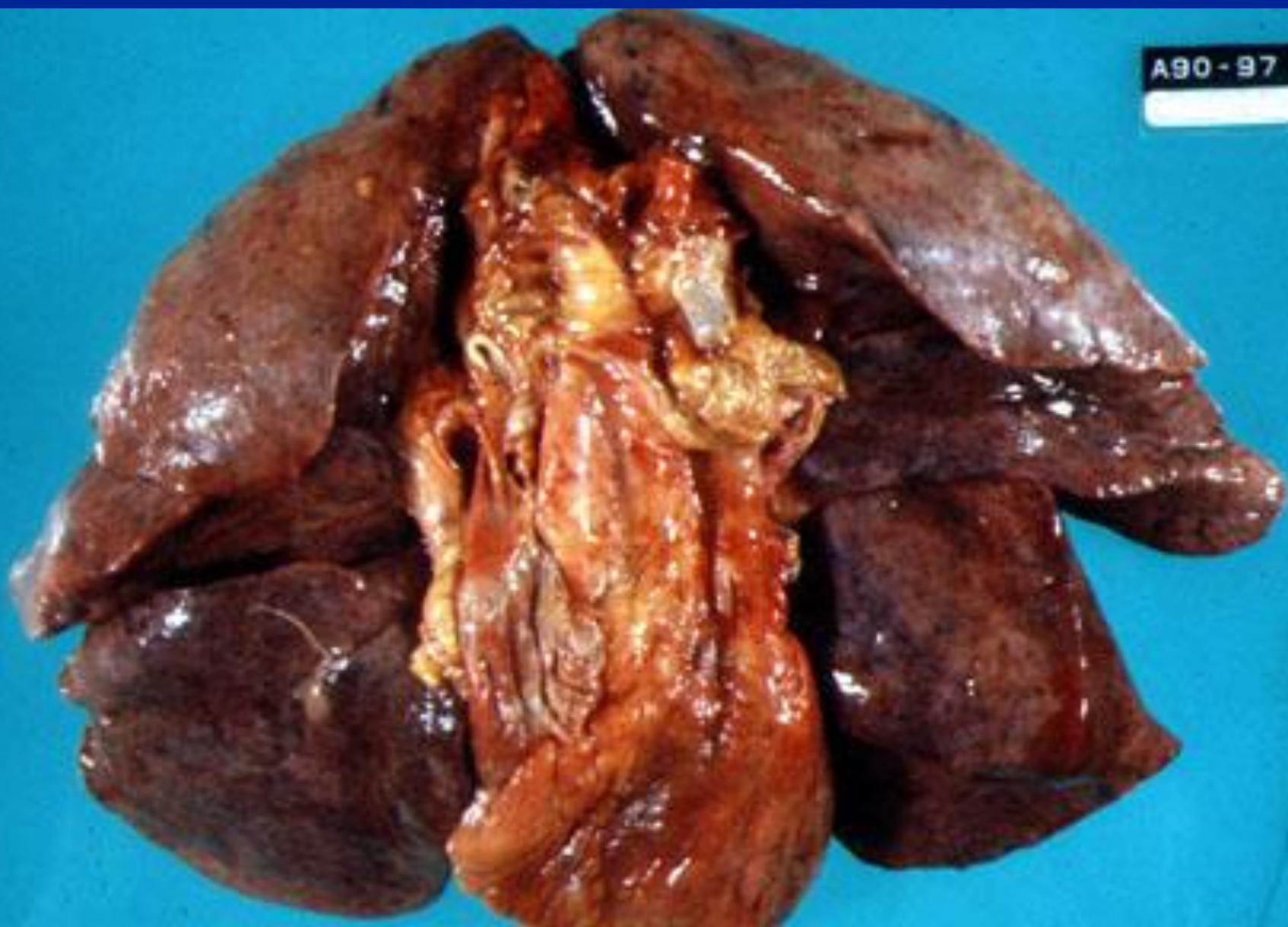


# Lung Examination: Abnormal

Arcot J. Chandrasekhar, M.D.

A90-97



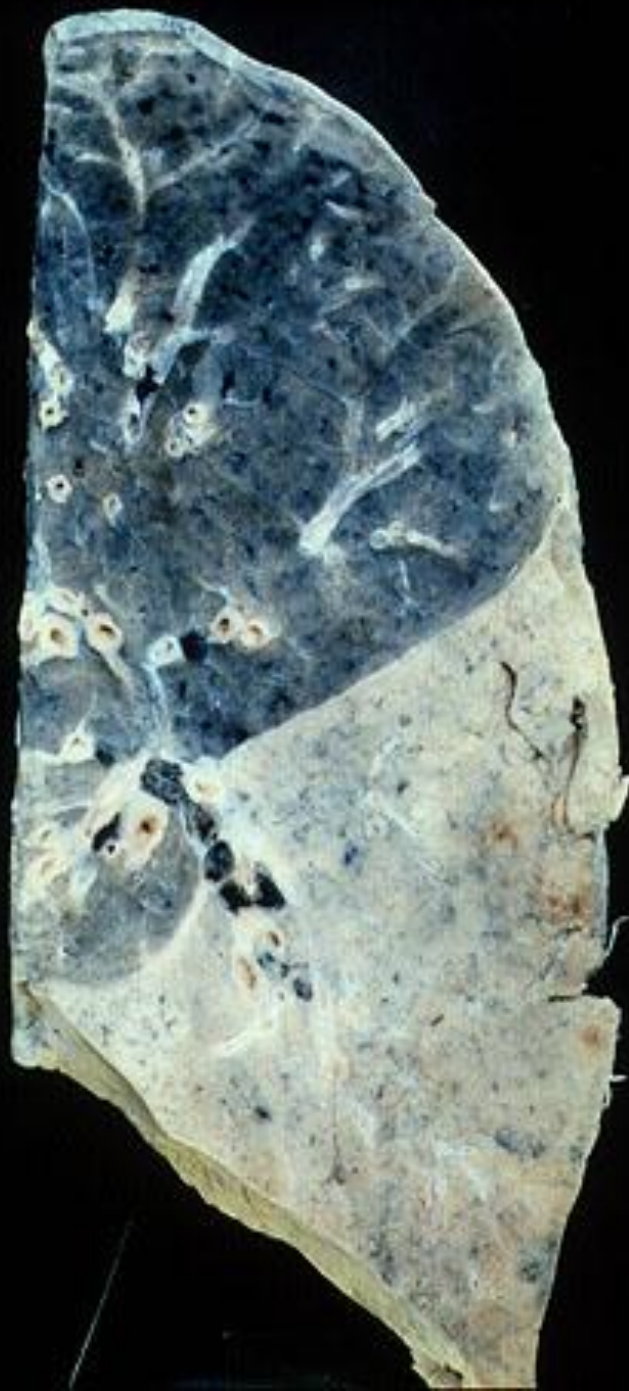




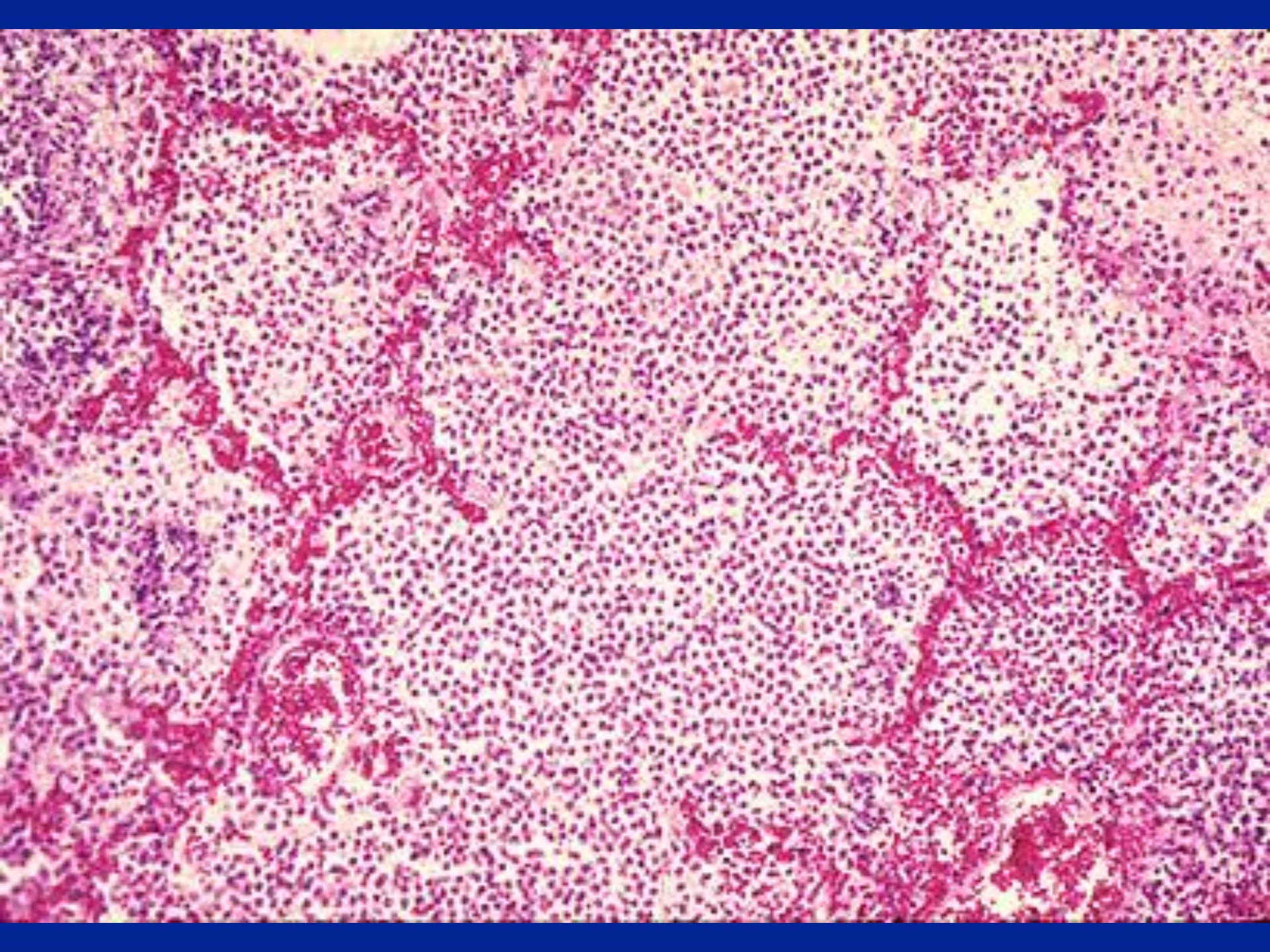


# Illustrative Pathological problems

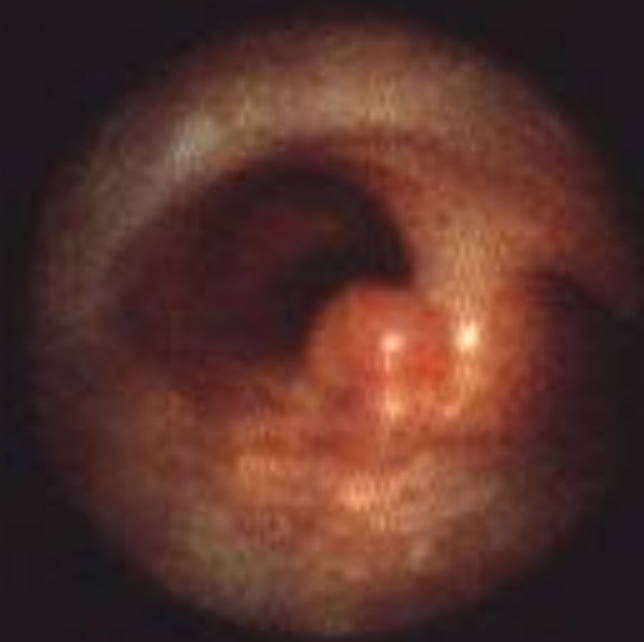
- Consolidation
- Atelectasis
- Pleural effusion
- Pneumothorax
- Mass
- Diffuse lung disease



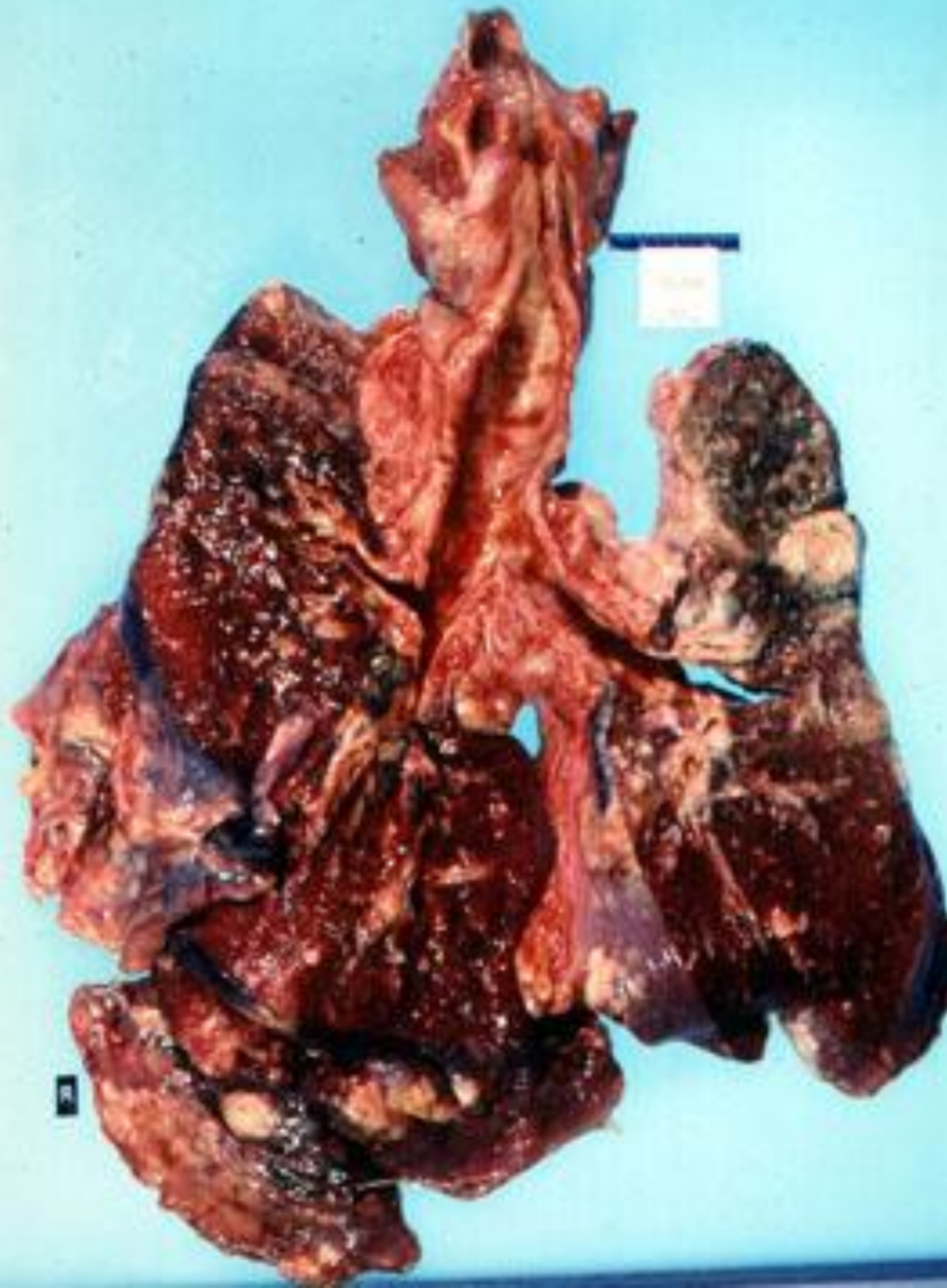
















A close-up photograph of a glass filled with a golden, shimmering liquid, likely beer. The liquid has a fine, bubbly texture and is set against a solid blue background. The word "SHIMMERING" is printed in yellow capital letters at the bottom of the frame.

**SHIMMERING**



# Steps

- General Examination
- Mediastinal position
- Chest expansion
- Lung resonance
- Breath sounds
- Adventitious sounds
- Voice transmission

# General Examination

- Respiratory rate
- Pattern of breathing
- Cyanosis
- Clubbing
- Weight
- Cough
- Hospital setting
- Effort of ventilation
- Shape of thorax

# Respiratory Rate

- Bradypnea: rate less than 8 per minute
- Tachypnea: rate greater than 25 per minute



# Pattern of Breathing

- Kussmals
- Sleep apnea
- Cheyne strokes
- Pursed lip breathing
- Orthopnoea: Short of breath in supine position, gets some relief by sitting or standing up.



**Sleep apnea syndrome**

# Central Cyanosis

- Results from pulmonary dysfunction, the mucous membrane of conjunctiva and tongue are bluish.
- If there was chronic hypoxemia and secondary erythrocytosis, you can detect the conjunctival and scleral vessels to be full, tortuous and bluish.





**Central Cyanosis**



**Corpulmonale**

# Clubbing



# Clubbing

- In clubbing, there is widening of the AP and lateral diameter of terminal portion of fingers and toes giving the appearance of clubbing.
- The angle between the nail and skin is greater than  $180^\circ$ .
- The periungual skin is stretched and shiny.
- There is fluctuation of the nail bed.
- One can feel the posterior edge of the nail.



## Significance: Clubbing Observed In:

- Intrathoracic malignancy: Primary or secondary (lung, pleural, mediastinal)
- Suppurative lung disease: (lung abscess, bronchiectasis, empyema)
- Diffuse interstitial fibrosis: Alveolar capillary block syndrome
- In association with other systemic disorders



**Gibbus**

# Weight

- Emaciation cachectic
  - Malignancy
  - Tuberculosis



**320 lbs**



# Weight

- Obese: Sleep apnea syndrome



**3 Layered sputum**

# Cough

- Productive
- Dry
- Whooping
- Bovine



**2 liters of O<sub>2</sub>**



# Hospital Setting

- Isolation room
- Oxygen set up

# Effort of Ventilation

- Person appears uncomfortable. Breathing seems voluntary.
- Accessory muscles are in use, expiratory muscles are active and expiration is not passive any more.
- The degree of negative pleural pressure is high.
- The respiratory rate is increased.

# Resting Size and Shape of Thorax

- Barrel chest
- Kyphosis
- Scoliosis
- Pectus excavatum
- Gibbus

# Barrel Chest

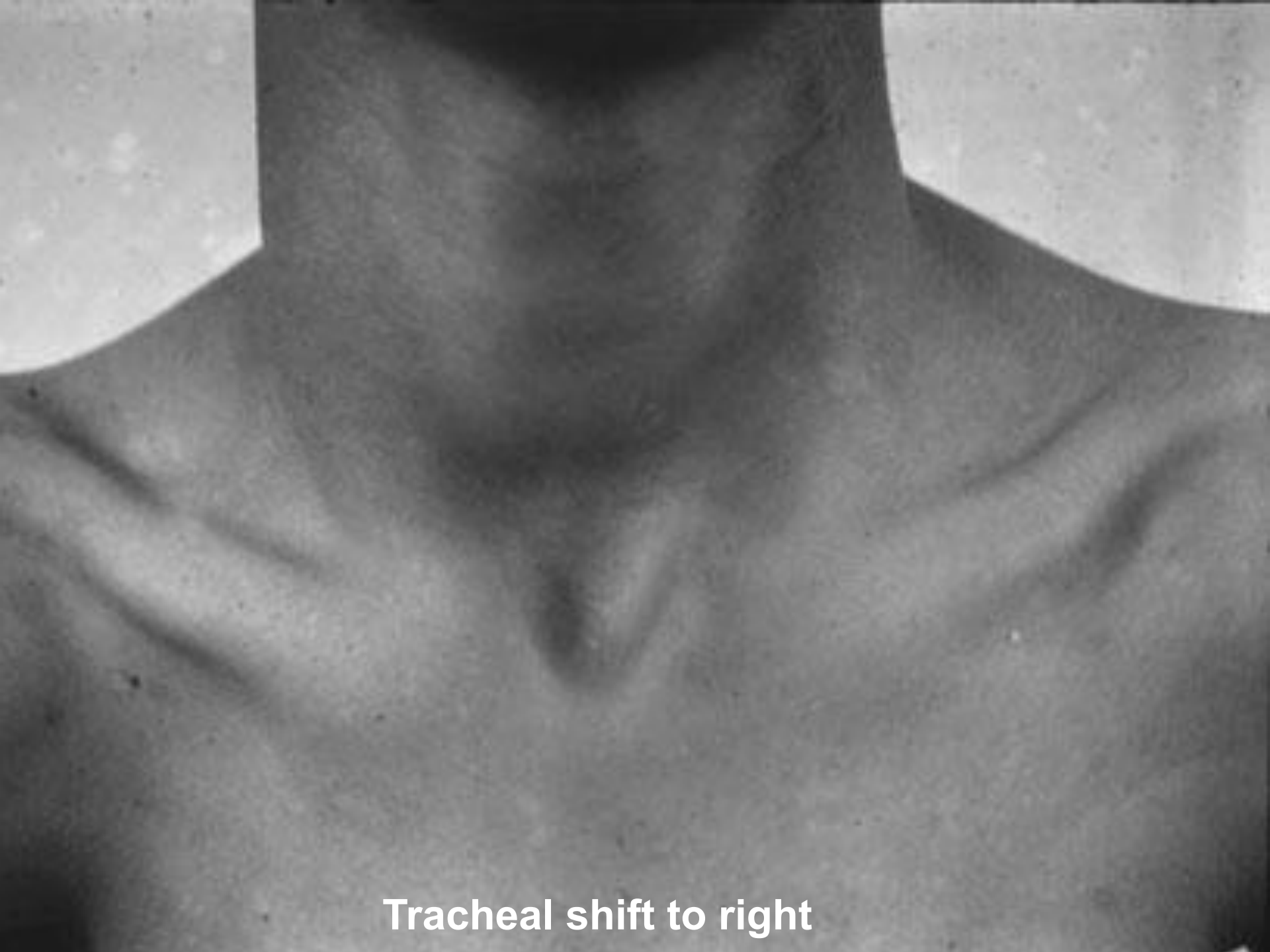


**AP Diameter = Transverse  
Diameter**



# Tracheal Position: Mediastinum

- Any deviation of the mediastinum is abnormal
- Lateral shift: The mediastinum can be either pulled or pushed away from the lesion
  - Pull: Loss of lung volume (Atelectasis, fibrosis, agenesis, surgical resection, pleural fibrosis)
  - Push: Space occupying lesions (pleural effusion, pneumothorax, large mass lesions)
  - Mediastinal masses and thyroid tumors



**Tracheal shift to right**

# Chest Expansion

- Asymmetrical chest expansion is abnormal
  - The abnormal side expands less and lags behind the normal side
  - Any form of unilateral lung or pleural disease can cause asymmetry of chest expansion
- Global expansion decrease

# Percussion: Decreased or Increased Resonance is Abnormal

- Dullness
  - Decreased resonance is noted with pleural effusion and all other lung diseases
  - The dullness is flat and the finger is painful to percussion with pleural effusion
- Hyper resonance: Increased resonance can be noted either due to lung distention as seen in asthma, emphysema, bullous disease or due to Pneumothorax
- Traube's space

# Breath Sounds: Diminished or Absent




- Intensity of breath sounds, in general, is a good index of ventilation of the underlying lung.
- Breath sounds are markedly decreased in emphysema.
- Symmetry: If there is asymmetry in intensity, the side where there is decreased intensity is abnormal.
- Any form of pleural or pulmonary disease can give rise to decreased intensity.
- Harsh or increased: If the intensity increases there is more ventilation and vice versa.



# Bronchial

- Bronchial breathing anywhere other than over the trachea, right clavicle or right inter-scapular space is abnormal.
- In consolidation, the bronchial breathing is low pitched and sticky and is termed tubular type of bronchial breathing.
- In cavitory disease, it is high pitched and hollow and is called cavernous breathing. You can simulate this sound by blowing over an empty coke bottle.

# Bronchial breathing

Expiration as long as inspiration	
Pause between inspiration and expiration	
Quality	

# Rhonchi

- Rhonchi are long continuous adventitious sounds, generated by obstruction to airways.
- When detected, note whether it is generalized or localized, during inspiration or expiration, and the pitch.
- Diffused rhonchi would suggest a disease with generalized airway obstruction like asthma or COPD.

# Rhonchi



**Asthmatic  
Continuous**

# Rhonchi

- Localized rhonchi suggests obstruction of any etiology e.g., tumor, foreign body or mucous.
- Mucous secretions will disappear with coughing, so would the rhonchus.
- Expiratory rhonchi implies obstruction to intrathoracic airways.
- Asthmatics can also have inspiratory rhonchi while it is uncommon in COPD.



# Pleural Rub

- Normal parietal and visceral pleura glide smoothly during respiration.
- If the pleura is roughened due to any reason, a scratching, grating sound, related to respiration is heard.
- You can hear the sound by compressing harder with the stethoscope and making the patient take deep breaths.
- It is localized and can be palpable.

# Pleural rub



**Scratching, Grating**  
**Related to respiration**

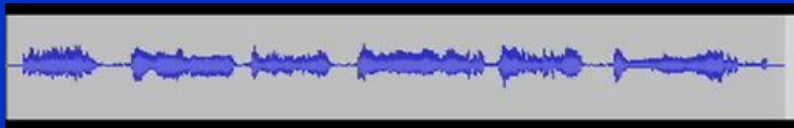
# Stridor

- Loud audible inspiratory rhonchi is called a stridor.
- Inspiratory rhonchi in general, implies large airway obstruction.





**Stridor**



**Asthma**

# Crackles



- Interrupted adventitious sounds are called crackles.
- Make a notation about timing, intensity, effect with respiration, position, coughing and character.
- Timing and Intensity Crackles heard only at the end of inspiration are called fine crackles.
  - When the surfactant is depleted, the alveoli collapse. Air enters the alveoli at the end of inspiration.
  - This sound is generated as the alveoli pop open from it's collapsed state.



# Crackles

- When the crackles are heard at the end of inspiration and the beginning of expiration the fluid or secretions are probably in respiratory bronchioles: medium crackles.
- If the crackles are heard throughout it implies the secretions are in bronchi: coarse crackles.

# Voice Transmission (tactile fremitus, vocal resonance)

- Asymmetrical voice transmission points to disease on one side.
- Increased:
  - Any situation where bronchial breathing is heard the sounds become loud, sharp and distinct: Bronchophony.
  - In extreme situations, the whispered words come clearly and distinctly: Whispering pectoriloquy.

# Voice Transmission (tactile fremitus, vocal resonance)

- Decreased: A quantitative decrease in voice transmission could be due to any other form of lung or pleural disease.
- Qualitative alteration:
  - A qualitative alteration of voice transmission is noted over consolidation and along the upper margin of pleural effusion: Egophony
  - The sound is like a nasal twang or goat bleating.

# Voice Transmission

## Bronchophony

## Whispering Pectoriloquy



## Normal whisper



## Egophony

