

Still Crazy about Brewing after all these Years

By

Finn B. Knudsen









Content

- How a brewing career started
- Learning existing Brewing Technology
- Examples of projects, new and applicable technologies
- International orientation and experiences
- Comments on new technological opportunities

Starting a Career in Brewing

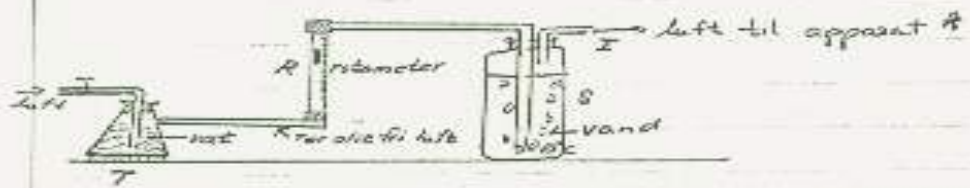
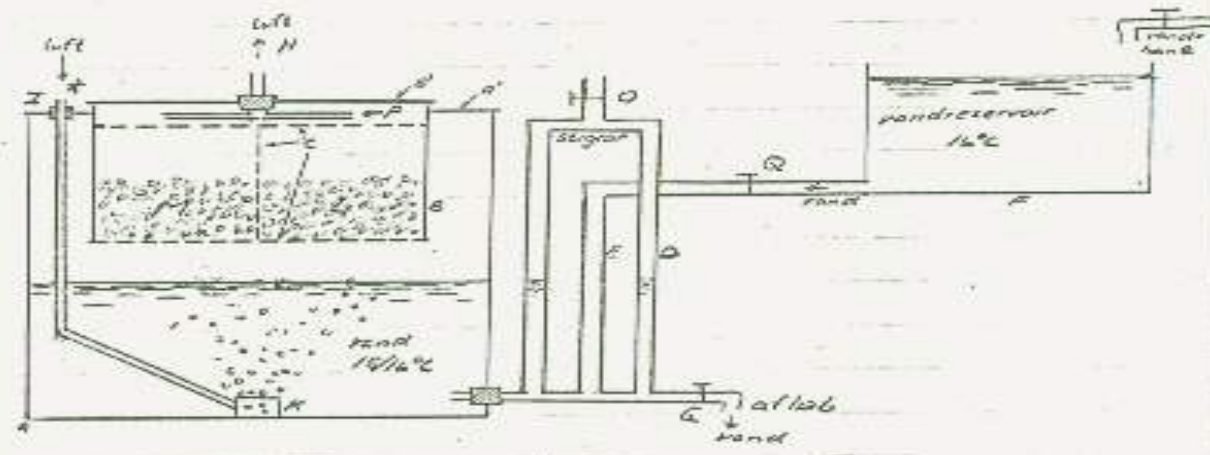
Tuborg Breweries

In

Hellerup, Denmark

Learning about Brewing Technology



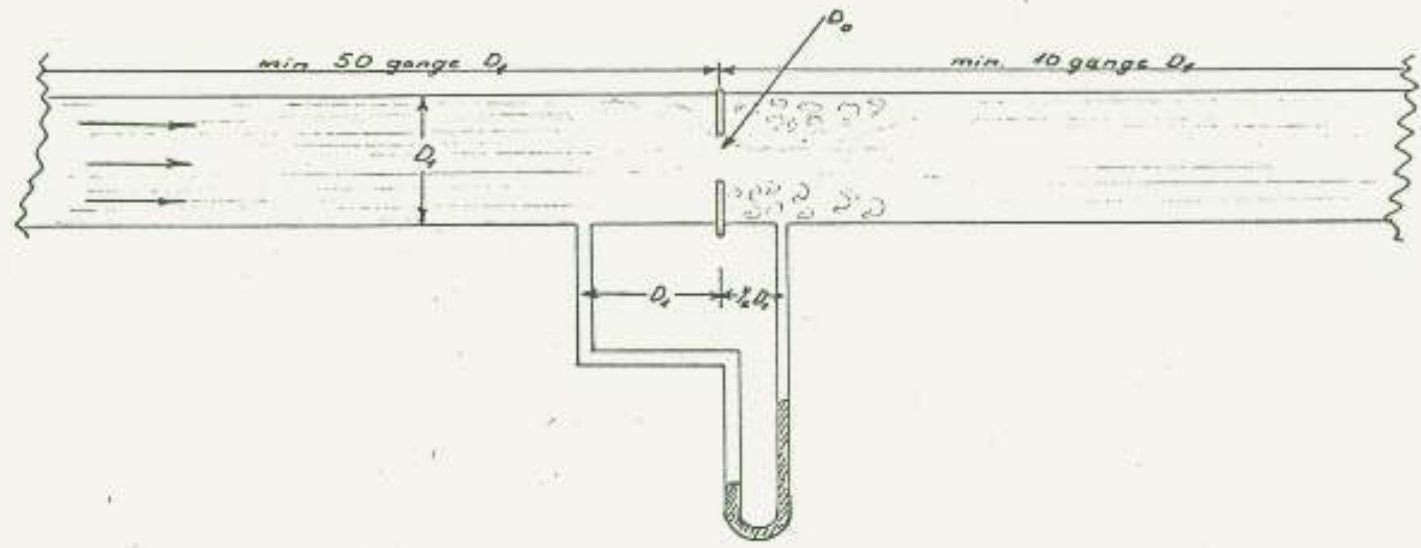


- A: Ydre kar R: Låg m. huller (Diameter 38cm ; Højde 37cm)
- B: Indre kar S: Låg m. huller (Diameter 33cm ; Højde 14cm)
- C: Trådnæt
- D: Stigret-overløbsrør
- E: Tilløbsrør
- F: Vandreservoir
- G: Fraløb
- H: Afgang for luft
- I: Tilgang for luft
- K: Luftfordeler
- L og M: Byggestøtter
- O: Hane ved stigret p. luftafgangsfordeler
- Q: Hane for vandtilgang
- R: Rotameter
- S: Vandbeholder
- T: Stopkran

18.01.66



Examples of projects, new and applicable technologies



→ ← måleblende tykkelse:
 $\frac{1}{30}$ gange D_1 , eller $\frac{1}{4}$ af D_0
 eller $\frac{1}{4}$ af $\frac{D_1 - D_0}{2}$ som
 maximal tykkelse af blenden.

Forsegsstilling:

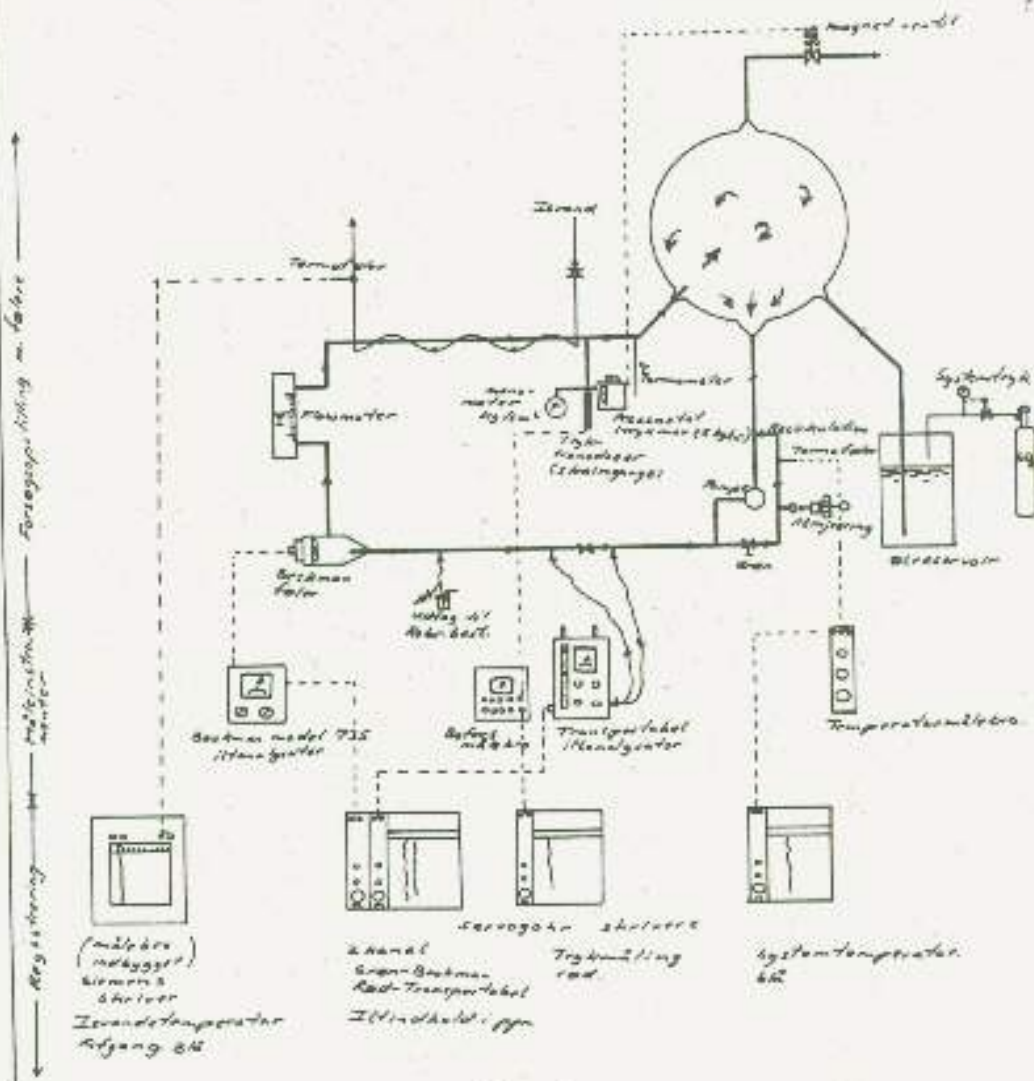
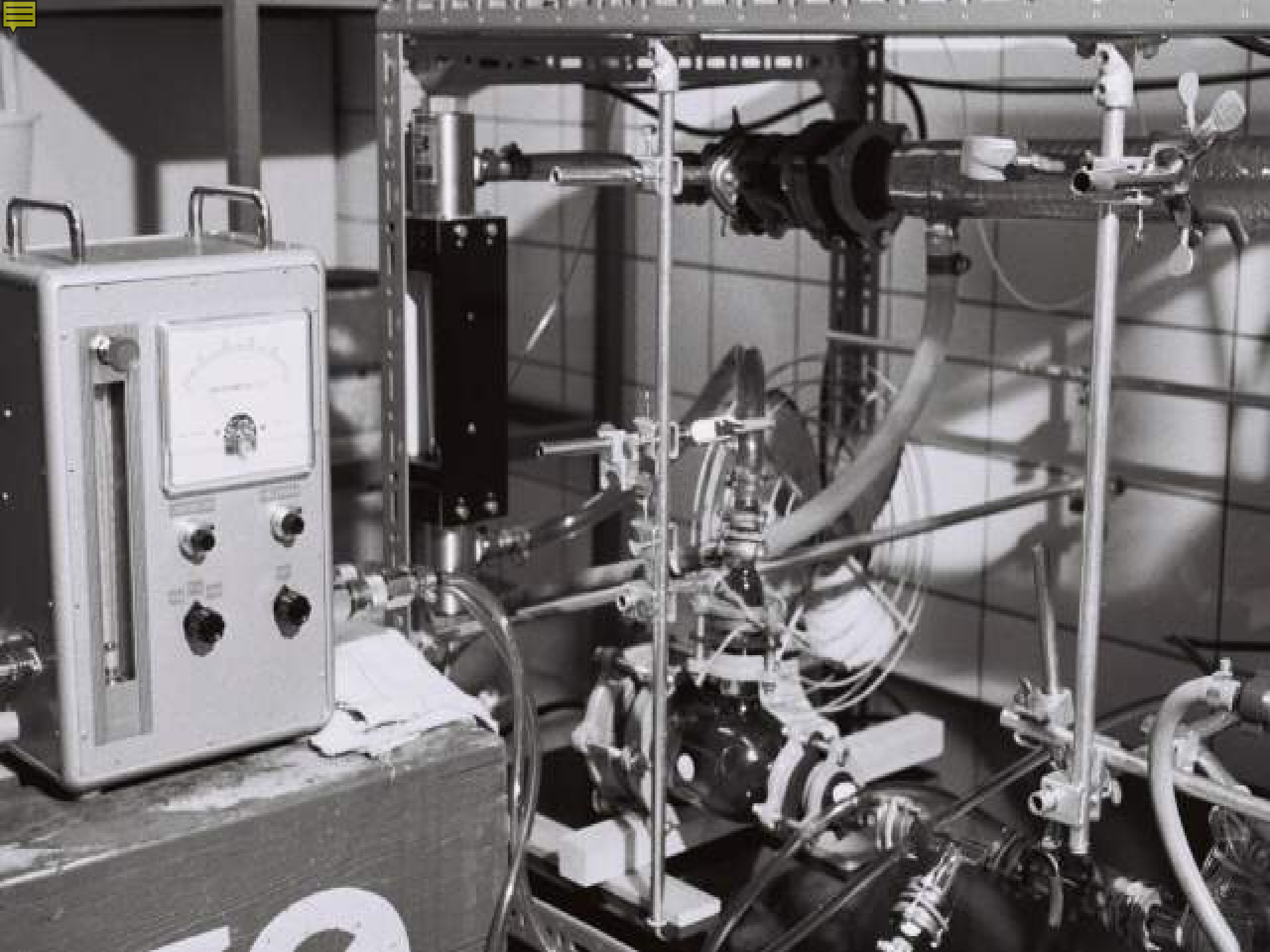
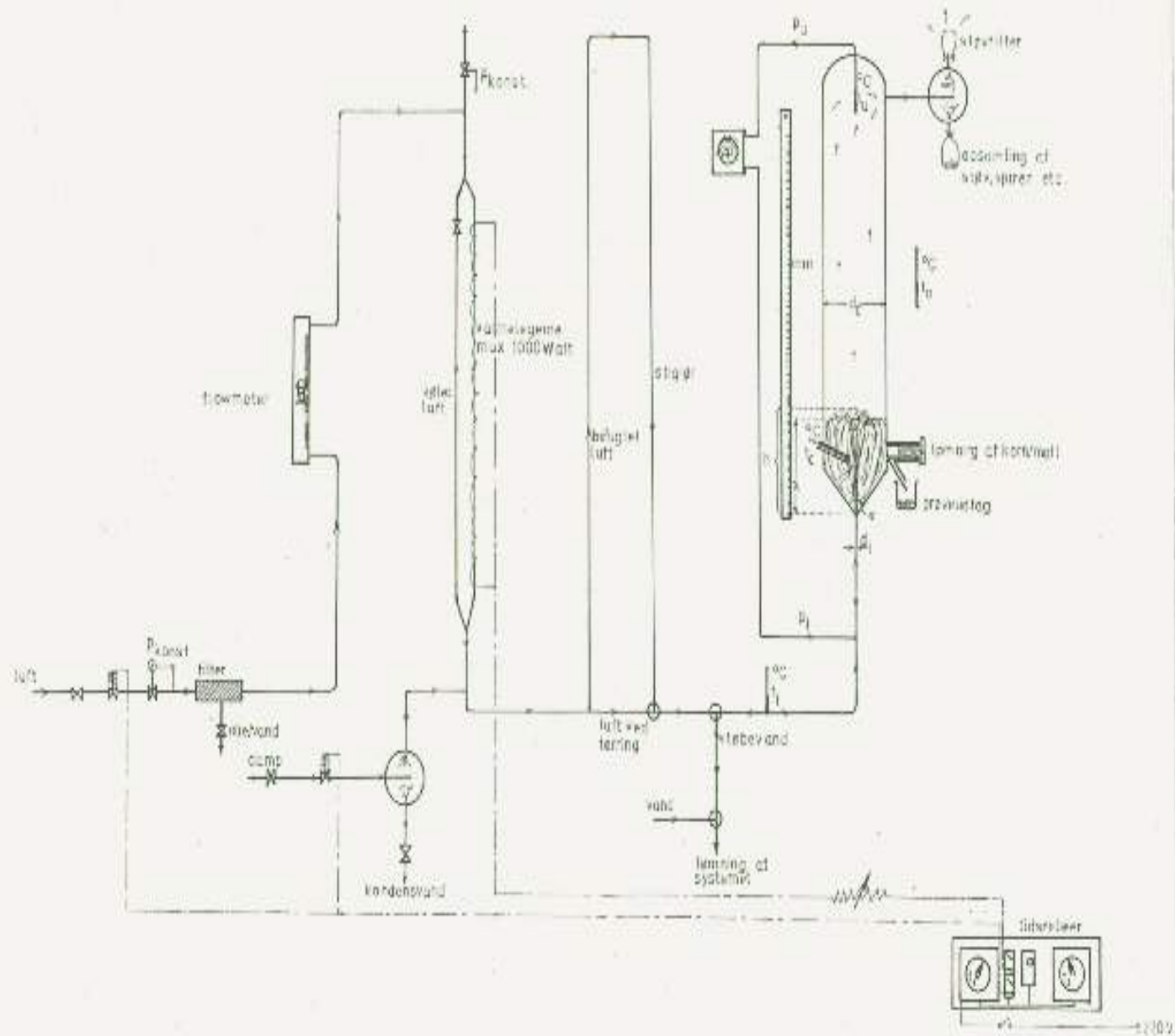


Fig. 1









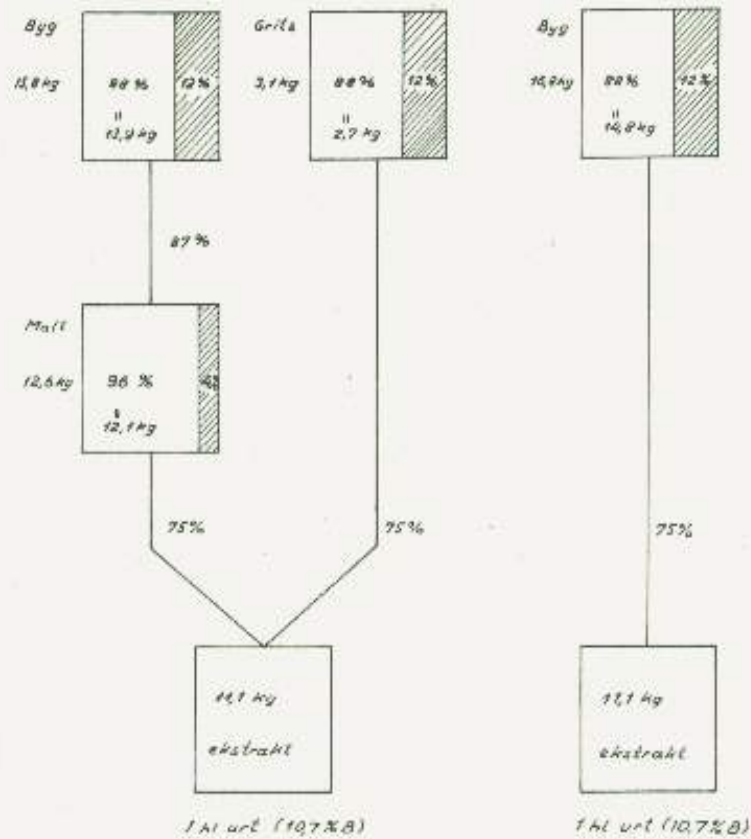




Råstofforbrug ved fremstilling af 1 hl urt og fro

MALT + GRITS

BYG



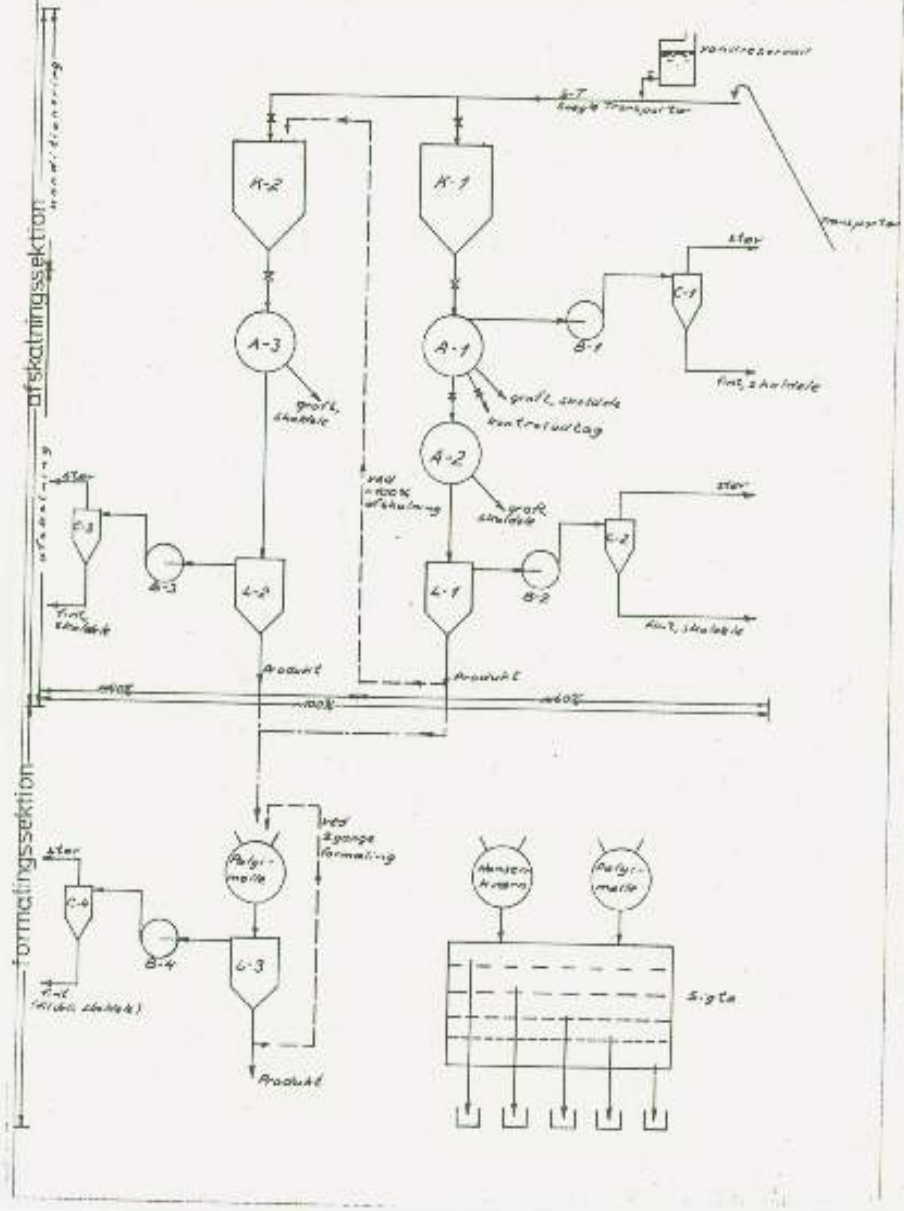
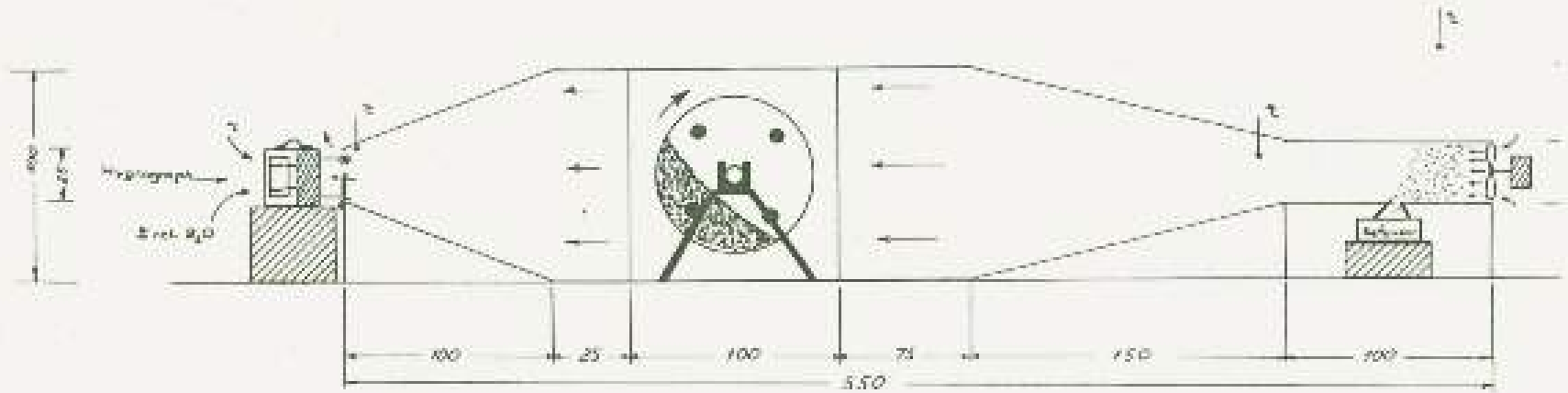


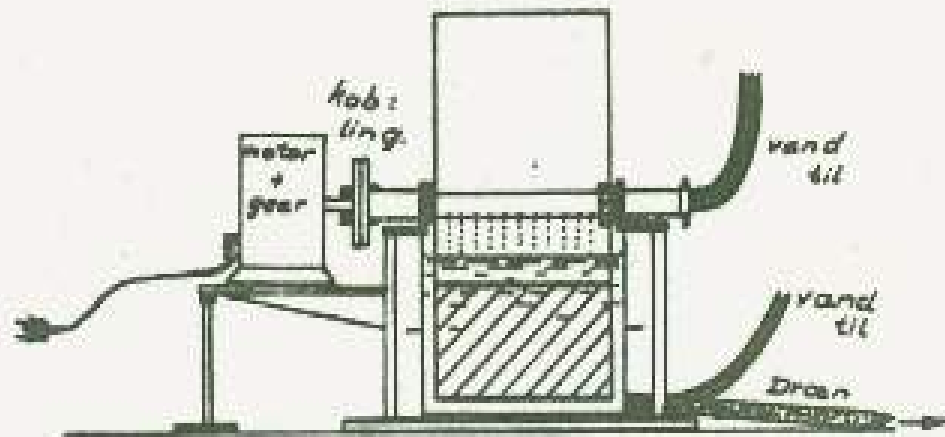


Fig. 7

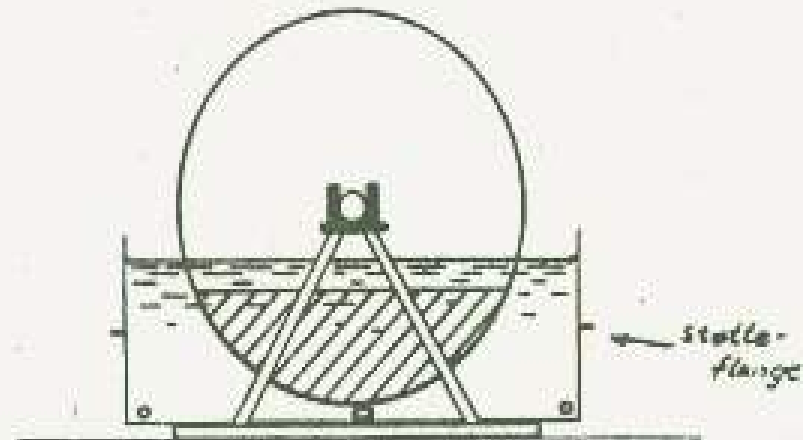


Set fra loen

Set forfra

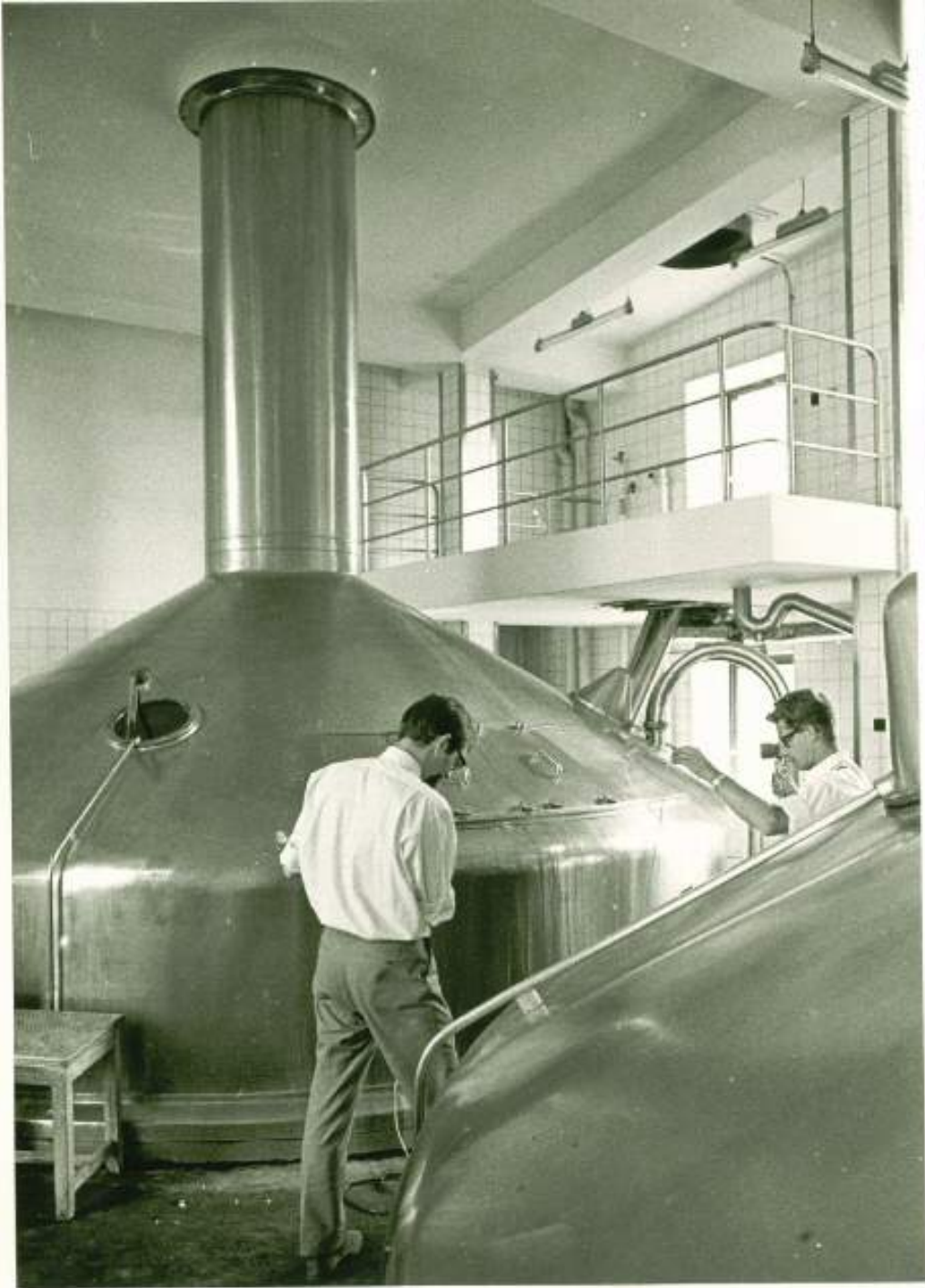


Set fra siden

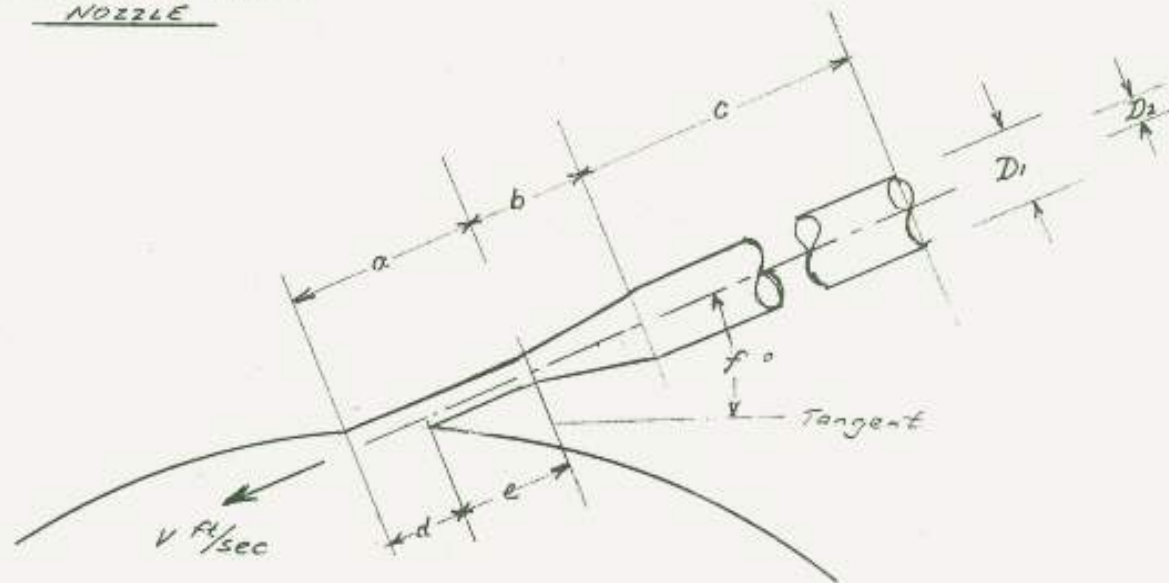


Vand til Dræn (tryk måler)
(ej benyttet)

Fig. 6



WHIRLPOOL DESIGN
NOZZLE

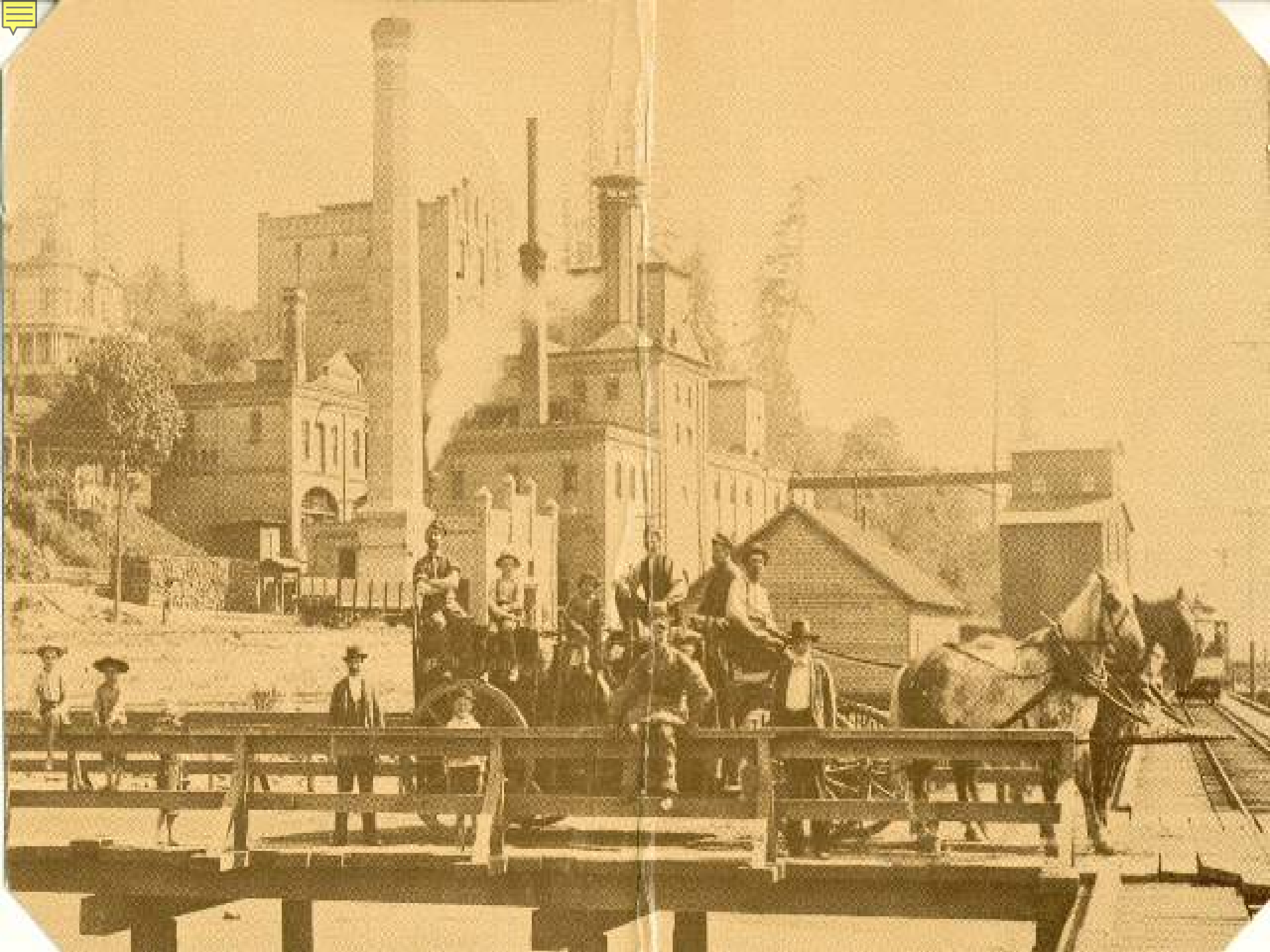


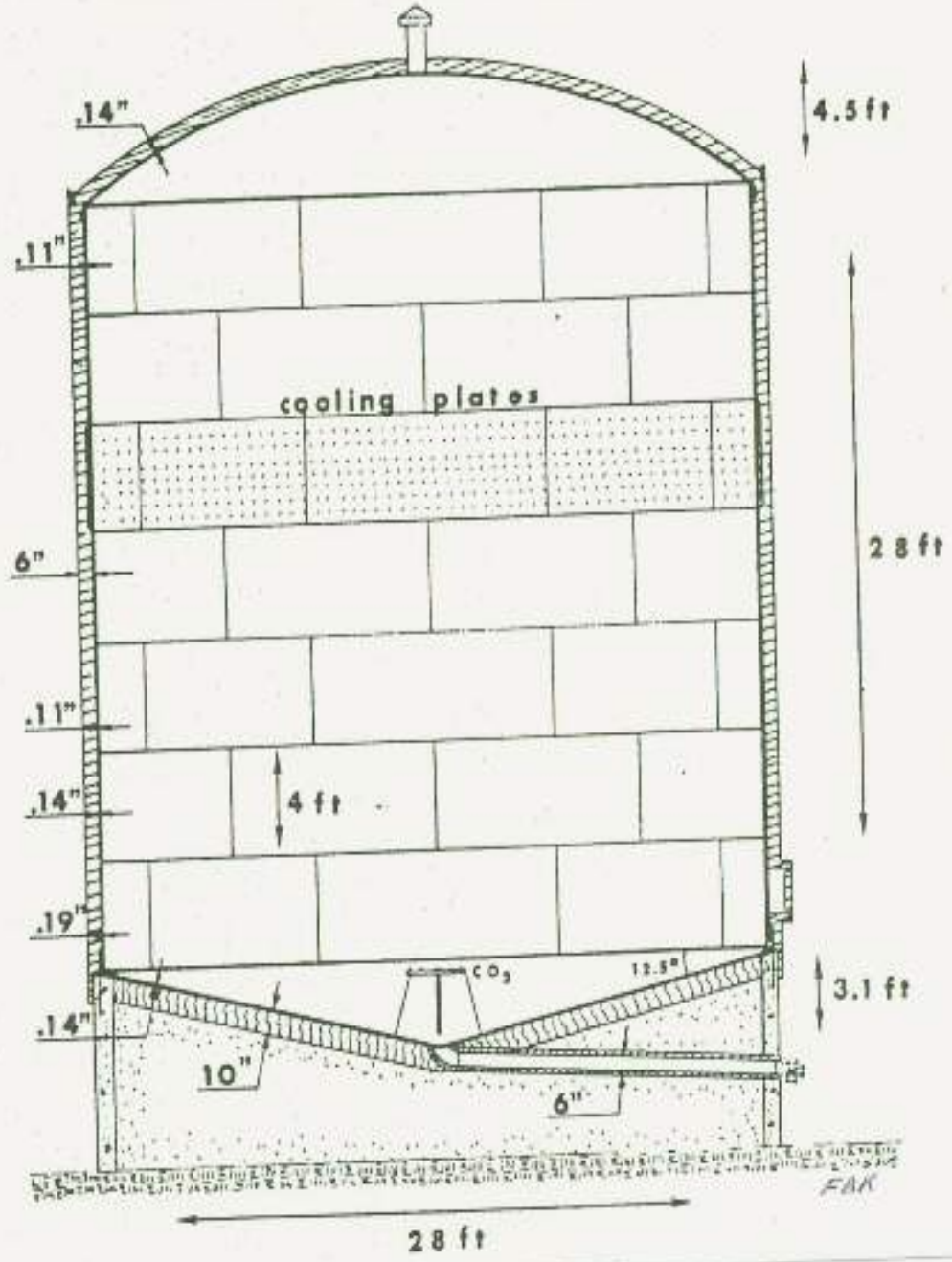
- TANK LIQUID H/D
- Relationships a, b, c, d, e
- f° angle
- V ft/sec

Finn B. Knudsen
1993-07-14



International orientation and Experiences







R

D R D

Vertical Tank

Reg. 7101-I, S

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Date: 05-1971

Fig. 1
Additive injection.

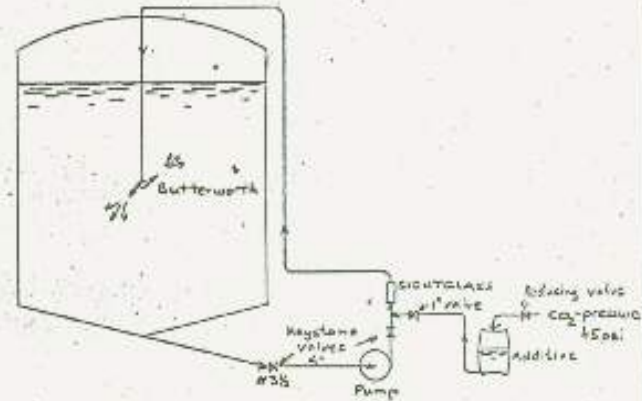
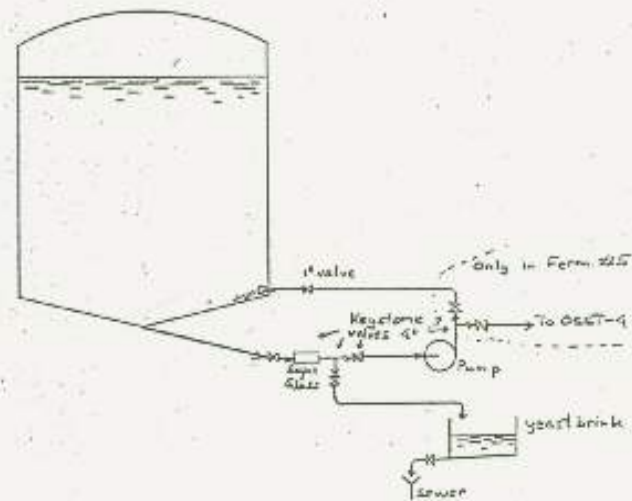
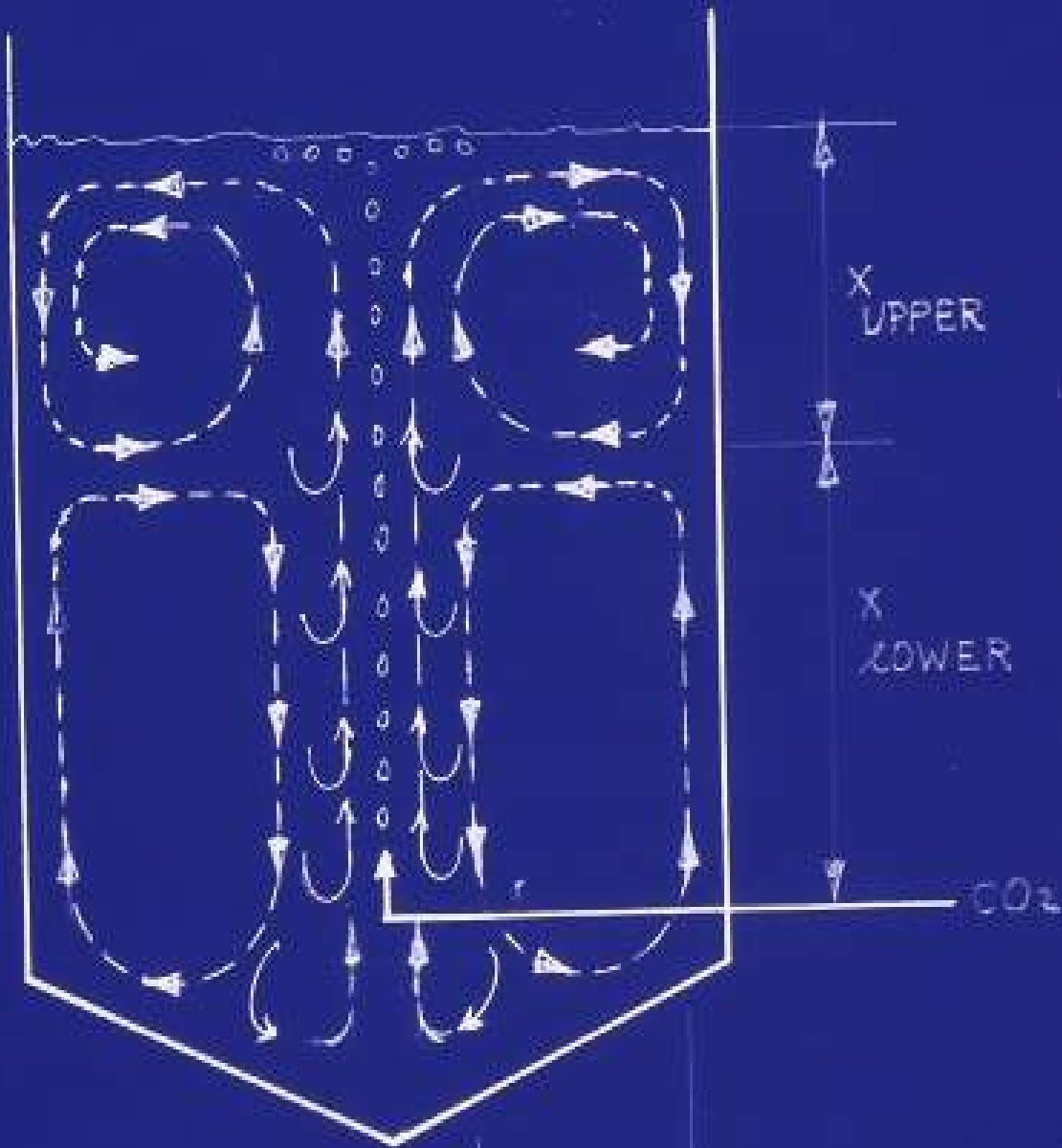


Fig. 2
Yeast collection.
Flushing.



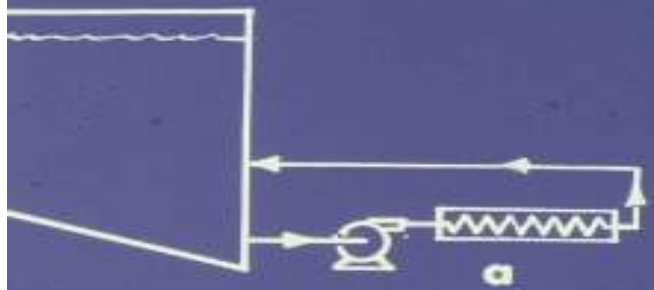




$$V_U \approx 6 \text{ m/min}$$

$$V_D \gg V_U$$

$$V_L \approx 4 \text{ m/min}$$



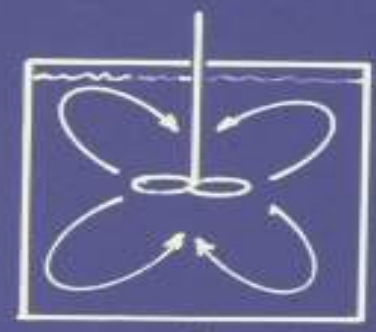
a



b



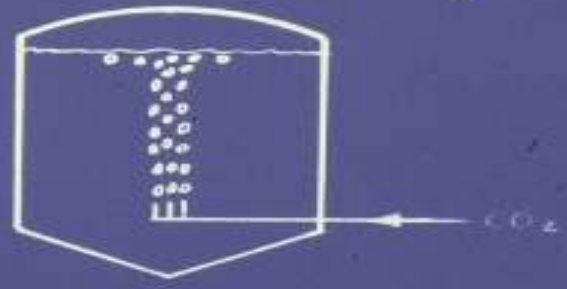
c



d



e



f

CO₂





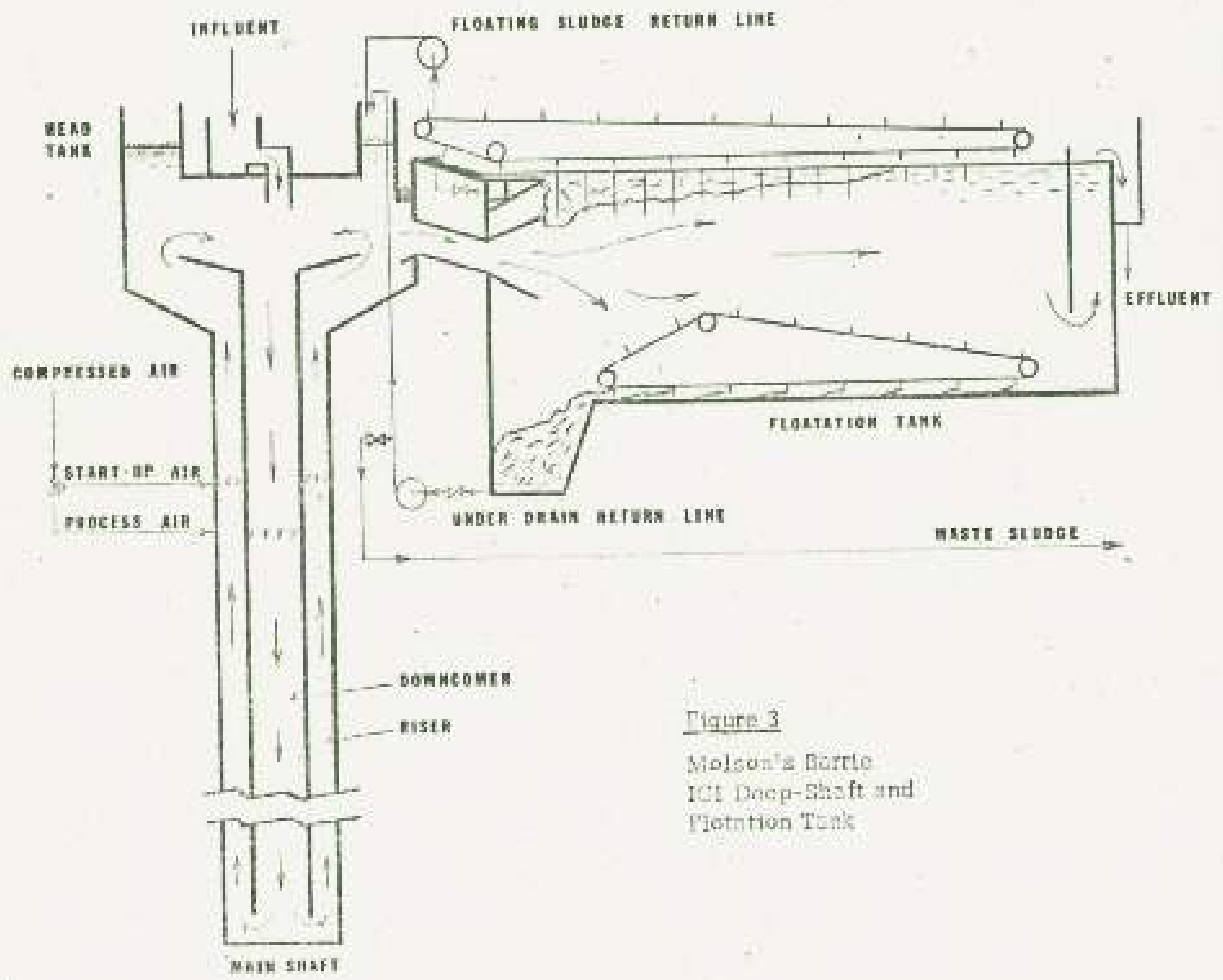


Figure 3
 Molson's Barrie
 ICI Deep-Shaft and
 Flotation Tank







老英雄

大庆式企业



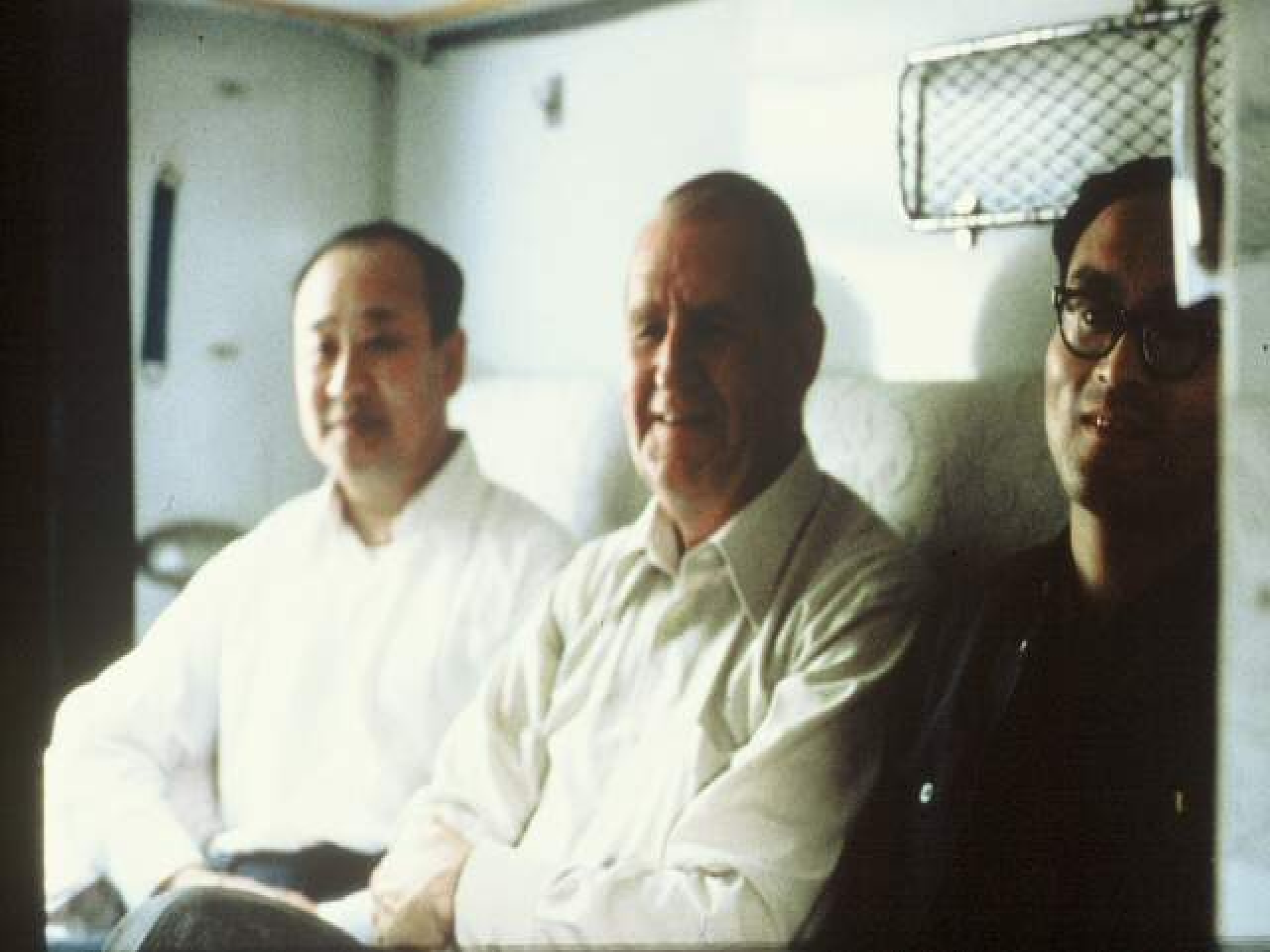


A group of 14 individuals, including men and women, are posed for a photograph in a room with dark wood-paneled walls. The group is arranged in two rows. The front row consists of seven people, and the back row has seven people. The individuals are dressed in a variety of attire, including traditional Chinese jackets (such as grey, blue, and dark jackets) and Western-style suits (including a man in a dark suit and tie, and another in a grey suit). In the foreground, a table with a white tablecloth is set with several dishes, glasses, and silverware. Several chairs with light-colored covers are visible around the table. The overall atmosphere appears to be formal or semi-formal.



1159

济局  青段











中华人民共和国
广州市食品工业公司
广州啤酒厂
和

特鲁咨询有限公司代表
嘉士伯啤酒厂有限公司
的

技术合作协议书

日期：1981年10月16日

啤酒技术合作协议

中国广州食品工业公司和广州啤酒厂(以下称:广啤)与丹麦哥本哈根丹布鲁咨询有限公司代表嘉士伯啤酒有限公司(以下称:嘉士伯和丹布鲁)于一九八一年十月六日在中国广州通过友好协商,签订本协议书。

第一条 技术合作项目

1-1. 嘉士伯和丹布鲁向广啤提供专门技术和下列领域内的合作:

A. 加工技术是以嘉士伯在哥本哈根及国外,特别是嘉士伯香港啤酒厂(以下称:香港嘉啤)的生产工艺为基础,包括成套加工技术有关设备及图纸等资料。

B. 技术(咨询)合作,包括广啤现代化和扩展的有关加工方法和某些设施技术图纸。

C. 技术合作的目的是和意愿是,嘉士伯和丹布鲁协助广啤,改进广啤啤酒质量,使它能达到嘉士伯啤酒同等的质量水平,以缩短啤酒发酵期为28天。

1-2. 嘉士伯和丹布鲁向广啤提供和允许广啤得到和使用香港嘉啤的生产工艺技术资料应包括:

A. 全部工艺操作及设备维修保养技术规程。

B. 各工序的操作方法:如原料、辅料糖化煮沸、糊化、麦汁过滤、旋流式泥混槽(缸)发酵、贮酒、啤酒过滤(硅藻土过滤)、酵母培养(包括纯培养阶段)、酵母洗涤、回收贮存、二氧化碳饱和等详细工艺操作方法及技术资料。

C. 包装部分和动力中心、冷冻系统等设备(只需总图和布置图)。





二级超





















CORX 5001

7263























New Zealand TOURISM BOARD

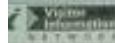
Host



Over 10 million people visit New Zealand each year. The Tourism Board is responsible for the New Zealand tourism industry, promoting the country as a world-class holiday destination.



Travel is the best way to see the world. Discover the beauty of New Zealand's landscapes, culture, and people.



The Wynne Environment Network is a coalition of environmental organizations working to protect New Zealand's natural resources and promote sustainable development.

WILSON GREAT PROGRAMS FOR THE FUTURE

The Wilson Great Programs for the Future are a series of initiatives designed to address the challenges of climate change and environmental sustainability. These programs focus on reducing carbon emissions, promoting renewable energy, and protecting natural habitats.

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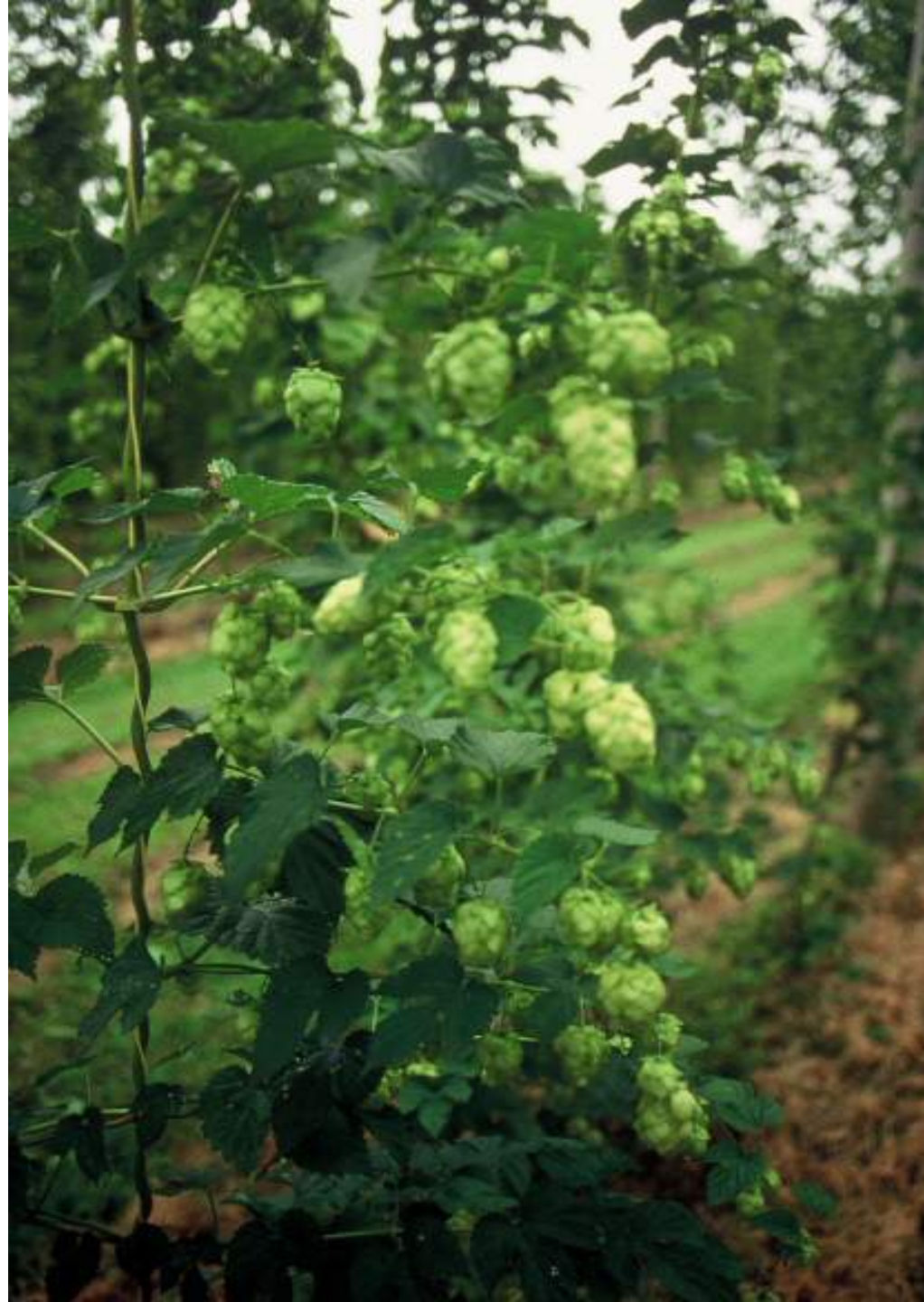
Edinburgh
Glasgow
London
Manchester
New York
Paris
Tokyo
Sydney
Wellington



Edinburgh Statement

The Edinburgh Statement is a key document in the New Zealand environmental movement, outlining the government's commitment to sustainable development and environmental protection.





New Technological Opportunities

- Yeast Propagation and Handling
- New Milling Technology
- Other

Yeast Propagation and Handling

- New developments described in the literature of faster and more consistent yeast propagation
- New possibility emerging of using fresh propagated yeast at start of each Fermentation
- Fewer vessels will be used from yeast culture to full scale production fermentations
- Assurance of more consistent and reliable fermentations and less chance of contaminations
- More economical

New Milling Technology

- Traditional milling based upon grinding
- New technology is not based on grinding but an air separation technology
- Opportunities include benefits such as
 - Tight particle specification
 - Significant lower capital and operating cost
 - Substantial less energy requirement
 - Less space
 - Increased utilization of raw materials

