk?
  - Cold milk
    - Mostly DeLaval brand out there – they are excellent units even though they are old
    - Milk is pumped through – not gravity fed
    - Size can be an issue
      - 240, 242, 340, 342 (approximately 200 gal/hr)
      - 270, 272, 370, 372 (approximately 450 gal/hr)
      - 290, 292, 390, 392 (approximately 640 gal/hr)
    - We have not found a source for new cold milk separators in the small sizes.

A decorative graphic on the left side of the slide, resembling a spiral binding of a notebook, with a series of dark, circular loops connected by a line.

# Selecting equipment – Cream Separators

---

- Cold milk or Warm milk?
  - Warm milk
    - Some real old used models out there – some of them still work.
    - Most units are gravity fed – output will be gravity as well
    - New units are available
    - Available in smaller sizes – wide range of sizes available.



# Selecting equipment – Cream Separators

- Some things to watch out for...
  - Does the separator work?
    - Rebalancing is expensive
  - Does the separator run with minimal vibration?
    - Rebalancing is expensive
  - Do a visual inspection. Has the separator been well cared for or is it all beat up?
    - The separator gets torn apart and put together every processing day. Some of them could tell a lot of stories if they could talk.
  - Is it painted frame or stainless frame?
    - If painted, make sure disc stack will pass inspection
    - Watch out for soldering in milk contact areas

A decorative spiral binding on the left side of the slide, consisting of a series of metal loops.

# Selecting equipment – Cheese Vats

---

- “Where do we want to go today?”
  - Just about any tank can be made into a cheese vat.
    - You can make cheese in a plastic tub from Wal-Mart.
    - You can make cheese in an old milk tank.
  - Know the cheese you want to make and how to make it before you start looking.
  - Small used cheese vats are almost unavailable.



# Selecting equipment – Cheese Vats

---

- What do you need your cheese vat to do?
  - Heat the milk to culturing temperature?
  - Maintain temperature over time?
  - Cook the curd?
  - Agitate? Removable agitator?
    - Is a strong man needed to remove the agitator?
  - Make it easy for uniform curd cutting?
  - Allow for draining and pumping of curd?
  - Press under the whey?

A decorative graphic on the left side of the slide, resembling a spiral binding of a notebook, with a series of dark, rounded loops.

# Selecting equipment – Cheese Vats

---

- Did you want it to be energy efficient?
  - Pressure wall vats allow for recirculation of hot water.
  - Water bath / Atmospheric vats either run water to drain or require an additional pump.
- Did you want to get done anytime soon?
  - Converted milk tanks are slower to heat.
- Did you want to make an outstanding product?
  - Triple wall vats allow for uniform heating of the milk.

# Selecting equipment – Cheese Vats

---

- Converting a milk tank to a cheese vat
  - Square Girton tanks with side hinging lids work reasonably well
    - Custom agitator can be built.
    - Freon cooling plate will allow for some water circulation – slow heating
  - Ice Bank style tank can be converted
    - Remove the bridge
    - Install a custom agitator
    - Hot water bath instead of ice water bath

# Selecting Equipment – Accessory items

Due to high demand from new people starting up, not much used equipment is available.

- Curd knives
- Cheese molds
  - Some used ones available
  - Most people purchase new ones of the size and shape that they want
- Custom Turning trays available
  - Sized to fit your cheese molds
- Optional Draining Tables
  - Allows for collection and drainage of whey



# Selecting Equipment – Accessory items

---

- Curd Processors
  - Uniform shredding of the curd
- Rakes, shoves, and forks



# Selecting equipment – Cheese Presses

---

- “Where do you want to go today?”
  - Presses are not rocket science – You may want to build your own.
  - Mechanical verses air-powered.
  - Semi-hard cheese versus hard cheese requires vastly different pressing capabilities.
  - Large presses available used / small presses primarily available new.
  - Know the capacity that you need and the style that works best for your cheese.
    - 3 psi to 15 psi
    - Horizontal or Vertical
    - Single or multiple press plates

# Don't get burned

---

- The used equipment market is subject to a lot of abuses – we have heard our share of horror stories.
- You spell assume with two dollar signs (a\$\$ume).
- Look before you leap.
- May common sense prevail.
- Work with someone who understands and appreciates what you want to do.



# How do you feel now?

---

- Confused?
- Overwhelmed?
- Discouraged?
- Challenged?
- Ready to go for it anyway?
- *All of the above?*

**You must be an entrepreneur!**



A spiral-bound notebook with a brown cover and a light beige page. The page has a horizontal line near the top. The text "Thank-You" is written in the center in a large, black, sans-serif font. The spiral binding is on the left side.

Thank-You