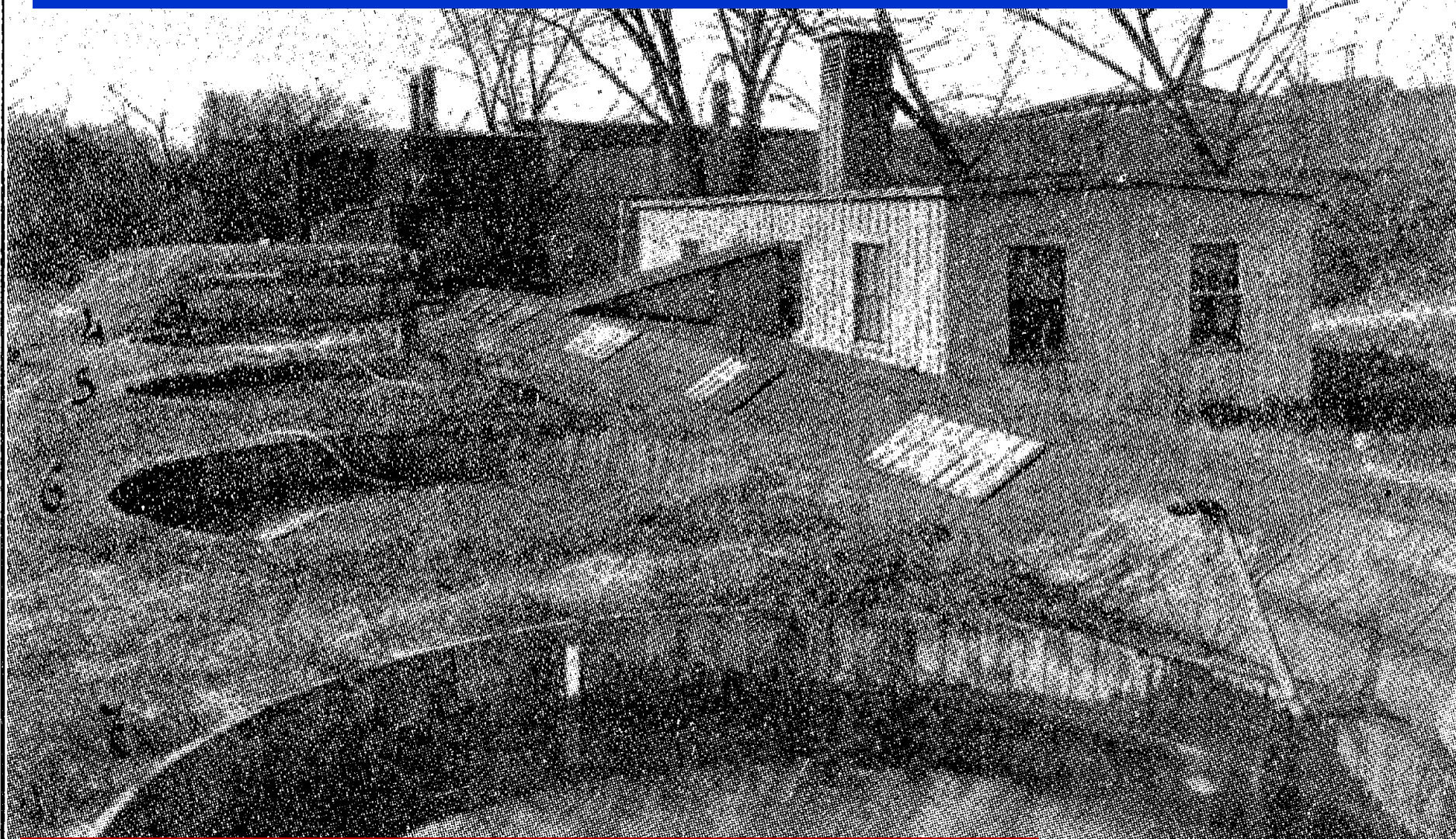


Media Filter Treatment Mechanisms and Applications



Colin Bishop, REHS, RS

Lawrence Experiment Station, 1909



Trivia: Who ran the station?

Community Sand Filter Massachusetts



FIG. 37.—View of Sand-filter Beds for Village in Massachusetts.

Community Sand Filter Illinois

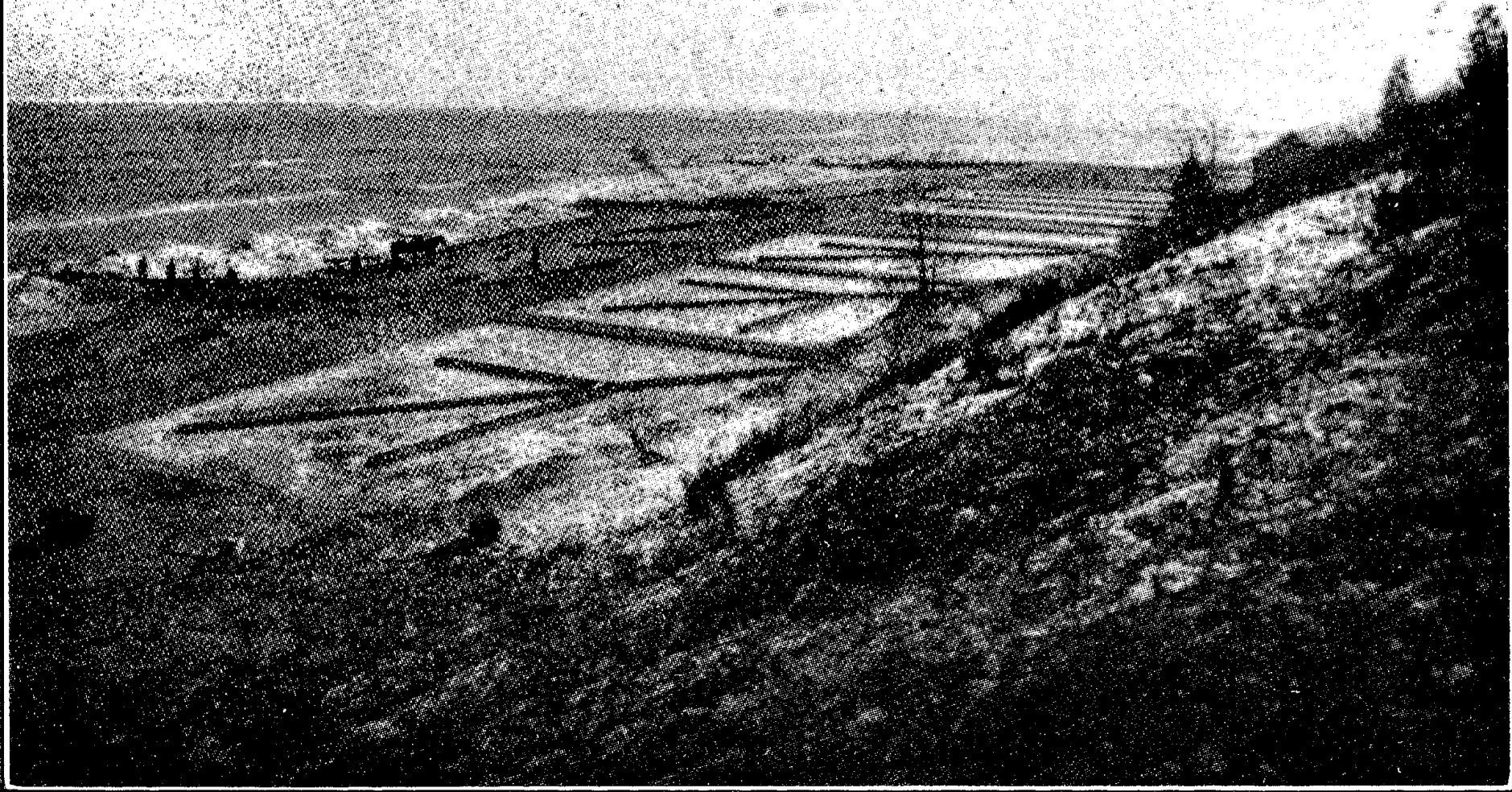


FIG. 68. General View of Intermittent Filters at Lake Forest, Ill.

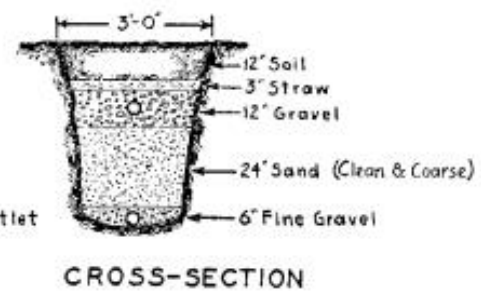
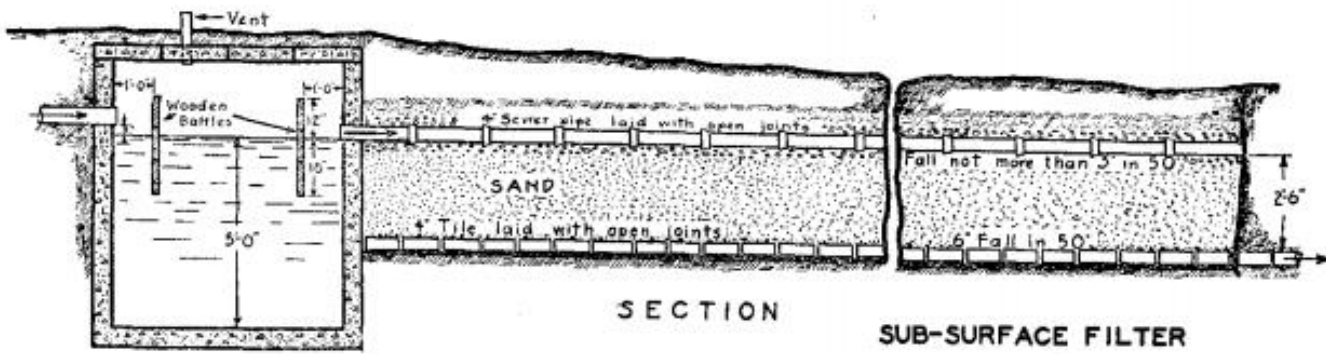
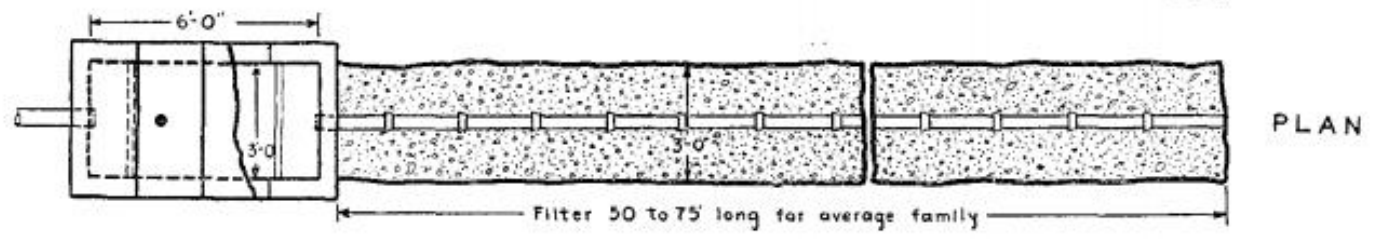
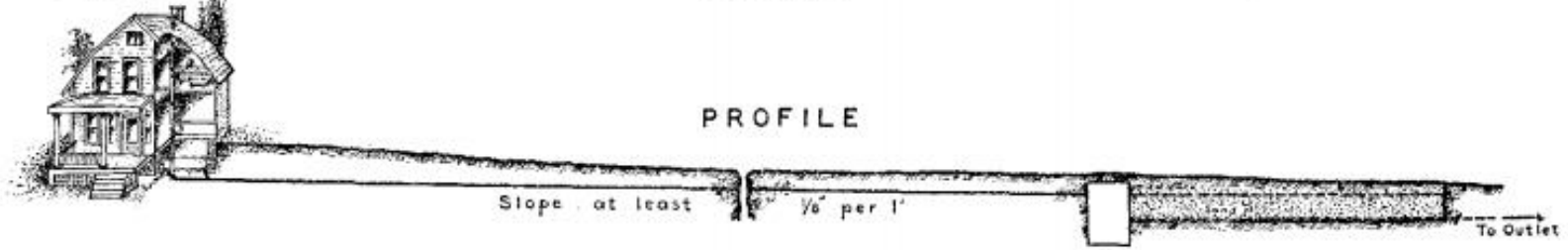
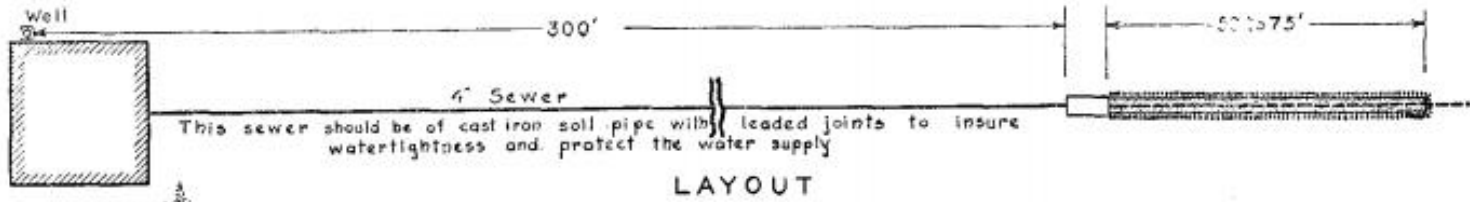
Polishing Sand Filter Ohio Camp



Polishing Sand Filter Ohio Camp

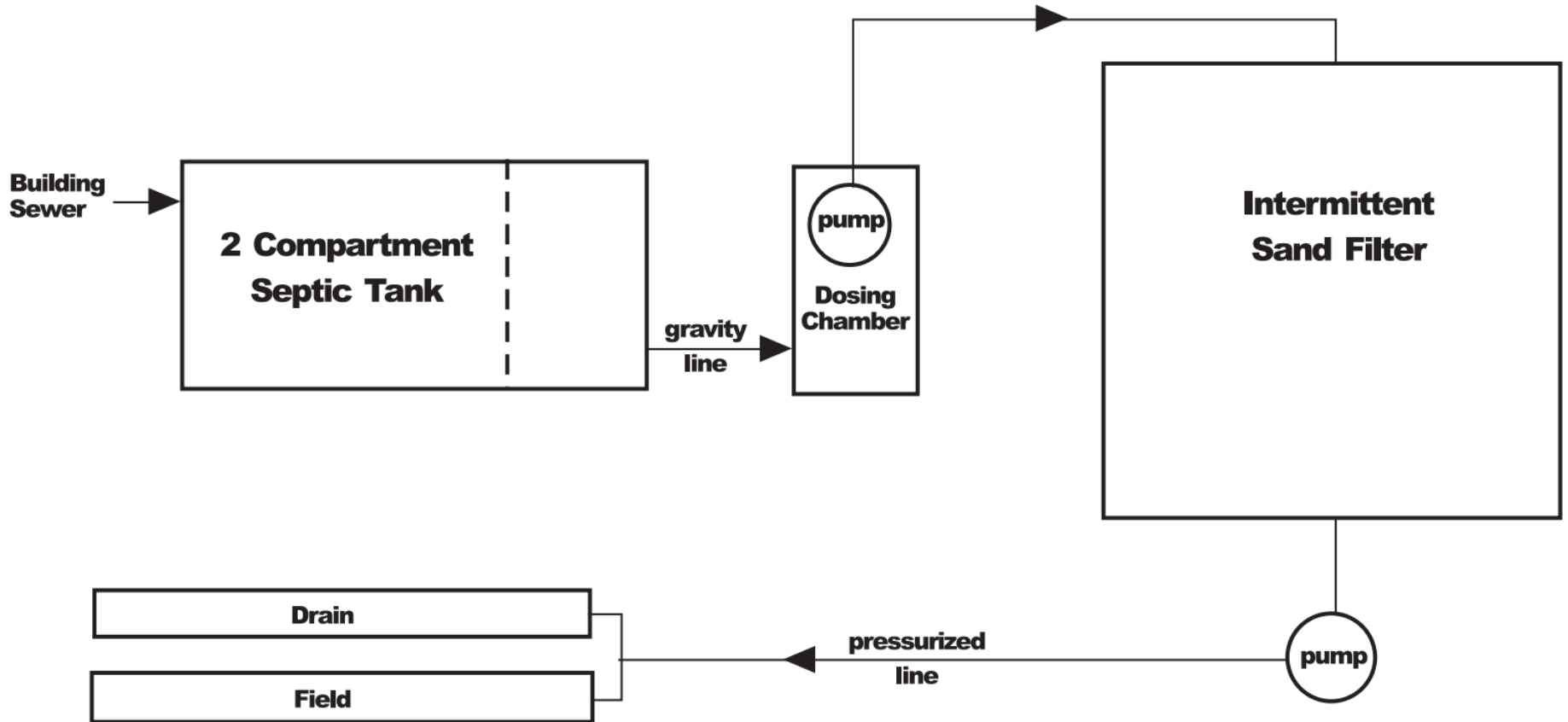


1938 Ohio Bulletin

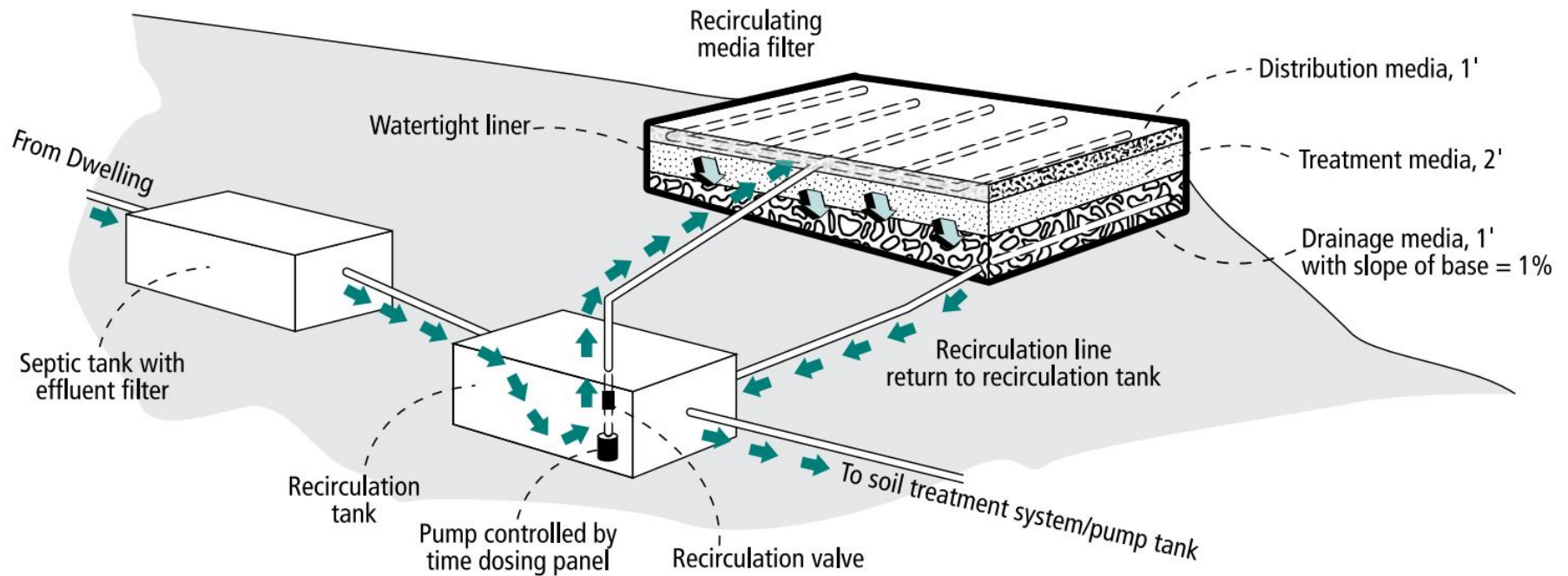


SETTLING TANK

Single Pass



Multiple Pass (Recirc)



Habitat

Goal?

**OPTIMIZE
MICROBIOLOGY**





Achieving Balance Nature's Way



C-N-P = Food



Food Source



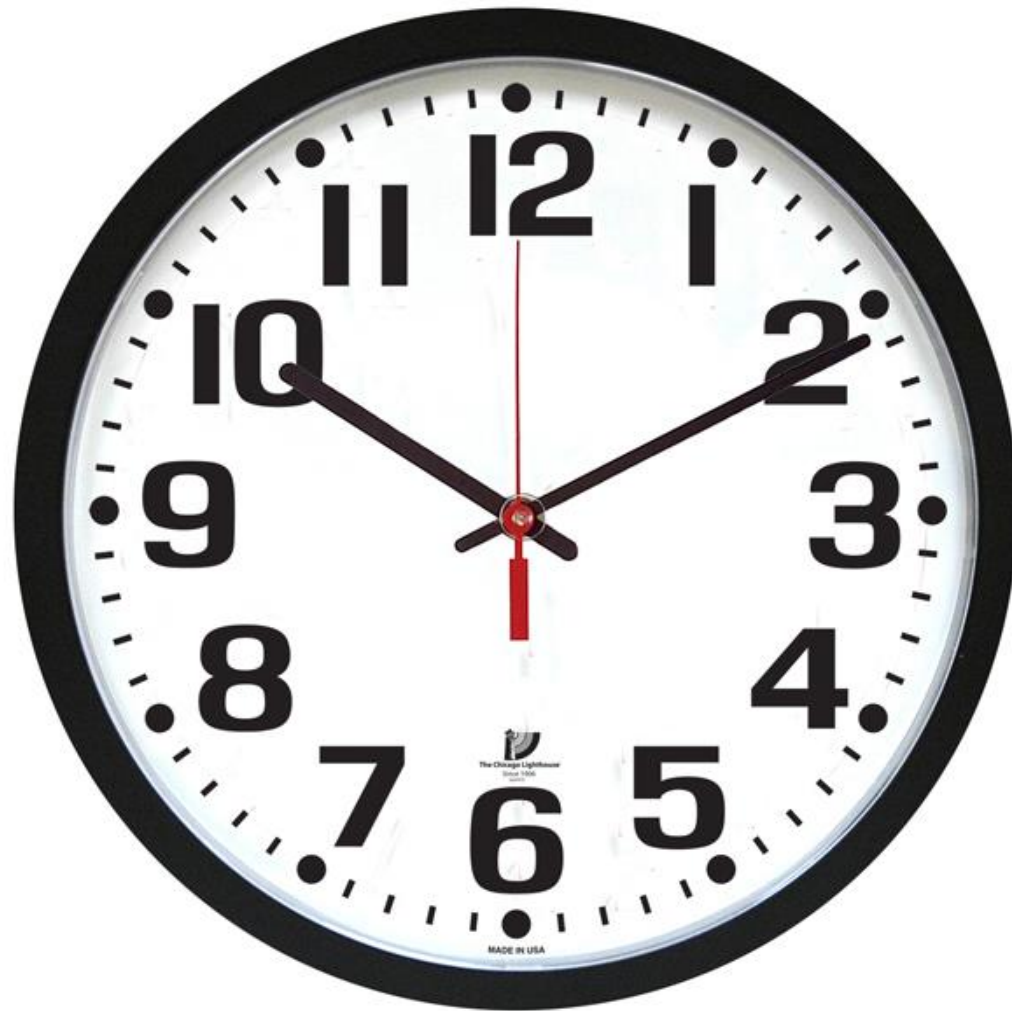


Water

pH and Alkalinity



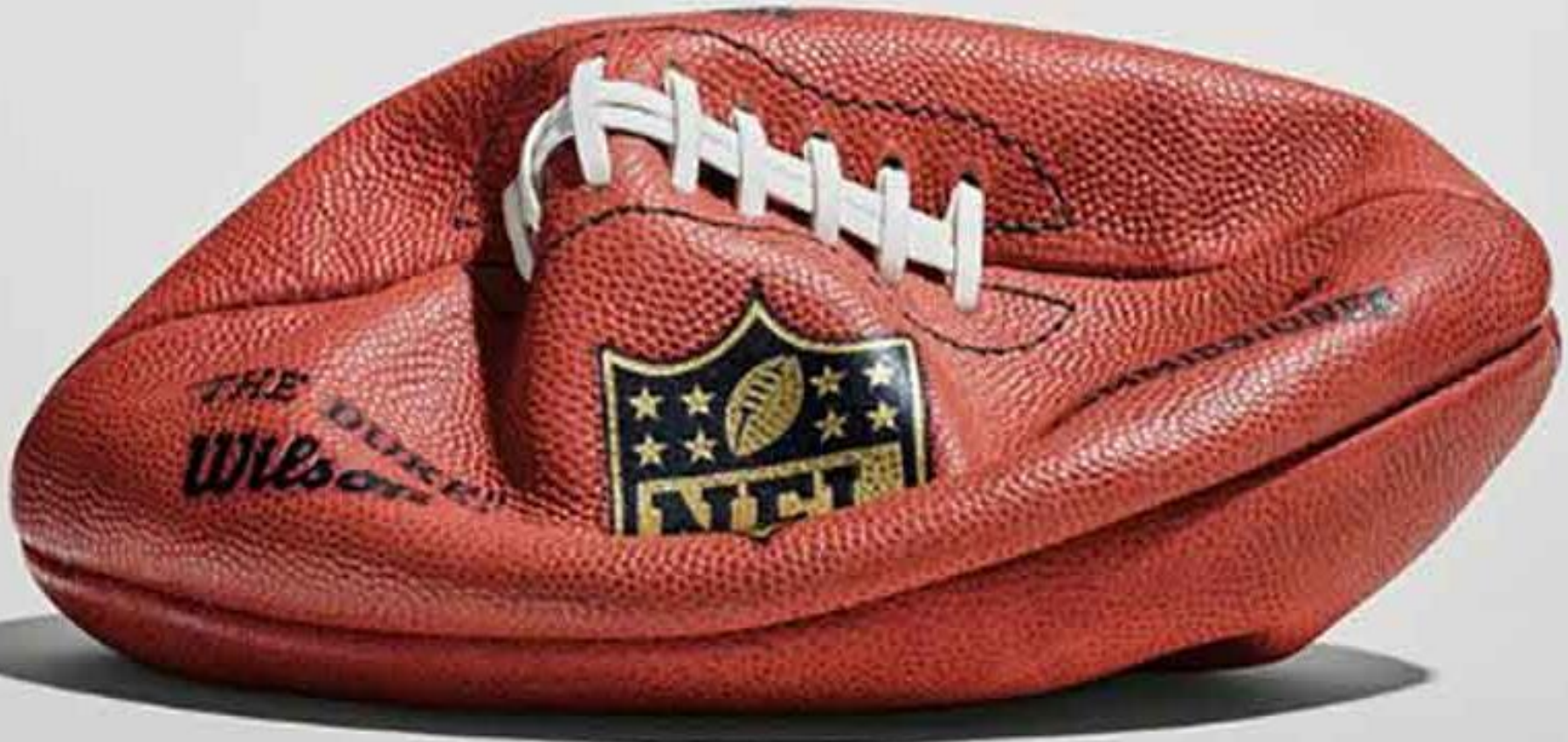
Time





**Oxygen
Aerobic**

No or Low Oxygen



Anaerobic or Anoxic

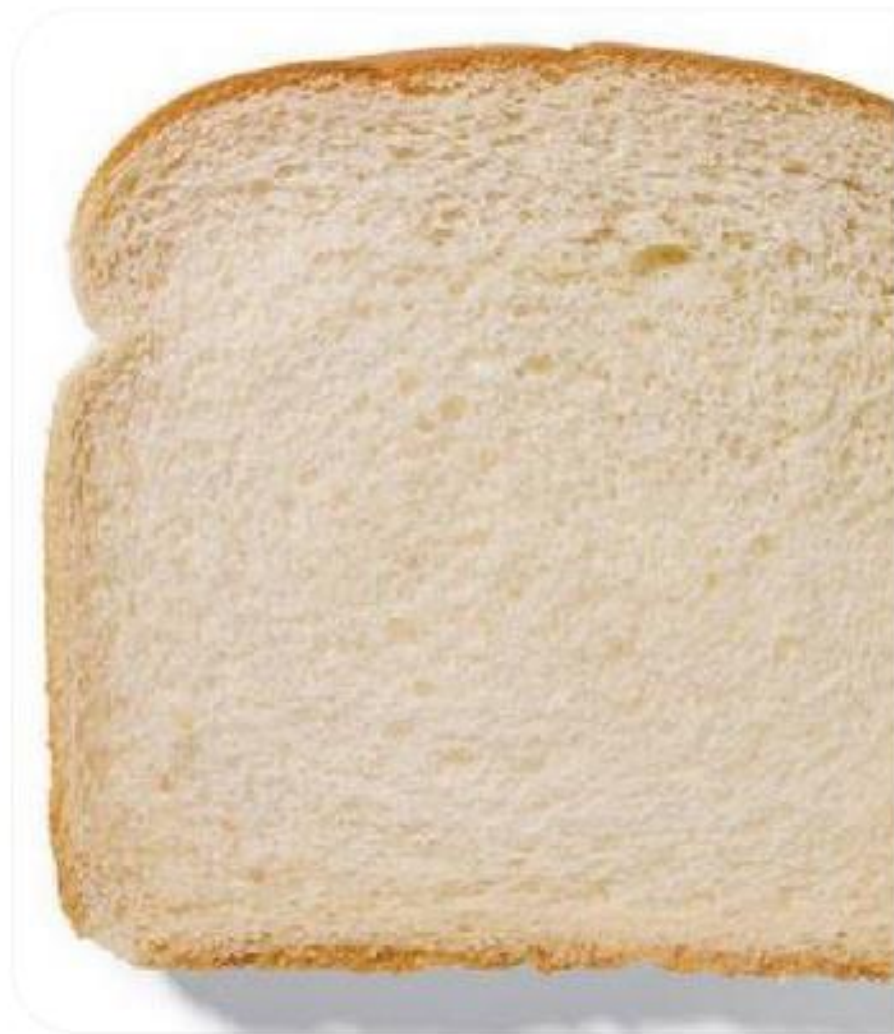
Intermission

- **The digital world...**
 - **Everyone's an expert chef!**
 - **Have you seen the “follow me for more recipes”?**

follow me for
more recipes



Follow me for more recipes.



Follow me for more recipes!



Follow me for more recipes!



Media Filter Summary

- Fixed in place in container
- Types → natural or synthetic
- Effluent delivery mechanism
- Drainage system
- Venting

Key Media Properties

- Loading GPD/FT² and GPD/FT³
- Surface area
- Volume and depth
- Void space
- Water holding capacity



Natural Media Types



Natural Media Types



Natural Media Types



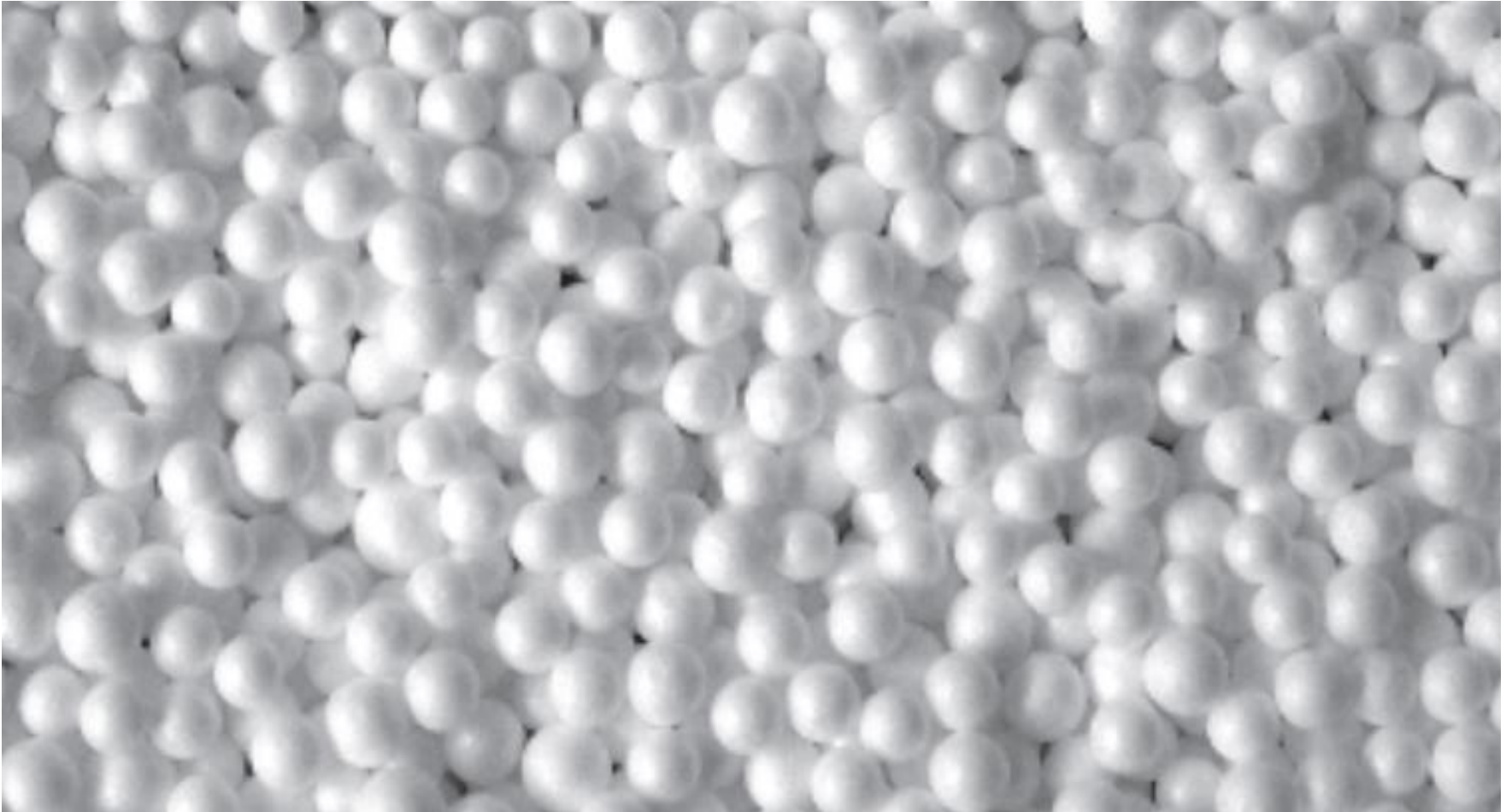
Natural Media Types



Synthetic Media Types



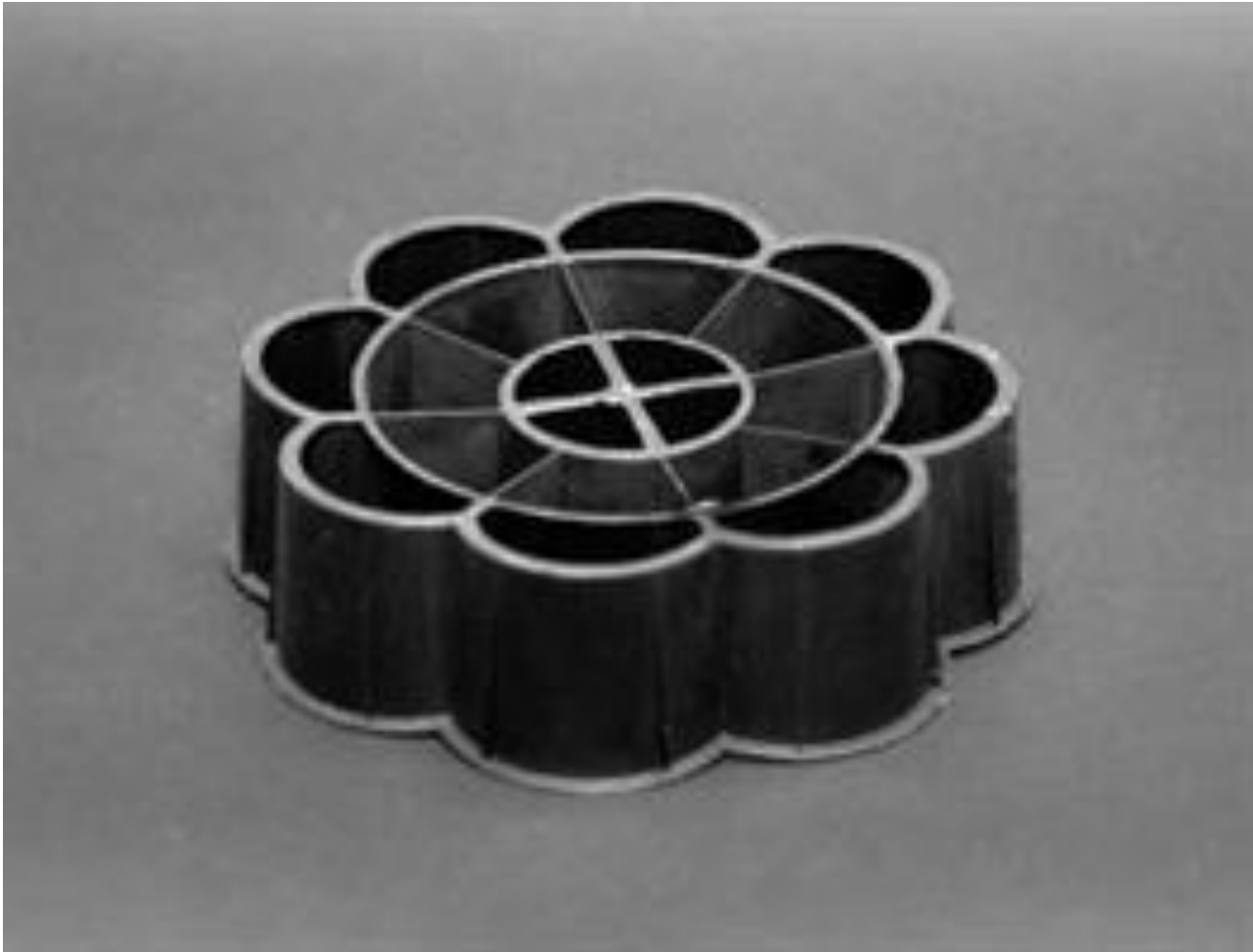
Synthetic Media Types



Synthetic Media Types



Synthetic Media Types



Other Types?



Delivery Mechanism

- **Submerged aerobic process exposes AIR to WATER**



DAB

WATER+TECHNOLOGY

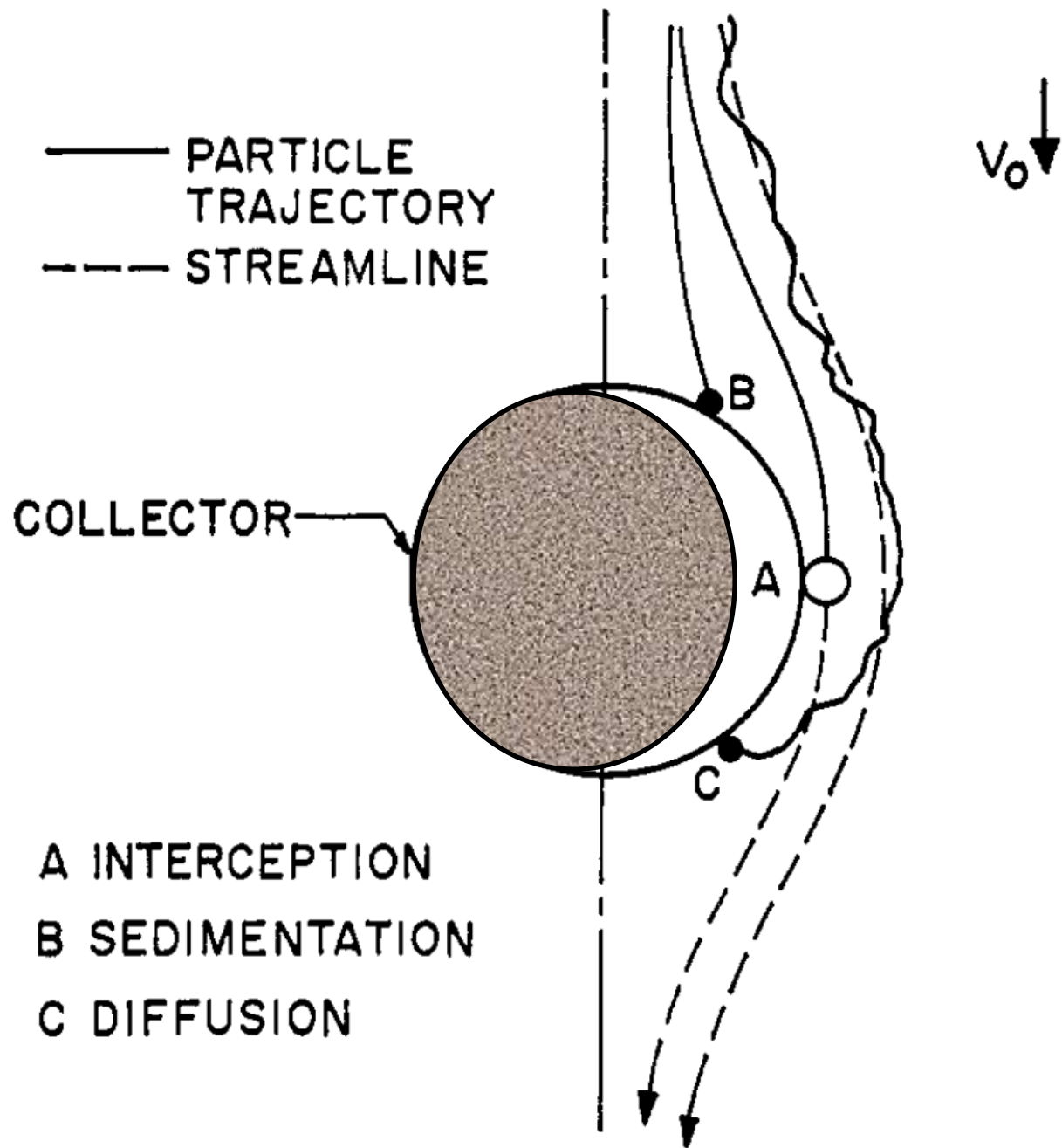
Delivery Mechanism

- **Media filter aerobic process
exposes WATER to AIR**



Media Filter Delivery

- **Oxygen not limiting**
- **Water (effluent) dosed intermittently**
- **More passive treatment process**



Let's Revisit the Past



FILTERING MATERIALS FOR SEWAGE TREATMENT PLANTS

PREPARED BY
THE COMMITTEE OF THE SANITARY ENGINEERING DIVISION
ON
FILTERING MATERIALS FOR WATER AND SEWAGE WORKS
ADOPTED OCTOBER 13, 1935

Timeless Wisdom

- **Controlling factors for success**
 - **Media characteristics (cleanliness and homogeneity)**
 - **Volume and character of sewage**
 - **Care with which the system is operated**

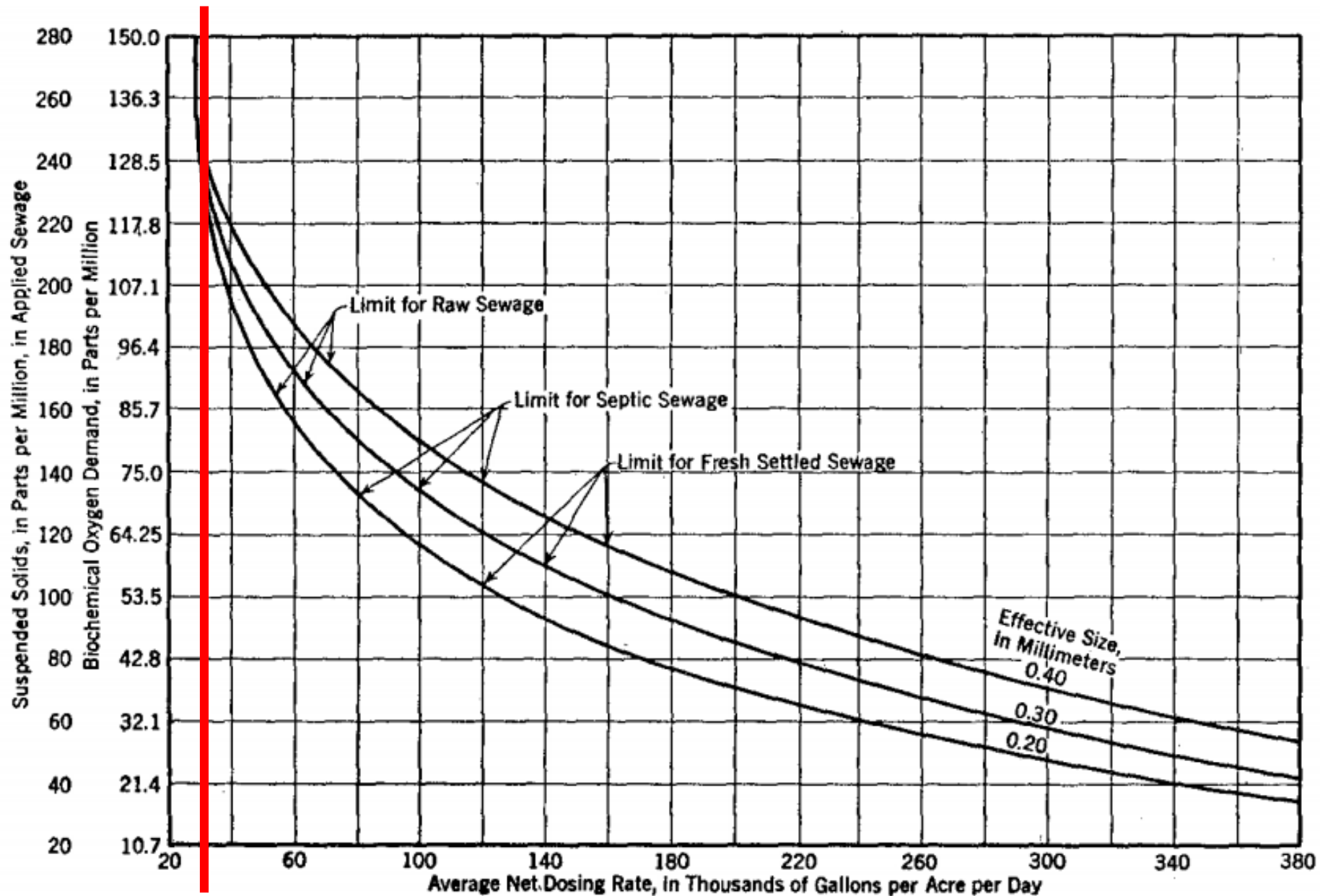


FIG. 1.—SUGGESTED SAFE LOADS FOR INTERMITTENT SAND FILTERS.

Timeless Wisdom

- **The designer should base calculations on three variables**
 - **Strength and composition of sewage**
 - **Volume of flow**
 - **Character of media**

Timeless Wisdom

- **There is a distinct need for definite criteria as to the proper relation between...**
 - **Organic load applied to filters**
 - **Physical characteristics of media**

The Future?



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