SEP 12 1972

In Mid Micro course
notes. 1945
(First of to six 7/10/45)
see last page. ±
note juxtaposition of yeast life cycle
dissociation .... Kohn + Harris

7/9 [1945]

Bacteria are
microsc. plant-like microorganisms ~~s~~ chlorophyll
Repr. by binary fission.

Morphological differences - Microscopic developments
cocci
~~bacilli~~
rods
spirilla.

Light
Electron
Dark field

Size variation considerable
Neither chitin nor cellulose.

Nucleus - debatable.

Some species show granules - volutin
metachromatic
polar etc.

" " " capsules. Usually assoc. c̄ high virulence.
are immune - specific. SSS.

Motility - flagella found on some rods + spirilla.

Spores - some rods. A 'resting' stage

Sex ? Gram stain mechanism
1. Physical - cortical region sp.
2. Phys-Chem. - Strains + Strains IEP
3. Chemical - spec. Dens zen.

Colonies - descendants of single cells.
two types S, R

Pleimorphism - Löhnis -
Mellon

Variation in Bacteria

Hadley. Micr. Dissociation.

a. life cycle - incl filtrable phase.

Clinically important - S. e.g. being pathogen - virulent.

Exc. anthrax.

R-S transition Reversibility.

~~Lacd~~ L. acidophilus. (R).

Accultivation, S may be obtained. Irreversible.

Transmutation, ex. Pneumococci.

cit. Avery et al., Dawson, etc.

Bacteria - chemistry. Eschericia coli. 7/10

1. Water
2. Ash 2-13% K = 13% Na = 2% Cl = 0.
3. Proteins - 8-15% Arginine, Hist, Lysine, Tyrosine
   - Nucleoproteins enzymeproteins (apoenzymes).
4. Carbohydrate - cellulose?
   SSS
   ribose in complexes

Growth cycle lag, log, late phases
bases - space ??
(glucose? distinctive).
Autotrophs + heterotrophs -

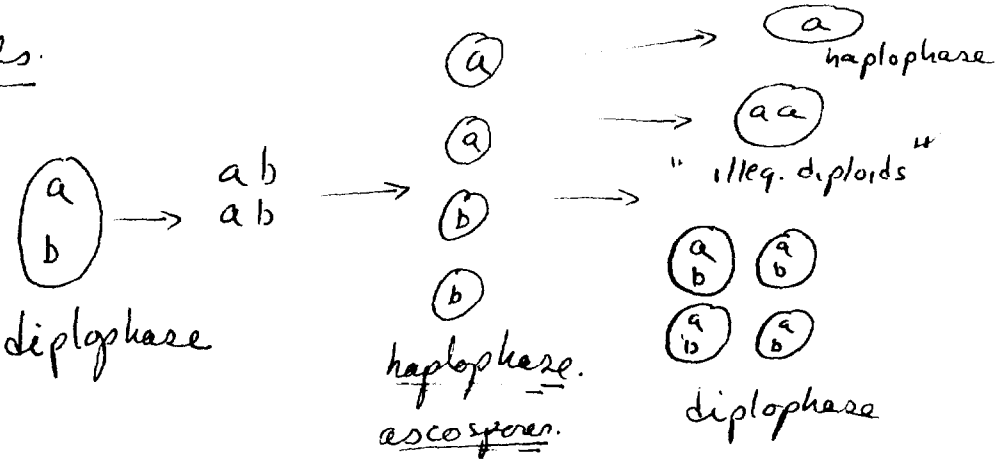
Final bacterium may contain more G.F. than is provided by medium ! ~~[illegible]~~ implies "adaptation" regularly.

Extracellular reactions, - hydrolyses

Intracellular . . . . . .

Life cycle of yeasts.

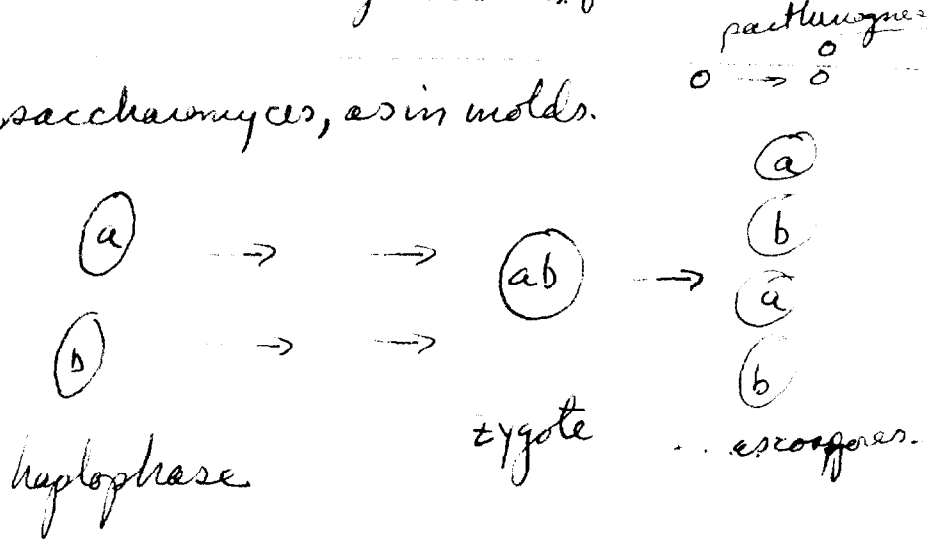
Saccharomyces.



Parthenogenetic formation of ascospores claimed by Guilliermond.
No essential sex differentiation.
Single ascospore isolation can yield normally sporulating cultures.

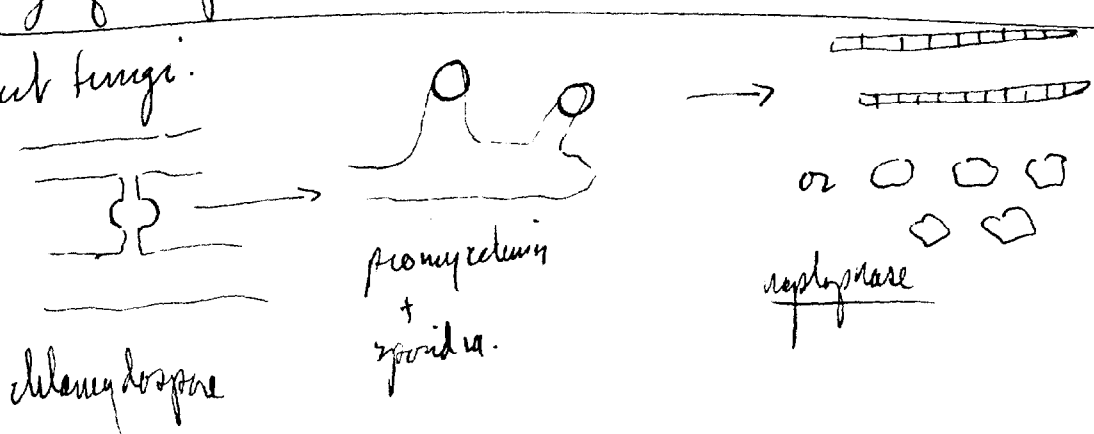
Winge — vs Lindegren on regularity of illeg. diploids (single ascospore cultures) and fertility of their ascospores.
germination

By Schizosaccharomyces, as in molds.



Mating types?
Size of ascospores?

Smut fungi.

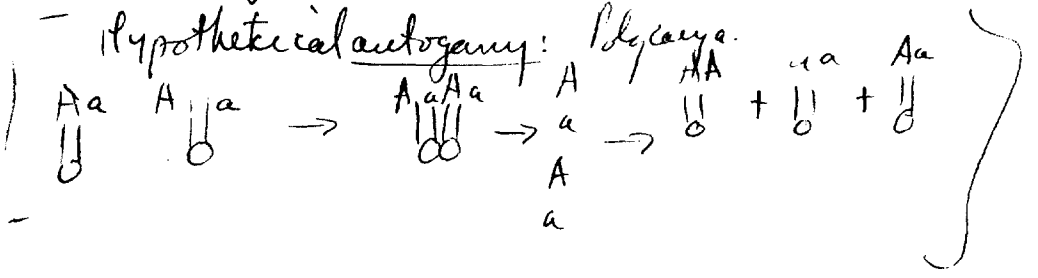


Variation.

"type" forms.

Isolated observations contemp. c̄ Koch. Koch maintained a strictly monomorphic

– Hypothetical autogamy: Polycarya.



Only reasonable classification is etiologic. Of recognized causes of death

Exogenous.	Animate	42.7%
	Inanimate	22.3%
Endogenous. – unknown (Idiopathic!)		35%.

Mechanisms of disease: Infection: Df. process by which (parasitic) organisms gain entrance to a susceptible host, causing injury + giving rise to a reaction. Saprophytes vs parasite:

a. Thermophilic – capable of growth at 37° as in T.B.

Pathogenicity is "adaptation" Many lose "virulence" on artificial culture. Response mechanism? e.g. B. pestis. Some maintain virulence B. typhosus

b. ~~Hosp~~ Host specificity.

c. Growth rate. – incr. in virulence as serial transfer during log phase.

aggressin + organism → virulent organism?

Wash organism.

Dosage - variability.

General host reactions.

1. Incubation period - apparent even in toxin.

2. Fever

3.

Mechanisms of resistance.

Nutritional variation in E. coli.

1. Test strain – Inoculate a ~~known~~ type strain into Basal medium.
   Carry through 5 transfers.

2. Isolate – Plate out from minimal. Select a small colony, cultivate in Basal
   on to basal agar.

3. Repeat isolation, select a colony, prepare agar slant for storage
   inoculate into basal. = T_0

4. Serial transfer through SA and dl-methionine, A, B, C, D, E. – varying proportions. Transfer every 48 hours, from ~~tube~~ lowest tube (X) showing visible turbidity to ~~all~~ + higher tubes, and to basal. When inocula do not grow in basal medium, variation has been achieved. Concurrently, transfer serially through methionine alone. (M)

5. After inoculation from a culture, store in vitro. After variation is established, plate out ~~pure~~ previous transfers to test their homogeneity.

6. Test variant for methionine requirement
   " adaptation
   " quantitative response to methionine
   " specificity of response.

Regeneration of Tissues

a. Skin. Edges of [illegible] epidermis elaborate outgrowths on [illegible] surface of fibrin, [illegible], later thickening, later [illegible] papillation. [illegible] (.) Regen. in complete. Crim., C.T. irregular + densely bound, is adipose.

b. Sk Muscle – At cut end of fiber, cytoplasm nucleus; muscle accumulate in bud. Bud grows [illegible] (compare c̄ embryonal muscle cell). [illegible] peripherally striae develop.... [illegible] develop the bud c̄ collagen.

c.) Card. Muscle – very slight ability for regeneration.

d.) Nerve. Glia very proliferative. Neurons do not multiply. Functional substitution. "Associated c̄ structural complexity of cell" Cell cannot withdraw its processes. [illegible] of nerve processes. May be blocked (neuroma) [illegible]

e.) Kidney – If tubule is destroyed, no reformation. Glomeruli are not neo-formed. If a few cells are destroyed, rest of tubule can growth tonon. – flat, low cuboidal cells....

f. ~~[illegible]~~ Liver – Wax-plate reconstructions may indicate some budding off of new lobules – (where [illegible] [illegible])

Central necrosis – replacement very rapid [illegible] "New cells more resistant to CCl_4" – as ceiled to "anaplasia" [illegible]?

Intestine. — as shown, folds form, p[illegible]
[illegible] redundancy. [illegible]
down to muscularis; muscularis externa
does not regenerate.

Bone:

Problems:

1. Staph transformation, independence of a) pigment
b) antigenic formula (ABC?)

2. Growth vs Differentiation – Growth "energy"

3. Is differentiation the acquirement of new forms or the loss of most of the [illegible] repertoire c̄ the exaggeration of some part. Is not the "primitive" cell a composite of all structures + functions of mature, "differentiated" cells.

4. Sex in bacteria: If stable mutants are available, for two deficiencies, incubate together in a) minimal b) partial c) complete media. Plate out old cultures on minimal agar. Compare frequency of survivors c̄ that of individual old cultures. (Compare Sherman + Wing) Test for transformation by broth filtrates or killed. Because of selectivity, this is a preferable method, if stability can be achieved.

[One can also ~~pref~~ perform the comparable test of antigen inheritance, particularly c̄ independent alleles.]

If the frequency of recovery of ++ is significantly greater than

① / must be Burnet + McKie '79

Byatt is 1948

APR 17 1973
cc: Cooper