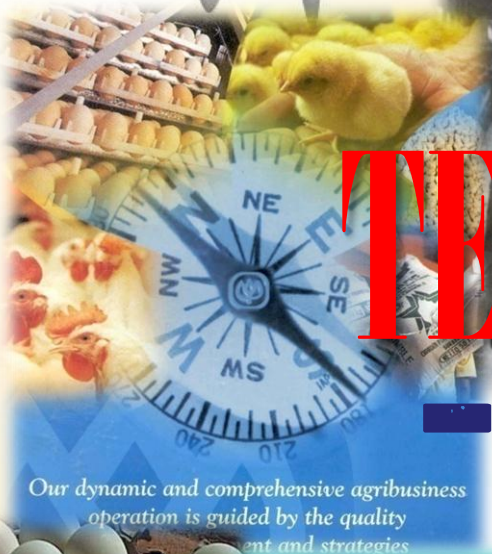
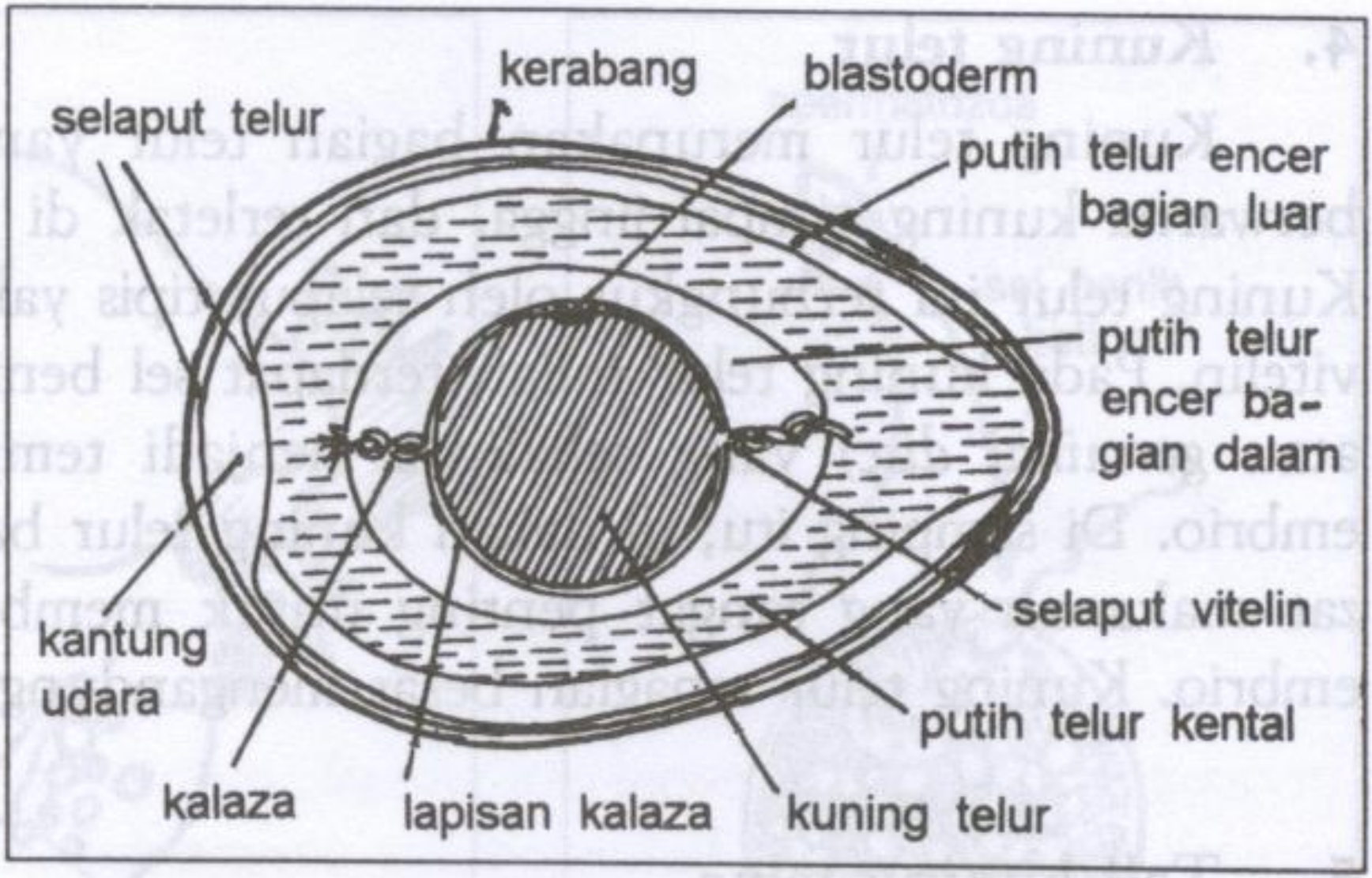


TELUR
-EGG-

Sukardi, S.Pt.,MP


kerabang
blastoderm
selaput telur
putih telur encer bagian luar
putih telur encer ba-gian dalam
selaput vitelin
kantung udara
putih telur kental
kalaza
lapisan kalaza
kuning telur

Female Reproductive Tract

- Ovary
- Infundibulum - site of fertilization
- Magnum - albumin addition
- Isthmus - membranes
- Uterus - shell gland
- Vagina - transport to exterior
- Sperm storage occurs at various sites in tract in some species

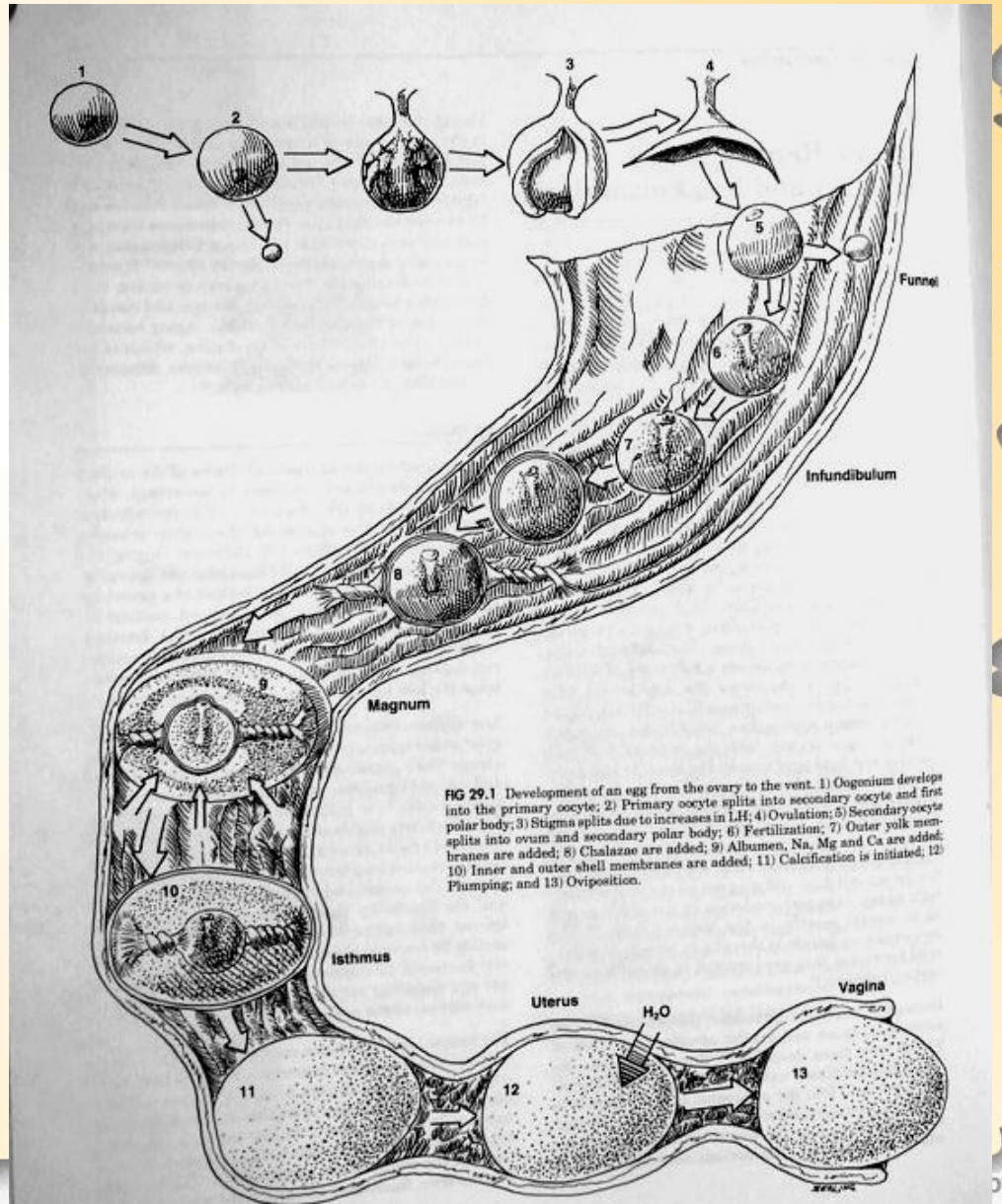


FIG 29.1 Development of an egg from the ovary to the vent. 1) Oogonium develops into the primary oocyte; 2) Primary oocyte splits into secondary oocyte and first polar body; 3) Stigma splits due to increases in LH; 4) Ovulation; 5) Secondary oocyte splits into ovum and secondary polar body; 6) Fertilization; 7) Outer yolk membranes are added; 8) Chalazae are added; 9) Albumen, Na, Mg and Ca are added; 10) Inner and outer shell membranes are added; 11) Calcification is initiated; 12) Plumping; and 13) Oviposition.

Female Reproductive Tract

- **Ovary**
- **Infundibulum** - site of fertilization
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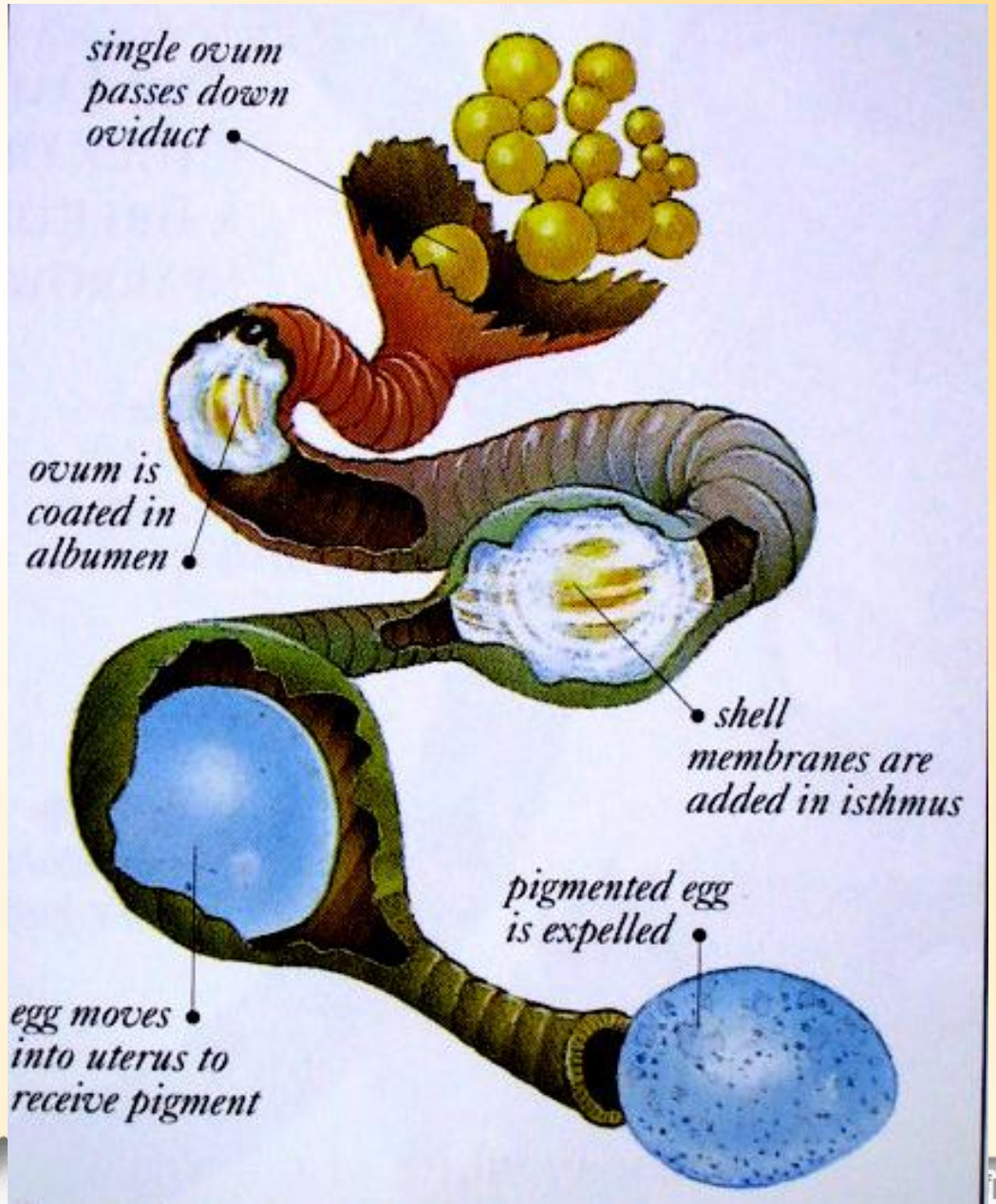
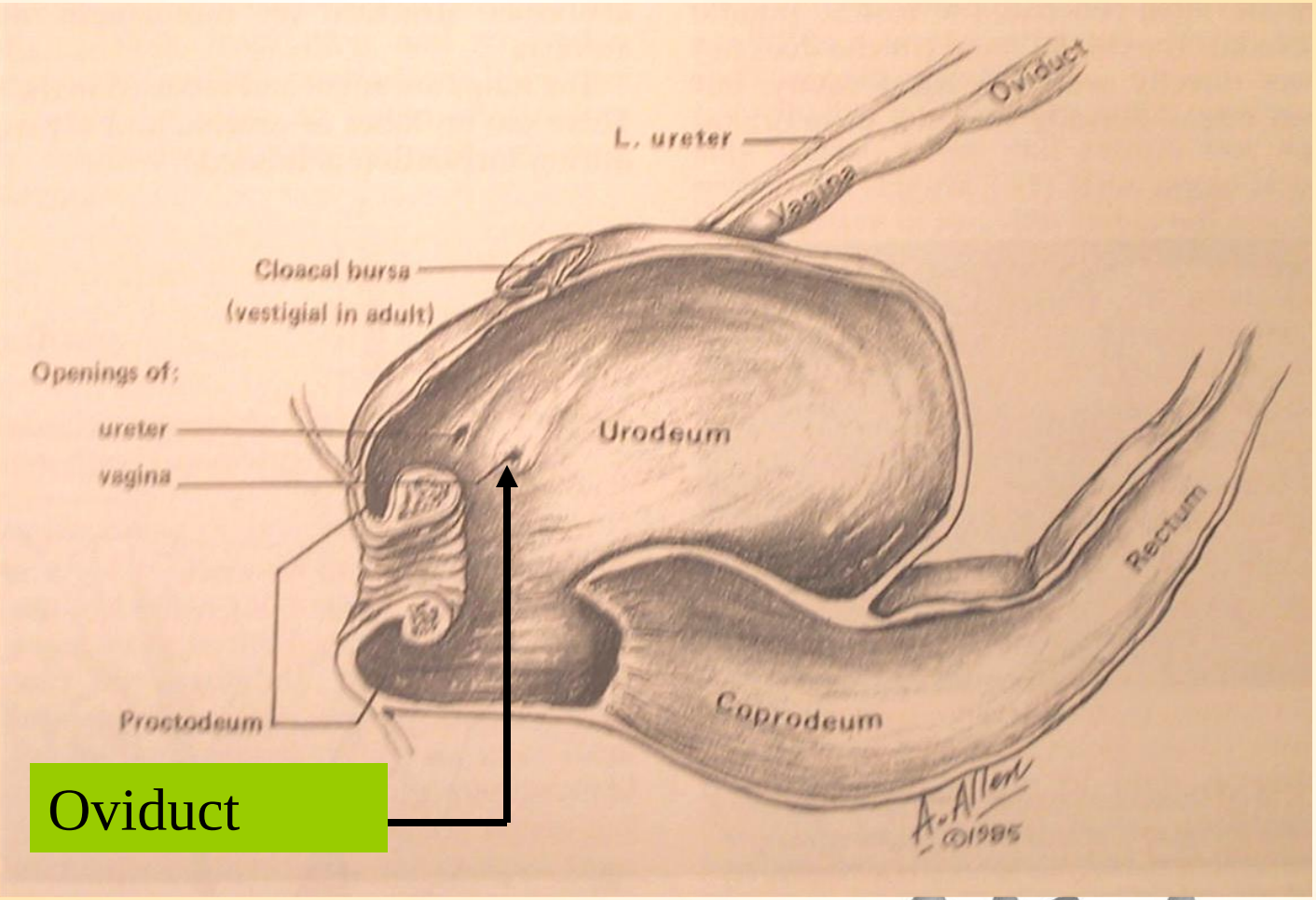


Cloacal Structure

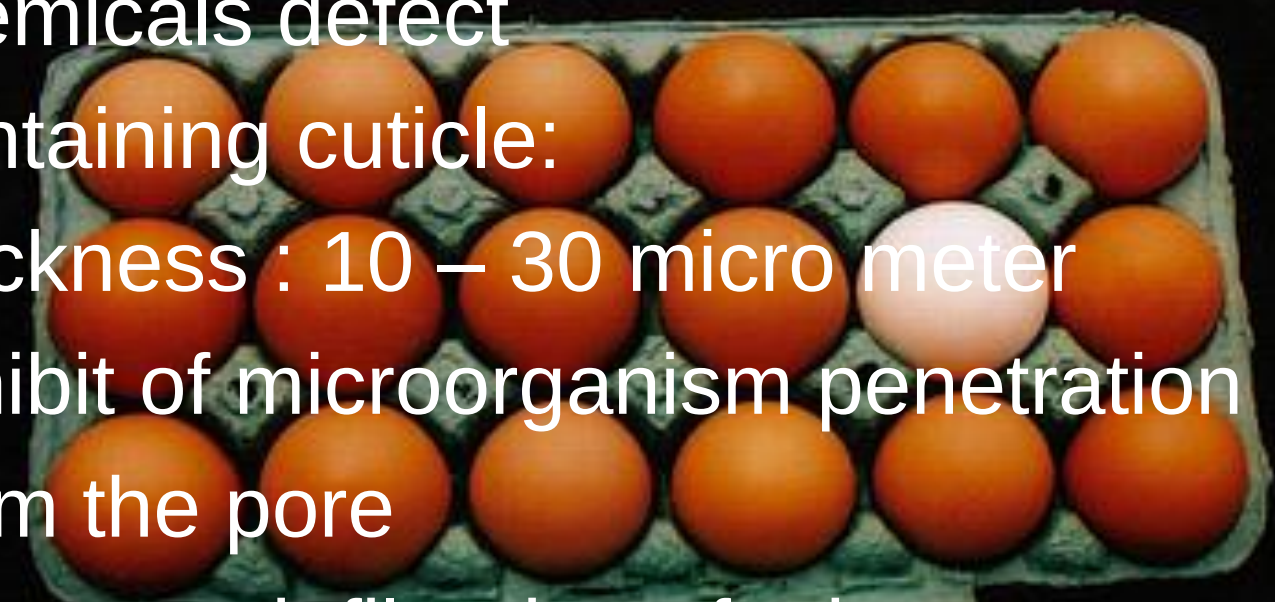


STRUKTUR & KOMPOSISI TELUR

1. Egg Shell
2. Shell membrane
3. Albumen (white egg)
4. Egg yolk

Kerabang/Egg shell (11%):

1. Hard, to coverage the content of egg and to protect the embryo from physical & chemicals defect
2. Containing cuticle:
   - thickness : 10 – 30 micro meter
   - inhibit of microorganism penetration from the pore
   - to protect infiltration of other agent from outer egg shell.

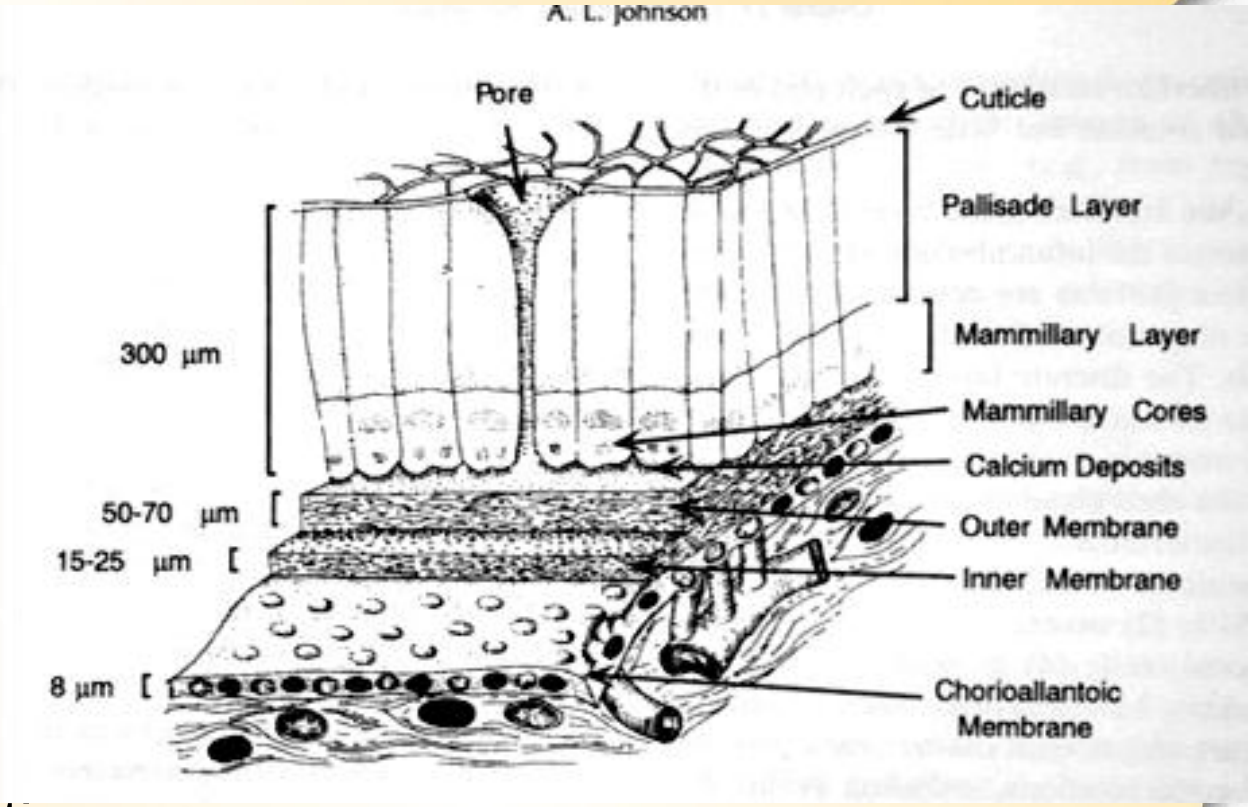


Egg shell (11%):

3. The pores content be variant : around 7000-17.000/egg, these function include:
   - respiratory: the embryo may breathe during incubation process
   - evaporate process
   - infiltration of outer liquor
   - the tickness depend on genetic factor, environment, temperature and diseases.
4. Pigment shell found in spongy layer
5. It consisted of: 94% Potassium Carbonate, 1% Magnesium Carbonate, 1% Calcium Phosphate, other organic component 4%

Cross-section of Egg Shell

- Membranes
- Pores
- Gas Exchange
  - Oxygen
  - Carbon Dioxide
  - **15% weight loss** during incubation
  - Related to incubation time (see tables)



Egg Shell Mebrane :

- Fibrous & harsh
- Compose of protein that similar as well as hair or feather
- Consisted of :
- - Inner shell membrane
- Outer shell membrane

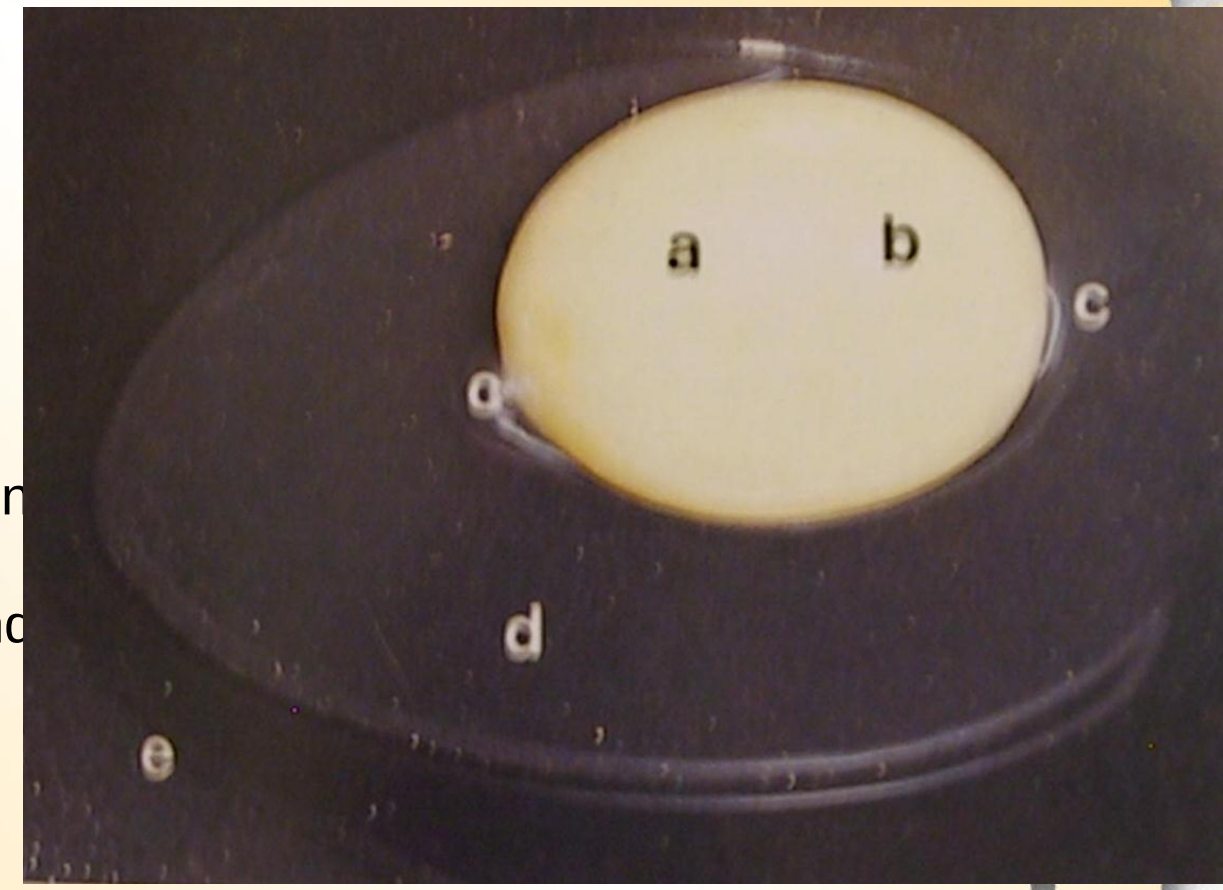
  Inner shell is thin down than outer shell

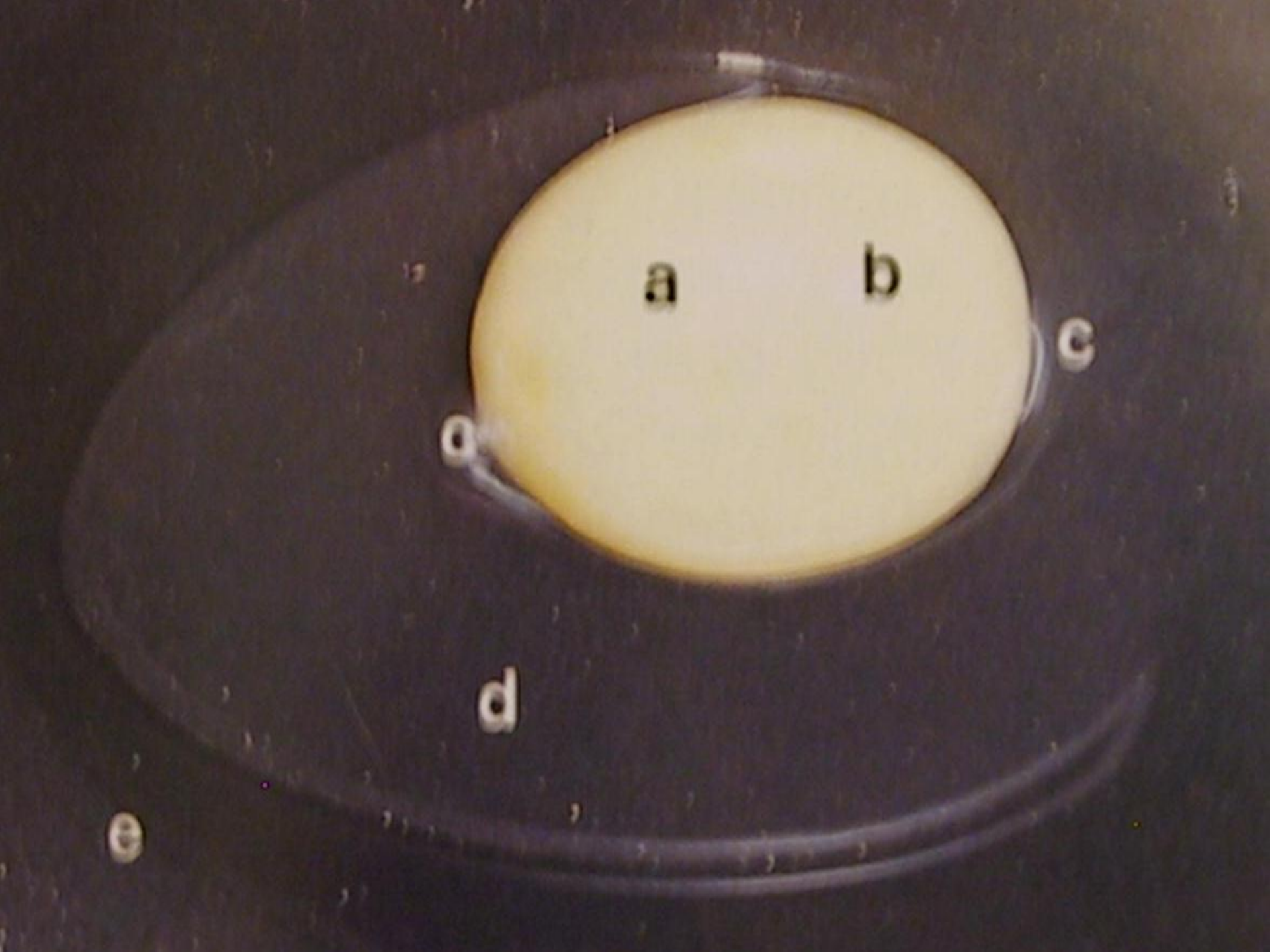
Albumen (58%):

- Chalazae (3% of albumen): smooth thin layer that conjunction with egg yolk and chalazae,
- Lapisan luar yang tipis dan encer (21% of albumen)
- Lapisan kental (55%)
- Lapisan tipis dan encer. Outer thin layer, conjunction with egg membrane shell

Albumin

- Four distinct layers
  - Chalaziferous - inner thick
  - Inner thin layer
  - Outer thick layer
  - Outer thin layer
- Protects yolk from invasion by microorganisms and provides water, protein and minerals to the embryo




a
b
c
d
e

Proteins found in Albumin

- **Ovalbumin** (54%): source of amino acids
- **Ovotransferrin** (13%): iron chelator -- prevents bacterial growth
- **Ovomucoid, ovoglobulins, avidin** comprise the remainder
  - **Avidin** is a biotin inhibitor - reduces bacterial growth

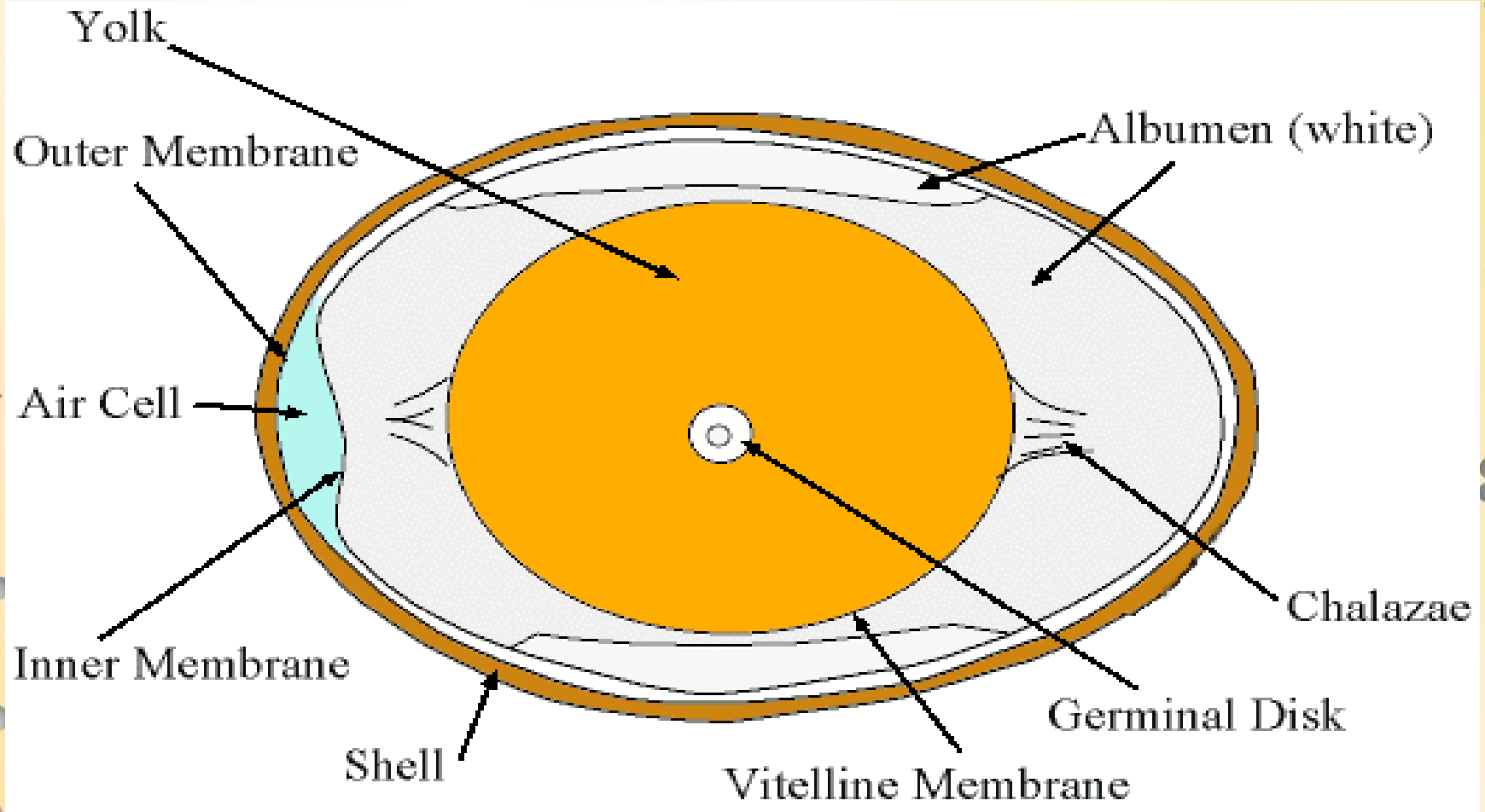
Egg Yolk (31%):

1. Latebra : The junction between discus germinal disk with egg yolk
2. Germinal Disk: Blastoderm stage of ovum cell
3. Concentric Ring of egg yolk
4. Vetelinne membrane : transparent membrane around egg yolk

Yolk

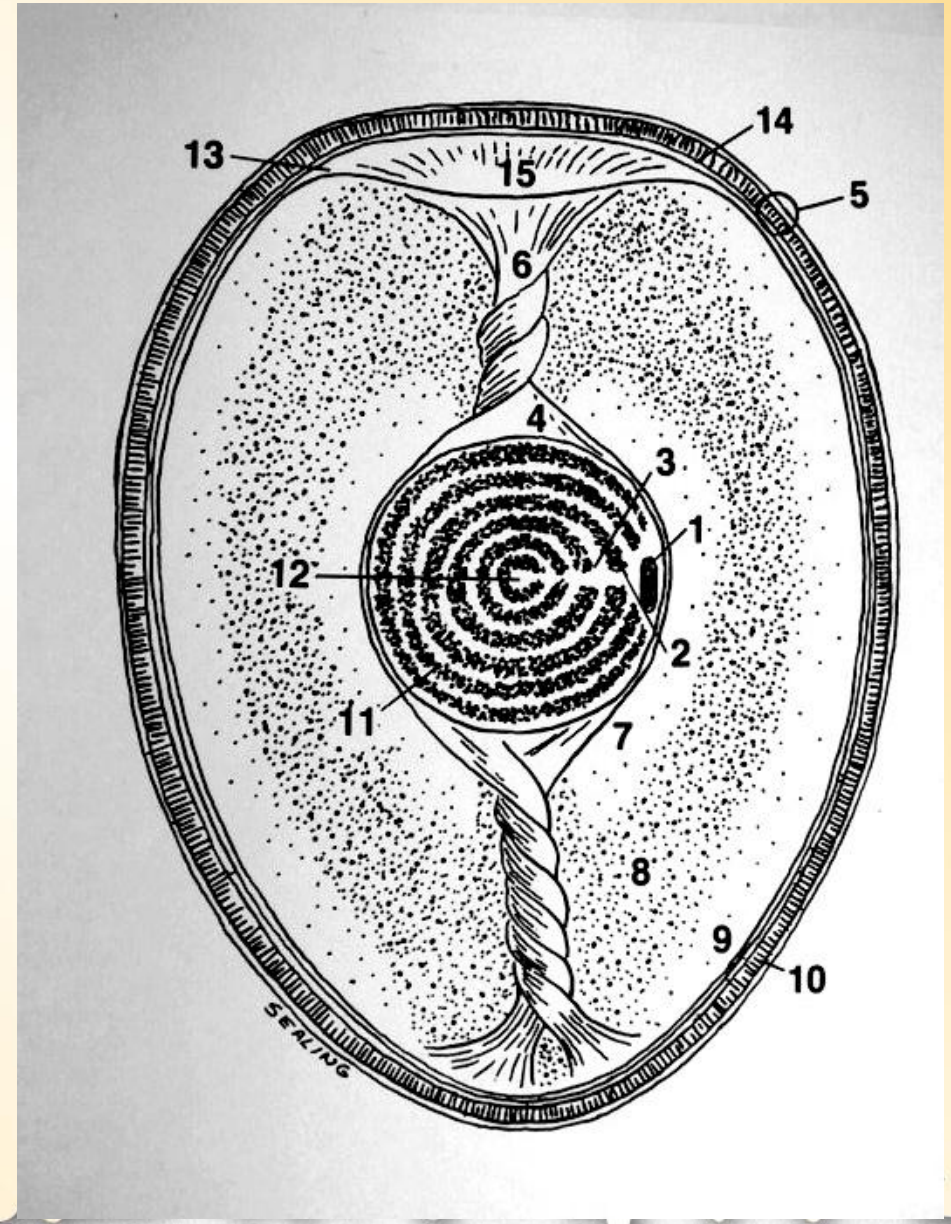
- Formed in the liver, transported to ovarian follicle
- 33% lipid
- 19% protein
- 48% water
- Layed in concentric layers

Egg Composition



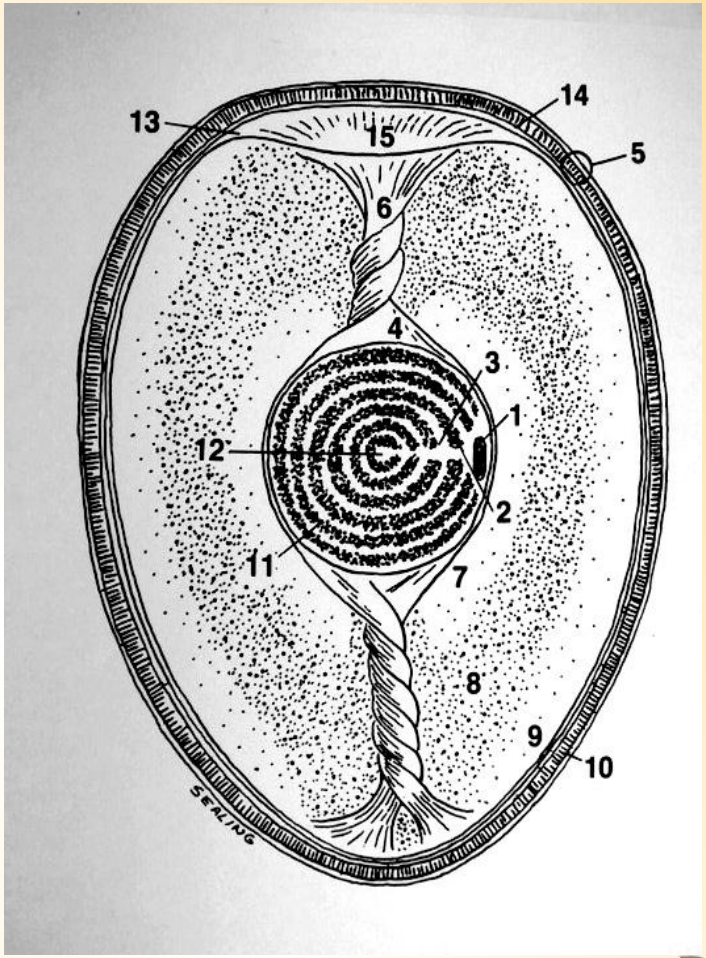
Chelaziae

- Twisted fiber-like structures at each pole
- Hold yolk in place inside the egg
  - permit limited rotation
  - inhibit lateral displacement

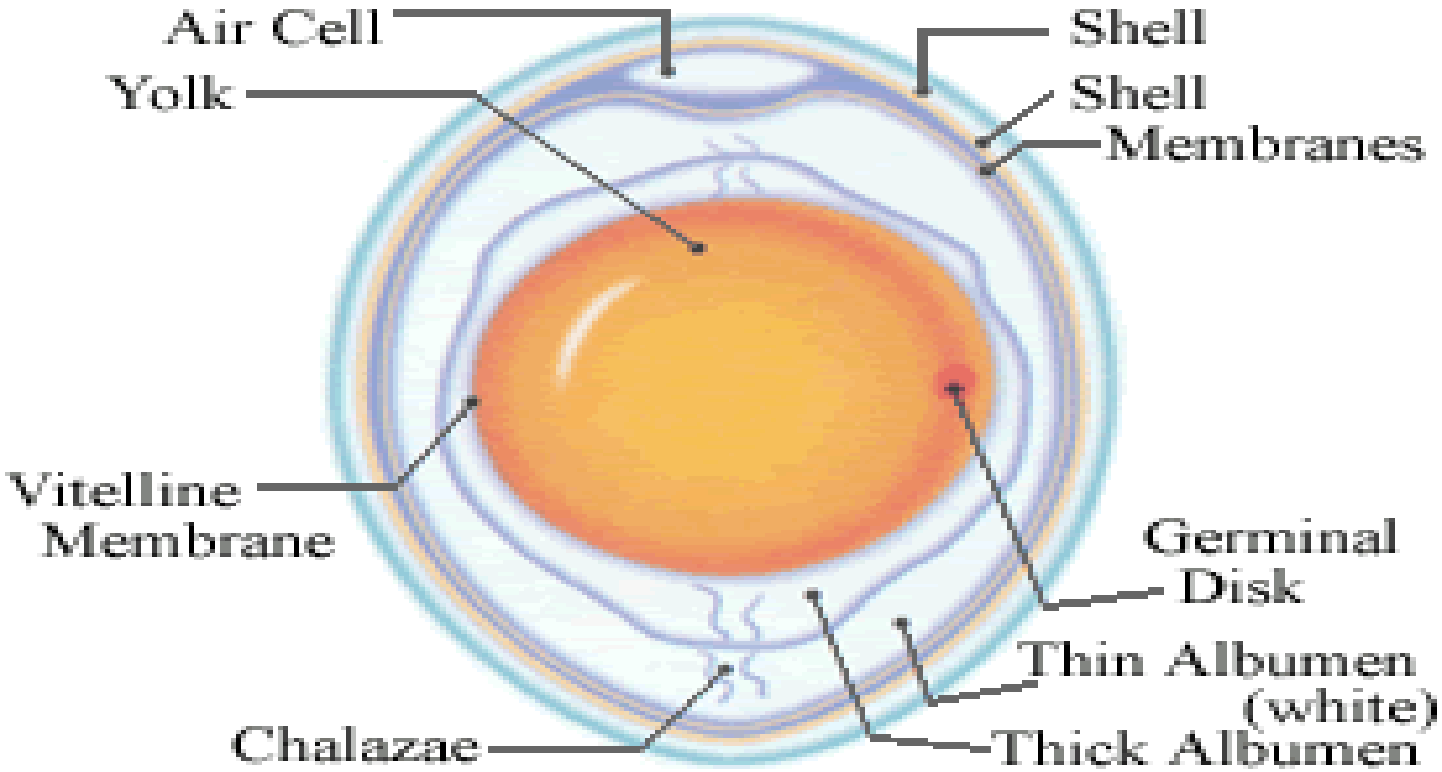


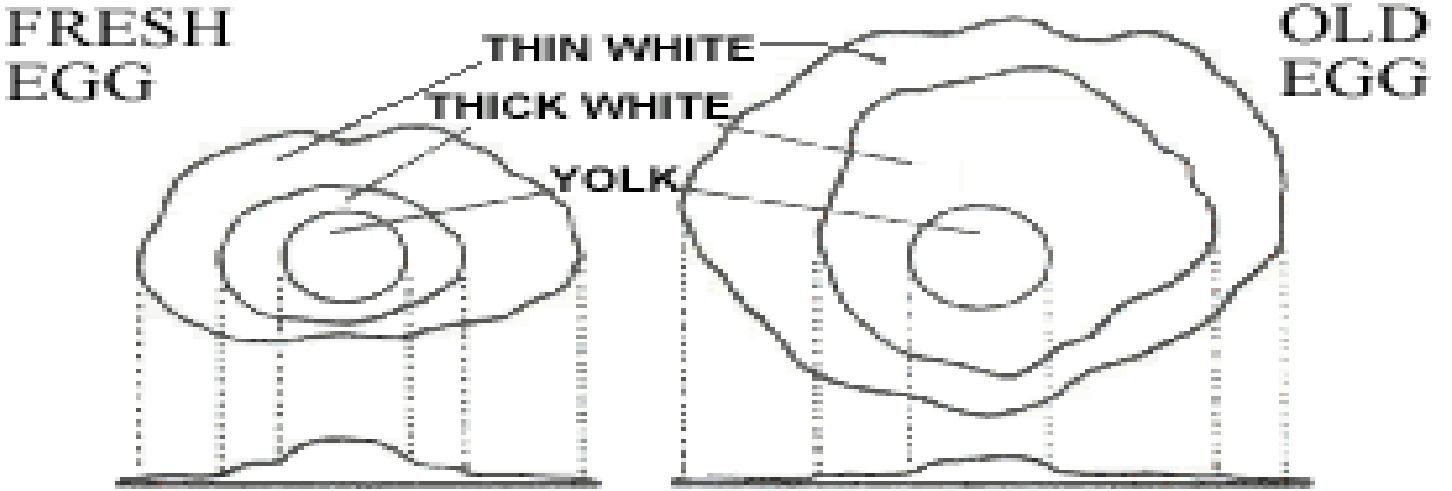
Anatomy of the Egg
Seven Components

- Yolk
- Albumin
- Membranes
- Chelazia
- Chorioallantoic Membrane
- Air Cell
- Shell



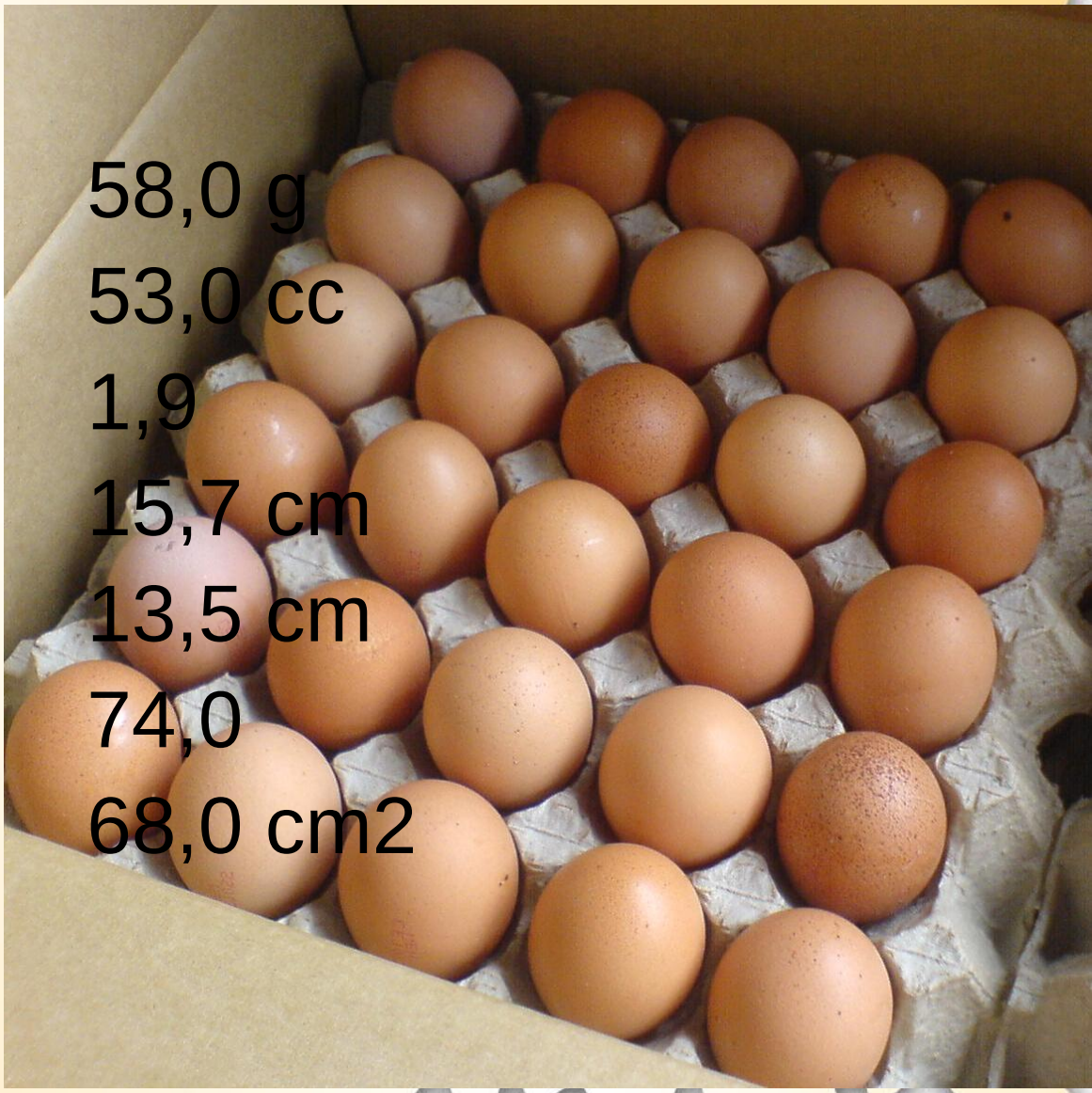
EGG STRUCTURE





Standar Telur Ayam Konsumsi

- Berat 58,0 g
- Volume 53,0 cc
- Berat Jenis 1,9
- Keliling panjang 15,7 cm
- Keliling pendek 13,5 cm
- Indeks bentuk 74,0
- Luas area 68,0 cm2



Bentuk telur dapat dinyatakan dengan indeks bentuk = keliling

$$\text{indeks bentuk} = \frac{\text{keliling lebar telur}}{\text{Keliling panjang telur}} \times 100\%$$

74 ; ujung runcing pada satu sisi, tumpul pada sisi lainnya

Chemical Composition :

	%	Moisture	Protein	Fat	Ash
Egg	100	65,5	11,8	11,0	11,7
Albumine	58	88	11,0	0,2	0,8
Egg Yolk	31	48	17,5	32,5	2,0
Egg Shell	11	1,6	3,3	0,03	

Composition of Egg yolk

- Protein of egg yolk :

  - ovovetelin : 2,4 gr (75%) as phosphoprotein / protein containing P

  - ovolivetin : 0,7 gr (25%), sulfur content is high

- Egg yolk : - Glyceride
  - Lecithin
  - Cholesterol

* Pigment of egg yolk : Xantophyle

Composition of albumen

- Protein :
  - Ovo albumen: 75%
  - Ovoconalbumen : 3%
  - Ovoglobulin: 2%
  - Ovo mucoid
  - Ovomucin
- Vitamin : riboflavin/ slightly green

Composition of Eggshell

- **Consisted of: Shell dan shell membrane**
- **Outer layer: cuticle**
- **Protein : collagen/ similarly with bone protein and cartilage**
- **Ca CO3 : 94%**
- **Mg CO3 : 1%**
- **Ca PO4 : 1%**
- **Organic matter : 4 %**
- **shell Membrane :**

- 4-5 % of the weight of egg shell

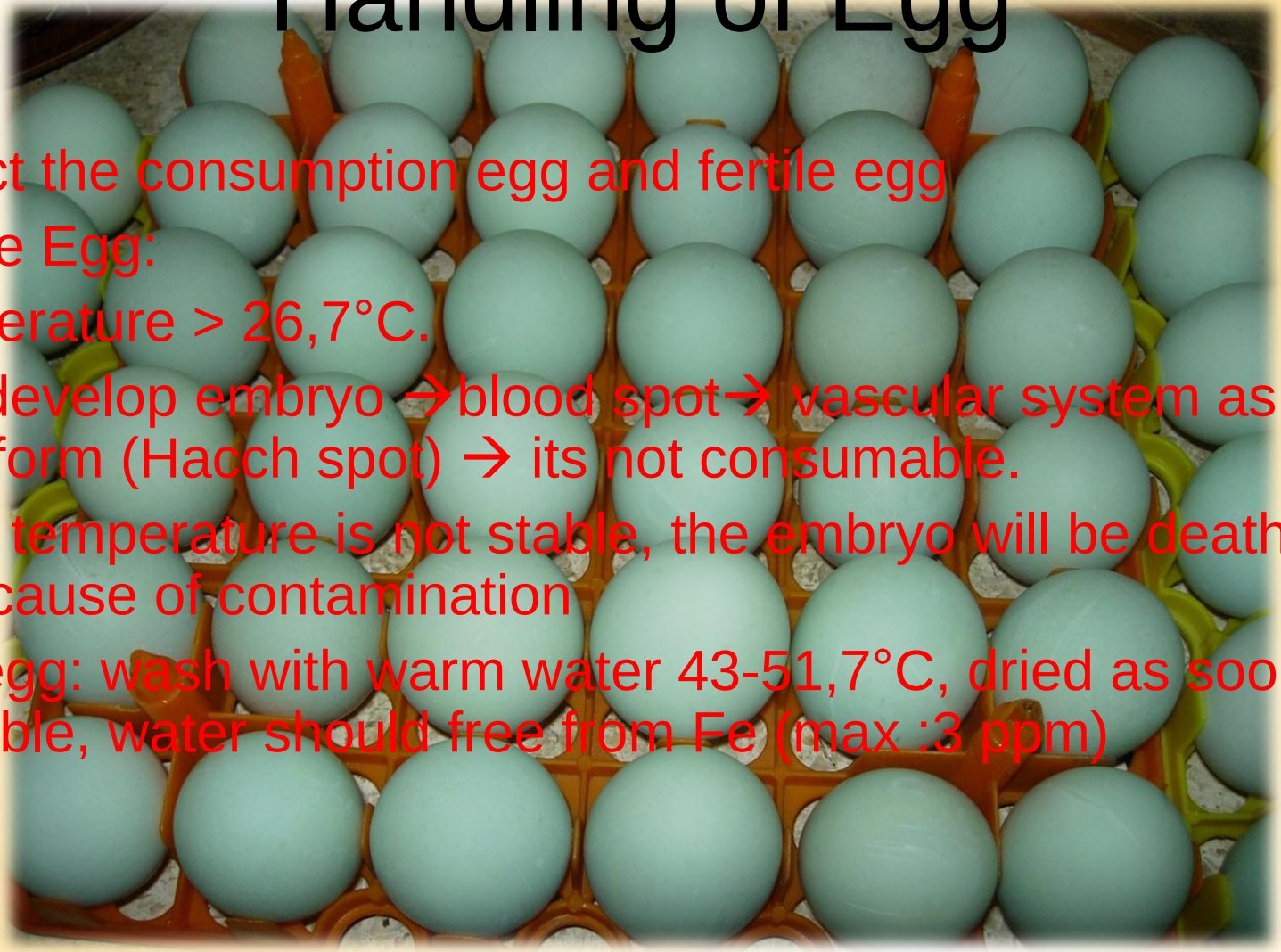
- containing: protein, water & mineral

- Protein : ovocreatine, with sulfur content about 1,5 – 3 kali higher than sulfur content in albumen

Composition of Water Fowl Egg

- Duck, Goose, Manila Duck (Entok)
- Moisture content slightly lower
- Fat content is higher
- Ducks need slightly higher temperature for embryo development

Handling of Egg



- Select the consumption egg and fertile egg
- Fertile Egg:

- temperature > 26,7°C.

The develop embryo →blood spot→ vascular system as bee nest form (Hacch spot) → its not consumable.

- If the temperature is not stable, the embryo will be death →because of contamination

* Dirty egg: wash with warm water 43-51,7°C, dried as soon as possible, water should free from Fe (max :3 ppm)

Damage Egg

1. Reduce of weight of egg:
   - evaporation
   - Size of air sac
   - Temperature & humidity during storage

   frozen → evaporate

   penetration of microorganism

   ventilation

   porosity of egg shell (evaporation, contamination of m.o.)

2. Pengenceran
   - Putih telur tebal turun : serat gliko protein ovomucin pecah
   - Ukuran yolk bertambah : perpindahan air, krn tekanan osmose
3. Kehilangan CO_2
4. Turunnya Berat jenis telur : air cell bertambah
5. Kenaikan PH
   - Baru : 7,6 – 8,2
   - Lama : naik, krn kehilangan CO_2 (= peningkatan konsentrasi ion Hidrogen)
   - CO_2 cenderung membentuk keseimbangan antara konsentrasi dalam telur dengan udara sekitarnya)
6. Dekomposisi bakterial : Naik , bila lembab dan temperatur tinggi
   Pseudomonas : bau busuk, pigmen yg menyebar melalui albumen

Thanks a lot