

Note: This is a reference cited in AP 42, *Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

PLASTICS
AP-42 Section 5-13
Reference Number
2

II. Process.

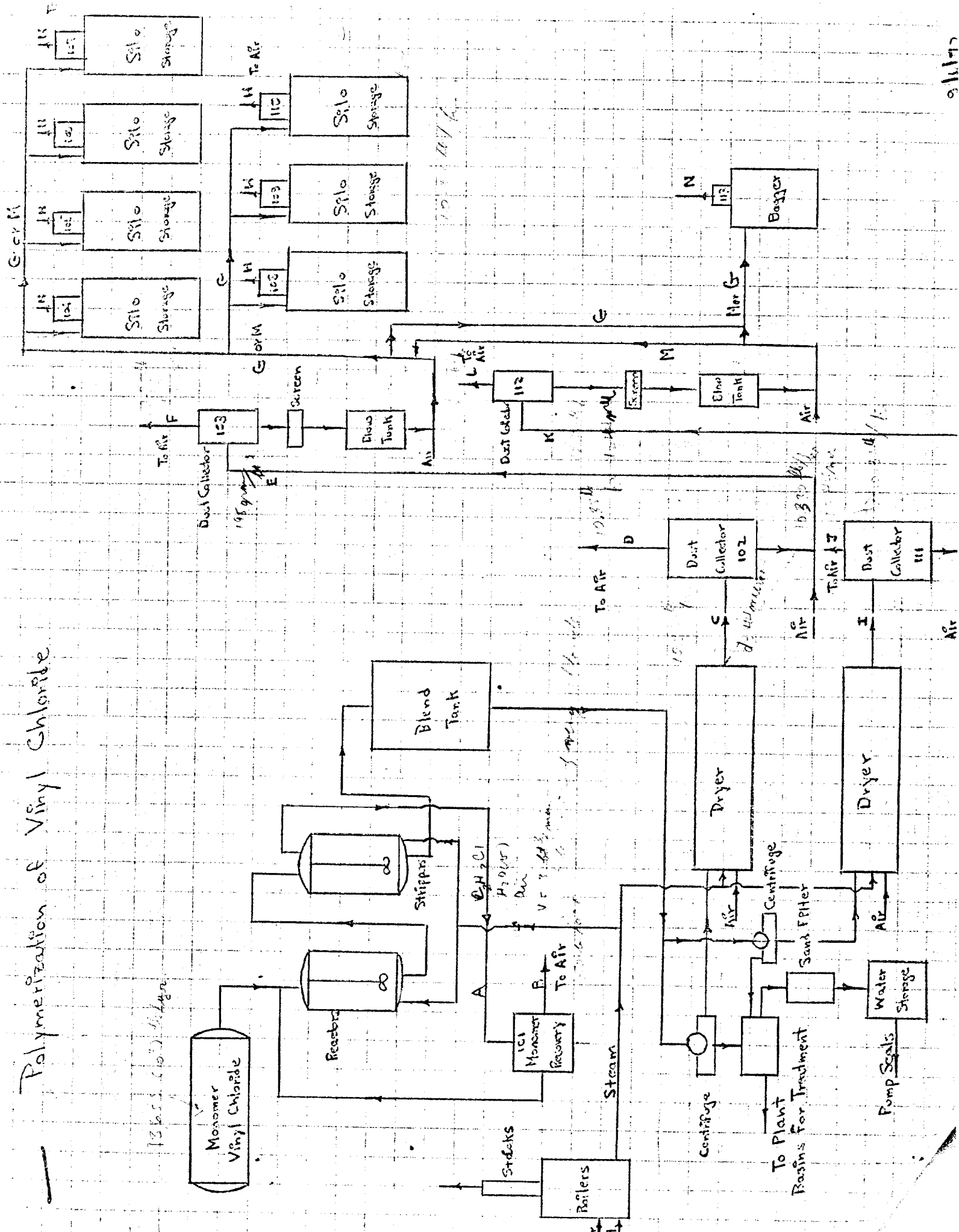
1. Process name.

Polymerization of Poly Vinyl Chloride (PVC)

2. Block diagram.

(See attached)

Polymerization of Vinyl Chloride



I. Capacity.

1. Process capacity. (not production)

90,000,000 pounds per year

Average 10,330 pounds per hour

2. Seasonal variation. (of production)

quarter

1

2

3

4

year
total

%

30

25

20

25

100%

II. Process. (Continued)

3. Raw materials and products

Raw materials

<u>Name</u>	<u>Quantity</u>	<u>Composition</u>
Vinyl Chloride Monomer.	93,655,000 lb/yr.	99.9% Vinyl Chloride
Cellulosic Suspending Agents.	94,000 lb/yr.	100% cellulosic suspending agents.
Substituted fatty acids (Sorbital type).	177,000 lb/yr.	100% substituted fatty acids.
Ethylenediaminetetraacetic Acid Salt (EDTA SALT).	125,000 lb/yr.	38% EDTA SALT 62% Water
Copperas (Effluent treatment).	24,000 lb/yr.	100% $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
Aromatic Hydrocarbon.	49,000 lb/yr.	100% Aromatic hydrocarbon
Azo & Peroxypercarbonate type initiators.	26,000 lb/yr.	100% A & P type initiators
<u>SiO₂ in Paraffinic hydro-Product and by-products carbons</u>	29,000 lb/yr.	100% active

<u>Name</u>	<u>Quantity</u>	<u>Composition</u>
Poly Vinyl Chloride	90,000,000 lb/yr.	99.5% Poly Vinyl Chloride

II. Process. (Continued)

4. Waste water.

Average of 100,000 gallons per day - Chemically treated
PH adjusted
Settled and pumped to
Town sewage treatment
plant.

5. Waste solids.

Waste solids are conveyed via the plant effluent to basins for treatment and settling at an estimated rate of 35 lbs per hour. As basins become full, they are cleaned out and material buried on the site.

After settling occurs we normally pump to the Town an average of 400-700 ppm total solids.

III. Emissions (composition and flow).

Six copies provided
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Stream flow shown on block diagram by letter A.

1. Flow Unknown^a Temperature 100°F Pressure 70 psig.

Component Name	Formula	State	Average amount or composition	Composition Range
Particulate	*	Solid		
Vinyl Chloride	C_2H_3Cl	Gas	50%	40 - 50
Water Vapor	H_2O	Gas	10%	10 - 20
Air	-	Gas	40%	40 - 50

Estimated flow of vinyl chloride = 78.5 lb/hr. 16/77

* Particulate matter should be described as fully as possible. Does not apply.

a. Estimate flow to represent 10% of total vinyl chloride recovered.

III. Continued For stream flow shown on block diagram by letter A.

2. Composition variation.

Variation results from opening and closing of vessels to which the system is connected.

3. Production rate during sampling.

Does not apply.

4. Method used to determine composition and flow.

Engineering estimate for composition - flow unknown.

III. Continued For stream flow shown on block diagram by letter A:

5. Sampling procedure.

Never sampled.

6. Analytical procedure.

Never analyzed.

7. Sampling frequency.

See 6f - Does not apply.

III. Continued For stream flow shown on block diagram by letter _____.

8. Confidence level.

Estimated guess.

9. Ease of sampling.

Yes/No/Probably/Probably not.

10. Odor problem. (Circle yes or no or mark "not applicable")

Is the odor of this emission ever detectable at ground level
on the plant property? Yes/no Off the plant property? Yes/no

If odors carry beyond the plant property are they detectable
infrequently? Yes/no Frequently? Yes/no Have you received a
community odor complaint traceable to this source in the past

year? Yes/no Has the odorous material been chemically identified?
Yes/no What is it? _____

(6)

III. Reactions (composition and flow).

Reactivity
0.0807 46/44
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 this section
 0.073

Stream flow shown on block diagram by letter W.

1. Flow 1000 Temperature 50-100° Pressure 10-20 psi.

Component	Formula	State	Average amount or composition	Composition Range
Formulate	#	Solid		
W	Chloride, $2\text{H}_2\text{O} + \text{CH}_4$	Gas	30% H_2O CH_4	5-35% by volume
Air		Gas	70%	65-95% by volume

Flow 144 (100) 144 46/44

144 073 46/44

073 46/44 (9) 46/44

0657 46/44

5.13 46/44

144 073 46/44

Calculate number should be described as fully as possible.

$$EF = \frac{5.13}{10.25} \times \frac{10.25}{10.25} = \frac{10.25}{10.25}$$

1000 46/44 46/44

1 Reactivity 46/44 738

III. Continued For stream flow shown on block diagram by letter B.

5. Sampling procedure.

Standard cross procedure was followed.

6. Analytical procedure.

See page 11.

7. Sampling frequency.

initially 2-4 times per month - when startup; now only
3 times per month; once per month. 4% error
in data. Note - venting in wet con-
ditions will reduce accuracy of data.

III. Continued For stream flow shown on block diagram by letter B.

2. Composition variation.

Due to variation in feed stream to recovery system.
See Stream A.

3. Extraction rate during sampling.

None.

4. Method used to determine composition and flow.

Direct flowmeter.

III. Continued. The stream flow shown on block diagram by letter B

8. Confidence level.

1 1/2

9. Amount of odors.

Odors are readily available.

10. Odor problem. (Circle yes or no or mark "not applicable")

Is the odor of this emission ever detectable at ground level

on the plant property? Yes/no Off the plant property? Yes/no

If odors carry beyond the plant property are they detectable
frequently? Yes/no frequently? Yes/no have you received a

community odor complaint traceable to this source in the past

year? Yes/no Has the odor or material been chemically identified?

Yes/no What is it? Does not apply.

III. Interfered (composition and flow).

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Stream flow shown on block diagram by letter C

1. Flow 100,000 Temperature 260°F Pressure at 1000 ft 150

Compound	Formula	State	Average amount or composition	Composition Range
Poly Vinyl Chloride	$(C_2H_3Cl)_n$	Solid	10,000 lb/yr.	7-12,000 lb/yr.
Pertinente			20,000 lb/yr.	Does not apply.

* Poly vinyl chloride should be detected as early as possible. Poly vinyl chloride is not detected in 100

100 lb of poly vinyl chloride

III. Continued For stream flow shown on block diagram by letter _____.

2. Composition variation.

Production requirement. Establish a variation in composition; i.e., production rate.

3. Production rate variation.

Production rate.

4. Method used to determine composition and flow.

By using specifications and component measurements.

III. Continued For stress flow shown on block diagram by letter _____.

5. Sampling procedure.

Never sampled.

6. Analysis procedure.

Not analyzed.

7. Sampling frequency.

None.

III. Continued For stream flow shown on block diagram by letter C.

8. Confidence level.

± 10%

9. Ease of sampling.

10 sample bags are easily available.

10. Comments. (Circle yes or no or mark "not applicable")

Is the odor of this emission ever detectable at ground level
on the plant property? Yes/no Off the plant property? Yes/no

If odors carry beyond the plant property are they detectable
infrequently? Yes/no Frequently? Yes/no Have you received a
community odor complaint traceable to this source in the past

year? Yes/no Has the odorous material been chemically identified?
Yes/no What is it? _____

III. Reactions (composition and flow).

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Stations flow shown on block diagram by letter A-F.

1. Heat, 1000000 Temperature 110°F Pressure 14.5 of water.

Component	Formula	Weight	Average amount or composition	Composition Range
Heat	H_2O	1000000	1000000	1000000
Pressure				
Temperature				

8,000,000/1000

Heat should be described as follows: Heat, 1000000, 1000000, 1000000, 1000000, 1000000, 1000000.

III. Continued For stress flow shown on block diagram by letter 5 A K.

5. Sampling procedure.

Never sampled.

6. Analytical procedure.

Never analyzed.

7. Sampling frequency.

None as no H_2 above.

III. Continued For stream flow shown in block diagram by letter B 2

8. Confidence level.

100%

9. Control schedule.

no control schedule available. schedule is under a review at this point.

10. Odor control. (Circle yes or no or mark "not applicable")

Is the odor of this emission ever detectable at ground level on the plant property? Yes/no Off the plant property? Yes/no

If odors carry beyond the plant property are they detectable infrequently? Yes/no Frequently? Yes/no Have you received a

community odor complaint traceable to this source in the past year? Yes/no Has the odoriferous material been chemically identified?

Yes/no What is it? _____

III. Experiments (composition and flow).

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Section flow shown on block diagram by letter 2

1. Flow (1000000) Temperature 160° Pressure 1000 psi

Component	Formula	State	Average amount or composition	Composition
Gas	C_2H_4	Gas	4.1	4.1
Paraffin	$C_{10}H_{22}$	Solid	4.1	4.1

0.12 27,000,000/yr.

$$E F = \frac{10.33}{100,000} = 24.1^\circ C$$

* The distance between should be described as fully as possible. At 1000 psi 1000000 psi.

At 1000 psi 1000000 psi.

III. Continue! For an asm flow sheet or block diagram by letter _____.

2. Composition variation.

Composition will be a function of rate (FVC) into collector.

3. Indicator and/or detector readings.

None in this case.

4. Method used to determine composition and flow.

Ordinary flow meters.

III. Continued. For stream flow shown on block diagram by letter _____.

5. Simplified procedure.

Only usual.

6. Modified procedure.

Only usual.

7. Procedure to show

how to simplify.

VII. Continued. Per stream flow shown on block diagram by letter B

8. Confidence level,

± 10%

9. Time of sampling,

No time available - info. on who makes sampling
available only.

8. SPILLAGE 10. Identification (Circle yes or no or write "Not applicable")

Is the odor of this emission ever detectable at ground level
on the plant property? Yes/no Off the plant property? Yes/no

If odors carry beyond the plant property are they detectable
occasionally? Yes/no Frequently? Yes/no Have you received a

community odor complaint traceable to this source in the past

year? Yes/no Has the odorous material been chemically identified?

Yes/no What is it? _____

III. Flow Diagram (Composition and Flow).

See copies provided
this section

See flow diagram on block diagram by letter II.

1. Flow Diagram Temperature 100° Pressure 1000 psi

Composition	Flow Diagram	Temperature	Pressure	Flow Rate	Flow Direction	Flow Rate	Flow Direction
CO ₂	100%	100°	1000	1000	1000	1000	1000
CH ₄	100%	100°	1000	1000	1000	1000	1000
N ₂	100%	100°	1000	1000	1000	1000	1000
H ₂	100%	100°	1000	1000	1000	1000	1000
Other	100%	100°	1000	1000	1000	1000	1000

See flow diagram by letter II.

See flow diagram by letter II.

See flow diagram by letter II.

III. Continued For series filed under or filed directly by the [unclear]

2. Continuation-in-part

See explanation for item 1.

3. Divisional application

See item 1.

4. Reissue application

See item 1.

III. Continued. For direct flow shown in block diagram by letter P or Q.

5. Sampling procedure.

See Figure D.

6. Analytical procedure.

See Figure D.

7. Sampling frequency.

See Figure D.

III. Contoured Bar stream flow shown in block diagram by letter W

8. San Marcos River

$\pm 10\%$

9. San Marcos River

From the sections available

10. San Marcos River (circle yes or no or mark "not ascertainable")
Have you ever detected any odor at ground level on the plant property? Yes/no Off the plant property? Yes/no
If odors occur beyond the plant property are they detectable at a distance? Yes/no Frequently? Yes/no Have you received a complaint from anyone outside the plant?
If so, what is the nature of the complaint? San Marcos River
If so, what is the nature of the complaint? San Marcos River
If so, what is the nature of the complaint? San Marcos River

Figure 1. The effect of the concentration of the *Agrobacterium* strain on the transformation efficiency of *Agrobacterium* strain 1024. The concentration of the *Agrobacterium* strain was 10⁶ cells/ml (A), 10⁷ cells/ml (B), 10⁸ cells/ml (C), 10⁹ cells/ml (D), 10¹⁰ cells/ml (E), and 10¹¹ cells/ml (F). The transformation efficiency was determined by the number of transformants per 10⁶ cells of the *Agrobacterium* strain. The data are the mean $\pm$ SD of three independent experiments. The asterisk (*) indicates a significant difference from the control (p < 0.05).

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158

100

10

[illegible]

2/4

152

111. Continued For six of files shown on block diagram of letter 19.

2. Communication

See explanation Stream C.

3. Problems and Service Number

Never visited.

4. Method used to determine approximate age of files

Under file no. 1000000.

[illegible]

How many samples?

[illegible]

Lycopodium obscurum, L.

77. Continued. Do other flies show no black pigment by letter H.....

8. Confidence level.

± 10

9. Humidity level.

no significant change in humidity level

10. Significant? (Select yes or no or "not applicable")

REMARKS:

Is there a significant difference in "mean level" of the water present? Yes/no. If not, what is the level? If flies carry beyond the plant property are they detectable in the air? Yes/no. Frequency? Yes/no. Have you received a complete data recording system for this purpose in the past year? Yes/no. Has any disease or other been clinically identified? Yes/no. That is all.

Office Memorandum

TO : Mr. Tolson
 FROM : Mr. Clegg
 SUBJECT: [illegible]
 RE: [illegible]

[illegible text block]

FR 124617

[illegible text block]

III. Continued For a more flow sheet on this stream see the following.

2. Continued on flow sheet.

See stream 1.

3. Continued on flow sheet.

See stream 1.

4. Continued on flow sheet. Continued on flow sheet.
continued on flow sheet.

III. Continued. The second line again as third diagram by letter H.

1. Drawing of letters.

Lower letters.

2. Drawing of letters.

Lower letters.

3. Drawing of letters.

Lower letters.

8. Confidence is a virtue.

210

[illegible]

111. Continued. For each of the above, sketch a graph of $f(x)$ on $[0, 2\pi]$.

2. *Graphical solution.*

One graph of $f(x)$ is shown below.

3. *Graphical solution.* The graph of $f(x)$ is shown below.

One graph of $f(x)$ is

4. *Graphical solution.* The graph of $f(x)$ is shown below.

One graph of $f(x)$ is shown below.

S. Amphispiza bilineata

4. 30%

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971) using a Shimadzu 1010 spectrophotometer.

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

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100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

100% (average 100% of 100%)

[illegible]

1. *Phragmites* (common)

On the other hand, the results of the present study suggest that the use of a single, non-validated questionnaire may not be sufficient to assess the prevalence of the disease. The use of a validated questionnaire, such as the one used in the present study, may be more appropriate for the assessment of the prevalence of the disease.

III. Continued. (See page 116 for description of figures.)

5. *Prothion*
See page 116.

6. *Prothion*
See page 116.

7. *Prothion*
See page 116.

17. Location of the alarm clock shown on floor plan to letter _____

8. Confidence level.

± 11%

9. Estimated value

£ 100,000

10. High/Low/Low: (a) Is your estimate of the low/Low/Low?
Is the aim of this mission to be detectable at ground level?
on the plane property? Yes/no. (b) Is the plane property?

Yes/no. If your survey covers the plane property are they
detectable at ground level? Yes/no. (c) Is the plane property?

Have you received a community of the ground level? Is this
source in the ground level? Yes/no. Has the alarm system
been previously identified? Yes/no. What is it?

RECAP

Site of the ...
Cada

(1)

...

...

(2)

...

... or boat
...

...

...

873 16/11
850 16/11

3

→ 62.5

100 °F
50 °F

THEORY OF THE EARTH

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UNITED STATES DEPARTMENT OF THE ARMY

Form 100-10 (Rev. 1-1-60)
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Do not write in these spaces

1. NAME (Last, first, middle initial) JOHN W. BROWN

2. GRADE V. J. 100-10

3. ORGANIZATION (Include branch, division, and post office) Headquarters, Department of the Army, Washington, D.C.

4. TITLE (Include branch, division, and post office) Chief of Staff

5. ADDRESS (Include branch, division, and post office) 1000 Army Avenue, Washington, D.C. 20315

6. TELEPHONE (Include branch, division, and post office) 203-1500

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10. EFFECTIVE DATE (Include branch, division, and post office) 1000 Army Avenue, Washington, D.C. 20315

11. DATE 1000 Army Avenue, Washington, D.C. 20315

12. SIGNATURE (Include branch, division, and post office) 1000 Army Avenue, Washington, D.C. 20315

13. OFFICIAL USE ONLY

UNITED STATES DEPARTMENT OF AGRICULTURE

OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

Report of the Secretary of Agriculture

to the President of the United States

For the Year

1955

The Secretary of Agriculture

has the honor to acknowledge

the receipt of your letter of the 10th day of January, 1956,

concerning the

subject of

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of the

of the

195

Not Total
Due

to the
of the

