E. I. DU PONT DE NEMOURS & COMPANY
WILMINGTON, DELAWARE 19898
EMPLOYEE RELATIONS DEPARTMENT

HASKELL LABORATORY
FOR
TOXICOLOGY AND INDUSTRIAL MEDICINE

April 22, 1970

TO : See Distribution List

FROM: James F. Morgan
Employee Relations Department
Haskell Laboratory

ASBESTOS CONFERENCE
May 6 and 7, 1970

Attached herewith is the program for the Company-wide conference that was proposed in my letter of February 2, 1970 to all liaison personnel.

To date we have had indications that about fifty-six persons will attend. The sessions will be held at the Du Pont Country Club. It is expected that the total cost of holding this conference, exclusive of attendees' travel expenses, when distributed on a per capita basis, will amount to ten to twenty dollars per person. I should receive in advance of the meeting a general ledger account with appropriate sub-accounts to cover the per capita cost for each person who expects to attend.

Additional information regarding exact locations and times and more about the format of the second day's session will be forthcoming shortly.

JFM/bjd
Attachment

120698

ASBESTOS CONFERENCE

Preliminary Program

Du Pont Country Club

Wilmington, Delaware

May 6, 1970

9:00 A.M. Introduction

C. A. D'Alonzo, M.D.

Chairman's Remarks

G. J. Stopps, M.B., B.S.

Types of Asbestos Minerals.

J. P. Morgan

History and Description of Diseases Produced by the Inhalation of Asbestos.

R. T. P. de Treville, M.D.
President
Industrial Hygiene Foundation of America, Inc.

1:30 P.M. Environmental Surveys - Measurement of Concentrations of Asbestos Fibers and Particles in the Air in Work Places.

E. E. Ayer
J. R. Lynch
U. S. Public Health Service
Cincinnati, Ohio

5/6/70

Asbestos

5/7/70 uses Jim

EXHIBIT # L-66-7
DATE 1-30-97 dt
MAZZUCCHI & FORNAROLI INC.
CERTIFIED SHORTHAND REPORTERS

1. Thermal Insulation
   7.5 M of insulating materials used
   8.6 - 80% asbestos content
   14% in magnesia
   Amosite and Chrysotile
   8.6% Amosite only
   Asbestos Cement - pipe, sheet, tile
   Packings & gaskets
   Brake linings
   Saw use in products - fabrication, cutting
   Electrical insulation
   Filters (air)
   Gloves
   Sheets
   Radiator stop leak
   Tremolite in talc, up to 20%
   asbestos - like
   Asbestos wrappers
   Methods of sampling
   Use PHS with adapt Jerry Lynch's recommendation

Acceptable Limits 5/7/70 2

1968 revision 2 mppcf. less than 5 > 5μ

1970 " 2 mppcf less than 2 > 5μ *

Current 12 > 5μ

* British

Haskell Lab and ESD joint study on destruction of insulating materials - George Lang of ESD and Jim Morgan. Try to eliminate asbestos - measure relative hazard.

"Unibestos" has poor history

Thermasil much better for attention in shipping containers.

Torpisters during dismantling

"Dustly" #77 2113 Rumen Rims Dtl

medical - Completely non-specific

Meticulous history required

Old Hickory 9 and 23 were old timers one had 60% vital capacity - fibrotic

DUP 0901406

One lung cancer, one mesothelioma
(not an insulator) Selikoff's article
stirred up unions. No difficulty in persuading
employees to use respirators.
Chest x-ray annually.
Selikoff's article - [illegible] [illegible] magazine
summarizes - watch J. occup. med
Du Pont forced to accept the 5 [illegible]
particle TLV.

DUP 0901406.001

X

Dupont Asbestosis Conference 6 May 70

Wedgwood Rm → Banting Room [illegible]
Wedgwood Rm tomorrow

Types of Asbestos Minerals J. Morgan
- mineral silicates
- extremely small diameter compared to other fiber

Different types differ by: 1 Chrysotile 2 Crocidolite 3 Amosite
A origin
B composition Mg. silicate
C structure
D properties H_2O 12–15%

Origin:
Type of rock (serpentine, amphibolite) → pressure, heat + H_2O → crystals → fiber
Serpentine → chrysotile
Amphibolite → other two tremolite, actinolite; crocidolite + amosite

~~Imports~~ 1968
Canada (Chrysotile) 690,000 short tons $65 million
South Africa crocidolite + amosite $6 million

Characteristics - resistant to acids, alk, H_2O, heat insulation
~~spinnability~~

Chrysotile Properties.
- yellow to greenish color → white fiber
- small fibers less than 1 inch to 2 inches
~~[illegible]~~ hydrated magnesium silicate

190

DUP 0901407

Textile - [illegible] - [illegible]

Crocidolite

- $3H_2O \cdot 2Na_2O \cdot 6(Fe\,Mg)O \cdot 2Fe_2O_3 - 17SiO_2$
- 2-3% H_2O
- S. Africa
- Australia
- Color is Blue ∴ known as Blue Asbestos - due to the Na
- better resistance to acids, alkalies and sea water ∴ used more in ship building

Amosite

- used by Dupont for heat insulation

Rob. de Treville — History - Medical Aspects
- Basis — N.Y. Acad of Science — Biologic effects Dec 31, 1965
  Industrial Hygiene Highlights Vol I
  Fibrous Dust Publications of Industrial Hygiene Foundation

first lung cancer in asbestosis reported in 1935, Lynch U of South Carolina

Asbestosis

1900's asbestosis noted

fibrosis similar in some respects to silicosis - [illegible] difference is that silicosis has nodules - asbestosis are more diffuse - accompanied by emphysema ∴ more difficult to recognize;

- see right heart failure or cor pulmonale often present
- occurs with all types
- 10 to 20 years required

128701

DUP 0901408

Asbestos 6 May 70

- Knox in England found excess # of deaths (10x) from lung cancer in textile workers,
- Dr. ? Braun looked at Canada and did not find a clear cut differentiation
- Paul Kross – I.H.A.
  - can produce CA in rats ē crushed chrysotile for 16 months (40%).
  - ∴ assume that the hammering of the chrysotile resulted in it picking up trace metals from the hammer and these may be producing the CA.
- Knox – cleaned up the shops – found that the excess lung CA no longer existed

Dr. Wagner
Mesothelioma – saw ? around Cape [illegible] in S. Africa
Hx of exposure 40 yrs before; used as sand piles – along the roads; non occupational exposure

Dr. ~~[illegible]~~ Thompson in S Africa

- asbestos bodies - dumbbell bodies - stain blue, high ferritin
- 25% people in S Africa & Miami had these asbestos bodies at ~~post~~ autopsy

? Dr.: – raised question of exposure from brake drums
note may:
- non transparent center – false or pseudo bodies.
- Transparent " – true

Ferruginous body is better name unless you know what the core is

DUP 0901409

120702

Ede & Tenille [illegible]

chrysotile / asbestos

Theory

- milled asbestos – needle like rods not [illegible] in cells

-

breakdown dust – the chrysotile converts to fosterite which still contains some chrysotile and is capable of producing true asbestosis bodies. The greatest amount was fosterite

- Diseases caused by asbestos
  1. pulmonary fibrosis – clinically, epidemiologic and experimental
  2. bronchogenic ca. – epidemiologic; time dose dependent; 20-30 yr
  3. mesothelioma – crocidolite; role of chrysotile and amosite [illegible] dose not known

? of smoking being synergistic; [illegible] ca seen for smokers and non smokers

May get CA after short (few yrs.) exposure – as 20-30 yrs later

- chronic bronchitis & emphysema – claims for compensation generally not awarded; more information needed
- calcified pleural plaques
- asbestos body – if [illegible] lung should be able find body however the body by itself does not mean fibrosis

Can find ferruginous bodies in nearly 100% of population – [illegible] autopsy.

- Fibrous glass is free from pathogenicity

DUP 0901410

128703

Pulmonary function equipment - COR's folk
- X-ray
- Pulmonary function
- Smoking Hx

Typed U.S.P.N.S.

- overall dust measurements made originally
aerodynamics equivalent
Impinger total count vs. membrane filter count
ratios is a very weak correlation.

	per million dust		
	Total fibers	> 5μ fibers	> 10μ Fibers
Tyndale	10.3	5.5	2.7

TLV
3 million dust or 3 fibers > 5μ

Use >5μ because - not to be thought that only long fibers cause difficulty and also mainly the visibility is better and permits a better count

Light microscope compared to electron microscope show that we only measure 10% of the total fibers present in air samples on
Analyzed for Hg. and corrected to asbestos
by multiplying by 4.
Hence Tyndale 2 mg/m³ = TLV = 12 fibers/c.c.

120784

DUP 0901411

Countries

84% of all fibers seen were respirable
80% >5 μ " " "
~60% >10 μ " " "

μ+

Textile 35% respirable
Friction 36%
Pipe 45%

Asbestos in Products Dust

	Content	Product Dust	Respirable
Textile	75-85	72	50%
Friction	30-60	22	23%
Pipe	10-30	10	11%
Insulation	5-15	5	3%

Summary

① no practicable absolute method
② fibers > 5 μ @ 430x in chill
③ Bulk samples c̄ high volume sampler

Sampling
- high vol sampler
- size > 10 μ
- membrane filter

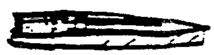
Atomic absorption for trace metals

Millipore membrane filter

DUP 0901412

120705

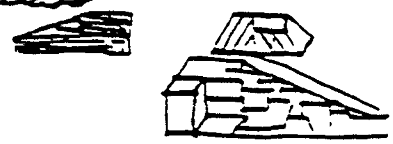
[illegible]



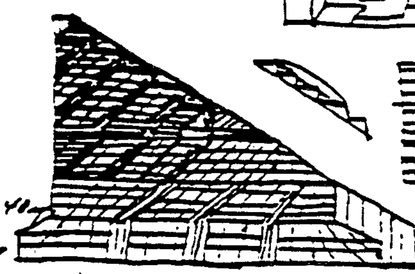
Personal air sampler 90 minutes, 2 l/min.

see 1 fiber per [illegible] ≡ 1 fiber per cc
to [illegible] (make a [illegible])
1:1 dimethyl phthalate [illegible] [illegible]
of the membrane

Sign up for reprint of method
Color millipore filter



Howard Ayers Standards
&
[illegible]



5 mppcf total dust
[illegible]
- 94% x-ray changes > 40 [illegible]
More [illegible] in smokers

Dr. John Wells - Georgia
50-60 mppcf found asbestosis & said that there is no safe level.

British [illegible] Occupational Hygiene Society 1968
Used risk of < 1%
. 2 fibers per cc 50 yrs
4 " " " 35 yrs

British study found basal rales preceding x-ray
> 5 μ fibers on M.F.

ACGIH
- [illegible] to 2 million pcf or 12 fibers per cc > 5 μ
USPHS
20% [illegible] x-ray - 5 to 10 fibers per cc
USPHS : 5 fibers per cc for industrial [illegible] [illegible]
: TLV. with ceiling of 10 fibers per cc 15 min peak

DUP 0901413
120766

transients workers have high risk exposure during mining. Difficult to monitor radiation workers

Air Pollution

30 fibers per cc found in D.C

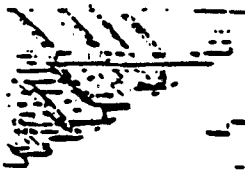
Ferruginous bodies

97/100 had the ferruginous bodies

~~90% then test~~ on the asbestos bodies is not known.

Clark Cooper examining aperture

1:30 A.M. Tomorrow



Asbestos

Wright G.W Asbestos a health in 1969
Amer. Rev. Resp Dis 100 467-79 at 69 (52 refs)

X

Dupont Asbestosis Conference 6 May 70

Wedgwood Rm → Barley Room Lab
Wedgwood Rm tomorrow

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- mineral silicates
- extremely small diameter compared to other fibers
Different types differ by: 1. Chrysotile 2 Crocidolite 3 Amosite
A origin
B composition Mg. silicate
C. structure
D. properties H_2O 12-15%

Origin:
Types of rocks ~~serpentine~~, amphibolite [chrysotile] → pressure, heat, H_2O → crystals → fibers
serpentine → chrysotile ~~and~~
Amphibolite → other two tremolite, actinolite, crocidolite + amosite

~~Imports~~ 1968
Canada (Chrysotile) 690,000 short tons $65 million
South Africa crocidolite + amosite $6 million

Characteristics - resistant to acids, as H_2O, heat insulation
~~spinnability~~

130

Chrysotile Properties
- yellow to greenish color → white fibers
- small fibers less than a inch to 2 inches
~~3 Mg~~ hydrated magnesium silicate

DEFENDANT'S EXHIBIT 131

128700

DUP 0901416

Textile - [illegible] - [illegible]

Crocidolite

- $3H_2O \cdot 2Na_2O \cdot 6(Fe\ Mg)O \cdot 2Fe_2O_3 - 17SiO_2$
- 2-3% Na_2O
- S. Africa
- Australia
- Color is blue ∴ known as Blue Asbestos - due to the Na
- better resistance to acids, alkalies and sea water ∴
used more in ship building

Amosite

- used by Dupont for heat insulation

Bob. de Treville History - Medical Aspects
- Basic N.Y. Acad of Sciences Biologic effects Dec 31, 1965
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Fibrous Dust Publications of Industrial
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Asbestosis

1900's asbestosis noted
fibrosis similar in some respects to silicosis - obvious difference is that silicosis has nodules - asbestosis are more diffuse - accompanied by emphysema ∴ more difficult to recognize;
- see right heart failure or cor pulmonale often present
- occurs with all types
- 10 to 20 years required

Asbestos   6 May 70

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Mesothelioma — saw ↑ around Cape Area in S. Africa

½ of exposure 40 yrs before; used as sand piles — along the roads; non-occupational exposure

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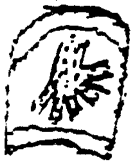


- asbestos bodies - dumbbell bodies - stain blue, high ferritin

- 25%. people in S. Africa + Miami had these asbestos bodies at ~~post~~ autopsy

- raised question of exposure from brake drums

P. Gross: non-transparent center — false or pseudo bodies.
Transparent " — true

Ferruginous body is better name unless you know what the core is

DUP 0901418

120782

Ed. ? Tumble [redacted] [illegible] asbestos

Theory

— rubbed salt — needle shaped not held in cells

—

breakdown dust – the chrysotile converted to ~~[illegible]~~ fortuite which still contains some chrysotile and is capable of producing true asbestos bodies

The greatest amt. is fortuite

- Disease caused by asbestos

1 pulmonary fibrosis – clinically, epidemiologic and experimentally

2 bronchogenic ca. – epidemiologic, some dose dependent; 20-30 yrs

3 mesothelioma – crocidolite; role of chrysotile and amosite unanswered, time dose not known

? of smoking being synergistic; ~~[illegible]~~ in ca same for smokers and non smokers

May get CA after short (few yrs) exposure – in 20-30 yrs later

- chronic bronchitis & emphysema – claims for compensation generally not ~~[illegible]~~ awarded; more information needed

- calcified pleural plaques

— asbestos body – if photo lung should be able find body however the body by itself does not mean fibrosis

Can find ferruginous bodies in nearly 100 20 yr population – ? Gen. Pop. autopsy

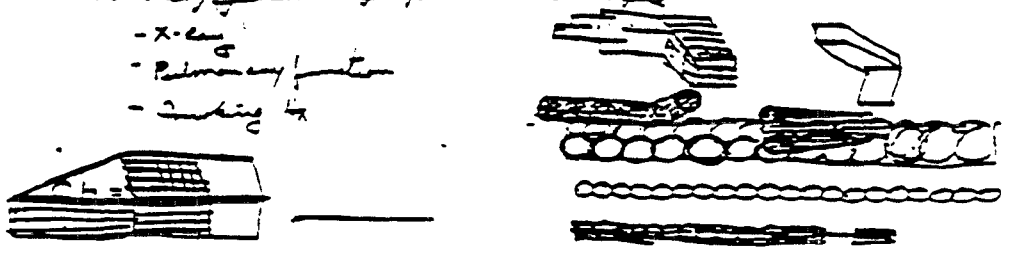
—

- Fibrous glass is free from pathogenicity

DUP 0901419

120703

Pulmonary function equipment - cost $ 1k
- X-ray
- Pulmonary function
- Smoking



Lynch USPHS.
- overall dust measurements made originally aerodynamics equivalent
impinger total count vs. membrane filter count ratios is a very weak correlation.

	per million dust Total fibers > 5μ fibers	> 10μ Fibers
Tylstile	10.3	5.5	2.7

TLV 5 million dust or 2 fibers > 5μ

Use >5μ because. must be thought that only long fibers cause difficulty and also mainly the visibility is better and permit a better count

Light microscope compared to electron microscope show that we only measure 10% of the total fibers even in oil samples on
Analyzed for Mg. and converted to asbestos by multiplying by 4
Mass Tylstile 2 mg/m³ = TLV = 12 fibers/c.c.

DUP 0901420

12/6/84

[illegible]

84% of all fibers seen within respirable
88% > 5 μ   "   "   "
~60% > 10 μ   "   "   "

[illegible]

Textile 35% respirable
Friction 36%
Pipe 45%

Asbestos in Products Dust

	[illegible]	[illegible]	[illegible]
Textile	75-85	72	90%
Friction	30-60	22	23%
Pipe	10-30	10	11%
Insulation	5-15	5	3%

Summary

1. no practical absolute method
2. fibers > 5 μ @ 430X is choice
3. [illegible] samples [illegible] high volume sampler

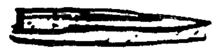
Sampling
- high vol sampler
- size > 10 μ
- membrane filter

Atomic absorption for trace metals

[illegible]

Millipore membrane filter

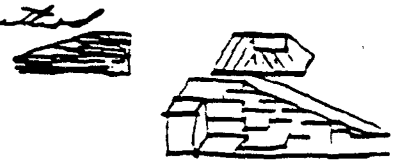
[illegible]



Personal air sampler 90 minutes, 2 L/min.

~~#/cc~~ 1 fiber per [illegible] ≡ 1 fiber per cc
to clear ~~the~~ [illegible] (make a gel out of it)
1:1 dimethyl phthalate diethyl oxalate [illegible] of the membrane

Sign up for reprint of method
[illegible] millipore filter



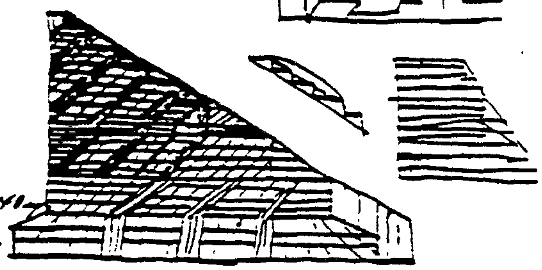
Hazard Asbestos Standards
&
Dreessen

5 mppcf total dust

[illegible]

- 94% x-ray changes > 40 [illegible]

More CA in smokers



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50-60 ~~mppcf~~ found asbestosis & said that there is no safe level

British ~~[illegible]~~ Occupational Hygiene Society 1968

Used risk of < 1%

2 fibers per cc 50 yrs

4 " " " 35 yrs

British study found basilar rales preceding x-ray

> 5 μ fibers on M.F.

ACGIH

- [illegible] to 2 million pcf or 12 fibers per cc > 5 μ

USPHS

20% had chest x rays ≈ 5 to 10 fibers per cc

USPHS [illegible] : 5 fibers per cc for industrial workers in [illegible] TLV, with ceiling of 10 fibers per cc 15 min [illegible]

DUP 0901422

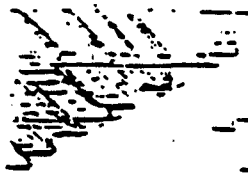
[illegible]

[redacted] workers have high vaf exposure during mixing. difficult to monitor radiation [redacted]

Air Pollution
.00 Liter per cc found in DC

Ferruginous bodies
97/100 had the ferruginous bodies
[redacted] the asbestos bodies is not known.

Clark Cooper expressing apertures
1:30 P.M. Tomorrow -



Asbestos

Wright G.W Asbestos: a health ... in 1969
Amer. Rev. Resp. Dis 100 457-79 or 459 (54 refs)

DUP 0901424

120708

Asbestos Conference 5, 6, 70

Types of asbestos minerals – [illegible]

Chrysotile – smallest diameter of known fibers, hydrated [illegible]

Crocidolite – rich in Fe

Amosite " " "

Serpentine forms chrysotile [illegible] from [illegible] I & P.

[illegible] – [illegible] 2 " " "

amphibole → crocidolite – main [illegible]

Chrysotile occurs in narrow veins in serpentine – yellow to green

fiber length [illegible] → 2" in length

hydrated [illegible] mag silicate

magnetite Fe_3O_4 present in the fibers, [illegible] fibers

[illegible] resistance to alkali & acid

high [illegible]

Crocidolite Fe [illegible] silicate

$3 Na_2O \cdot 2 [illegible] \cdot 6 (Fe, Mg) O \cdot 2 Fe_2O_3 \cdot 17 SiO_2$

$2\text{-}3\% H_2O$

Transvaal & Cape [illegible] S.A. areas – Australia & Bolivia

[illegible] fiber [illegible] in [illegible]

0.5–3.0" length – Blue color [illegible]

poor heat resistance, acid & alkali resistance good

Amosite – heat insulator – [illegible] in Du Pont

long fiber [illegible] in [illegible] – S.A. Fiber length [illegible]

good resistance to acids, alk. & [illegible] – good heat insulator.

History & Medical Effects

6 page questionnaire recently circulated (3 weeks) by [illegible] to collect data on individual exposure. [illegible] 20 year exposure [illegible] lifetime)

First [illegible] cancer detected in 1935 at [illegible] N.C. D. [illegible]

1900 – description of lung [illegible] similar to silicosis – [illegible] produces [illegible] – [illegible] to detect by X-ray – [illegible] with blood circulation – [illegible] by [illegible] 10-20 yrs. [illegible] produce [illegible] 10X [illegible] lung cancer [illegible] (1935–1955) [illegible] in Canada (chrysotile) 40% [illegible] [illegible] in [illegible] Co. etc. [illegible] [illegible] XB Canada [illegible]

[illegible] in vicinity of [illegible] mines in S.A. (Cape Blue) may be [illegible] [illegible] Also [illegible] ([illegible]) [illegible] bodies (dumbbell shaped) [illegible] like [illegible]

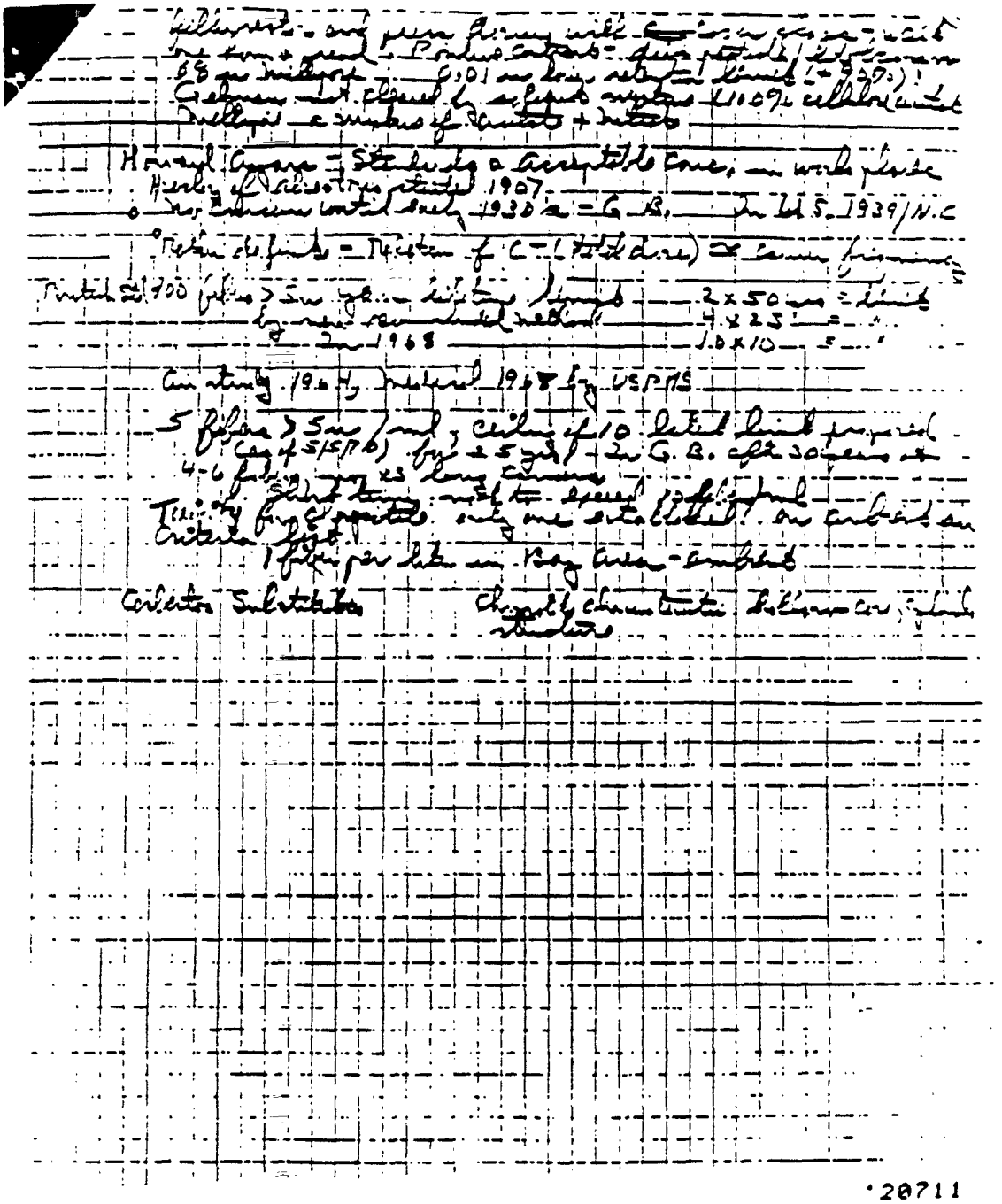
25% of population in [illegible] [illegible]. Thompson [illegible] for [illegible] possible. [illegible] other [illegible] (clay, glass fiber, etc)

EXHIBIT # [illegible]
DATE 1-30-97 [illegible]
[illegible] ROLL INC.
CERTIFIED SHORTHAND REPORTERS

DEFENDANT'S EXHIBIT 131A

~~120709~~

DUP 0901425



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