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Item Removal Form

Collection Number: MC 62

Collection Title: William H. Johnson Papers

Series: 7, Tobacco Freeze-Drying Research Correspondence

Box Number: 41

Folder Number: 6

Folder Title: American Tobacco Co., American Brands, 1958-1971

Description of item(s):

Handwritten data sheets (5), 1958

Reason for removal: Oversize

Removed to: Flat File 4

Date of Removal: 1/17/07

Staff Initials: ARC

This sheet is to be used whenever an item is physically removed from its original location within a collection and placed in a separate housing location. The form should be filled out and printed in duplicate, with one copy remaining in the original filing location and one placed with the item(s) in the new location.

2/9/2005



CABLE ADDRESS:
POW HATTAN

The American Tobacco Company

A DIVISION OF AMERICAN BRANDS, INC.

245 Park Avenue
New York, N.Y. 10017

ADDRESS REPLY TO:
DEPARTMENT OF RESEARCH & DEVELOPMENT
THE AMERICAN TOBACCO COMPANY
P. O. BOX 799
HOPEWELL, VA. 23860

October 14, 1971

Dr. K. R. Keller, Assistant Director
In Charge Tobacco Research
North Carolina State University
P. O. Box 5847
Raleigh, North Carolina 27607

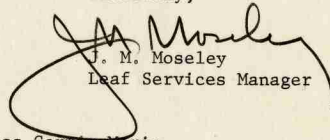
Dear Ken:

I will retire from The American Tobacco Company on December 31, 1971, and will be employed for an indefinite period by the Columbia Tobacco Company, Inc., located at 305307 Jose Rizal Street, Mandaluyong, Rizal, Manila, The Philippines. In my work there, I will be concerned with grading, blending, quality control, and improvement of quality of both flue-cured and burley tobaccos.

Please address all future correspondence concerning cooperative agricultural research to Dr. Preston H. Leake, Assistant Research and Development Director of The American Tobacco Company.

I have enjoyed my association with you and others at N. C. State concerned with tobacco production research, and I wish you success in the years ahead. If I can be of service at any time, I hope that you will call upon me.

Sincerely,


J. M. Moseley
Leaf Services Manager

MWT

cc: Dr. W. K. Collins ✓
Dr. W. H. Johnson
Dr. G. L. Jones
Dr. G. B. Lucas
Dr. D. F. Matzinger
Dr. J. A. Weybrew
Dr. W. G. Woltz
Dr. J. C. Rice

Miss Carmel Marin
Mr. F. A. Todd
Dr. C. B. McCants
Dr. T. J. Mann
Dr. C. J. Nusbaum
Mr. H. F. Ross
Dr. Jack Sheets
Dr. R. E. Welty



CABLE ADDRESS:
POWATTAN

The American Tobacco Company

A DIVISION OF AMERICAN BRANDS, INC.

245 Park Avenue
New York, N.Y. 10017

November 9, 1970

ADDRESS REPLY TO:
DEPARTMENT OF RESEARCH & DEVELOPMENT
THE AMERICAN TOBACCO COMPANY
P. O. BOX 799
HOPEWELL, VA. 23860

Dr. William H. Johnson
Department of Biological and
Agricultural Engineering
North Carolina State University
Box 5906
Raleigh, North Carolina 27607

Dear Bill:

Polyphenol Content - Freeze Drying Study, BAE 126, NCSU

We are handing you today 35,400 cigarettes which we manufactured from tobacco supplied by you. We have coded these samples 21 through 28, and the appropriate code appears on the individual packages and on the exterior of the cartons. Two of the lots were made at two different weights, and the cartons bear the notations "Light" and "Heavy." We are retaining 200 cigarettes from each of the ten lots for the determination of circumference and pressure drop. Results of these measurements will be forwarded when available.

		Code	No. of Cigarettes
Black	CK	6 21	5,200 ✓
	CKFD	6 22 - Light	2,400 ✓
		- Heavy	1,600 ✓
"	HT	6 23	3,200 ✓
"	HTFD	6 24	1,200 ✓
"	HTL	6 25	4,200 ✓
"	HTLFD	6 26	5,600 ✓
"	CK plus CKFD, 70%:30%	6 27 - Light	2,800 ✓
		- Heavy	3,400 ✓
"	HT plus HTFD, 70%:30%	6 28	5,800 ✓
Total:			35,400

Received 12/31/70

5000 #22 CKFD (Red)

5000 #24 HTFD (Red)

JMM:MWT

Sincerely yours,

J. M. Moseley, Manager
Basic Materials Research

American Tobacco samples shipped to us 12/2/70
received by us 12/3/70

Samples
(2 lb)
(shredded)
HTLFD
HTL
HTFD
HT
CK
CKFD

Samples
(5 lb)
(strip)
CK
HTL
HT

BAE 126

FEB. 1968

2

ORDER FOR SUNDRY SHIPMENT

SHIPPING MEMORANDUM

DEPT. OF RESEARCH
 PACK WITH SHIPMENT
 THE AMERICAN TOBACCO COMPANY
 A DIVISION OF AMERICAN BRANDS, INC.
 P. O. BOX 799
 HOPWELL, VIRGINIA

SHIP TO DR. WILLIAM H. JOHNSON
DEPT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING
NORTH CAROLINA STATE UNIVERSITY
RALEIGH, NORTH CAROLINA

VIA Truck CHARGES PREPAID
 ORDER NO. _____ AUTHORITY E E CONKLING

CASE NOS.	QUANTITY	DESCRIPTION	PRICE	EXTENSION	TOTAL
	10,000	Tax Free Experimental 85 m/m Unmonogrammed 20's/200 Cigarettes			
Permission Granted 12-22-70 By AT&F Div., Internal Revenue Service For Shipment Of Above Cigarettes					
CALCULATIONS BILLED CHECKED ACCT. DIS. TRIBUTION MONTH	VOUCHER APPROVED BY VOUCHER NO.	ORDER PREPARED BY <u>E E CONKLING</u> BILL TO CHARGE ACCOUNT NO. CREDIT ACCOUNT NO.	ORDER APPROVED BY <i>E E Conkling</i>	POSTED TO SUBSIDIARY RECORD	

N^o R-1490

DECEMBER 29, 1970

DATE
 DEPT RESEARCH & DEVELOPMENT
 DEPARTMENT

		BY
DATE PACKED	12-29-70	<i>EC</i>
NUMBER OF CASES	1 F Bx	<i>EC</i>
GROSS WEIGHT	24 Lb	<i>EC</i>
DATE CHECKED	12-29-70	<i>EC</i>
DATE SHIPPED	12-29-70	<i>EC</i>
ROUTE	Overnite Transportation	
RATE IF PREPAID		
CHARGES IF PREPAID		

*Discussion with J.M. Mosley
8/21/70*

EXPERIMENT TITLE: Polyphenol Content - Freeze Drying Studies, BAE 126, 1969-70

I. Introduction

During 1967 and 1968, laboratory and field investigations were conducted with emphasis on characterization of oxidative browning in flue-cured tobacco. Laboratory studies were aimed at evaluating effects of variety and leaf position on rate and extent of discoloration; whereas field curing studies were for the purpose of obtaining comparative chemical and smoke evaluation for control vs heat treated materials. Of particular interest was the result that polyphenols may be reduced up to 85% when oxidative browning occurs under optimal conditions. Furthermore, there was indication of slight reduction in nicotine levels.

Along separate lines, research in freeze drying had demonstrated marked modification of physical structure to provide filling capacity increases up to 100% or greater.

Both of the above research findings implied potential means for modifying smoke chemistry or smoke characteristics of interest to the tobacco industry. In the first case, it was considered that the heat treatment alone enables opportunity for evaluating the effect of either polyphenols or polymerized pigment on smoke phenol formation or other smoke constituents. With respect to freeze drying, modifications of physical structure was considered important in modifying the nature of combustion and level of combustion products. TPM, in particular, should be reduced somewhat proportionately with reduction of tobacco per cigarette.

II. Objectives

1. To study the effects of thermal modification of leaf constituents in combination with physical structure changes with freeze drying.

2. To evaluate, as completely as possible, product characteristics on basis of chemical analyses of cured tobacco, manufacturing characteristics, smoke panel evaluations, and smoke chemistry.

III. Procedure

A. Production of Tobacco - Tobacco (C 319, 1.5 acres) was grown at the Oxford Tobacco Research Station during 1969 under normal cultural practices including MH-30 for sucker control and with irrigation as required.

B. Curing and Heat Treatment for Thermal Modifications - Tobacco was harvested at weekly intervals to provide 6 cures. At harvest the tobacco was randomized and strung on sticks to provide three main treatments as follows:

1. Check (CK) - normally yellowed and dried by conventional flue-curing schedule.
2. Heat treated in curing chamber (HT) - normally yellowed, heat treated in chamber following completion of yellowing, normal drying as in (1) above.
3. Heat treatment in laboratory (HTL) - normally yellowed, heat treatment under infrared, normal drying as in (1) above.

All tobacco was yellowed in the same curing barn. Then tobaccos receiving heat treatment were removed, given heat treatments, and returned to the same barn for drying. This assured that heat treatment was the only variable imposed on the materials.

Heat treatment in the chamber was conducted within about 1 1/2 hours. Tobacco was placed on two tiers within a small compartment bulk curer. The chamber was closed tightly and temperature advanced within about 30-40 minutes to 170°F for effective "triggering" of oxidative browning. The vents were then opened and the tobacco cooled to near ambient then removed and replaced in the main curing unit.

Heat treatment in the laboratory consisted of first turgoring leaves by immersing petioles in water, then submitting leaves to a sudden infrared heat treatment for 20 seconds sufficient to elevate leaf temperature to 170°F. The reaction was complete within 30 minutes at room temperature.

- C. Post-Curing Handling of Tobacco - Tobacco for each treatment was composited over primings and blended together to form a homogeneous sample. Samples were held in cold storage from September - December, 1969. Samples were redried, separating lamina from midribs. Following redrying, samples were submitted to accelerated aging then shredded into cigarette rag by a cooperating company.
- D. Freeze Drying of Cured Tobacco Shreds - A portion of each of the three samples have been returned to the laboratory for freeze drying, to effect change in physical structure. Five-pound "thief" samples are being held in cold storage for chemical analyses, with evaluations on these lots to represent before aging analyses. Tobacco to be freeze dried will be handled in such fashion as to minimize breakage of shreds. Pre-conditioning before freeze drying may be found necessary. Tobacco will be placed into trays to form mats of approximately 1/2-inch thickness. Automatic turgor conditioning equipment will be used to establish a water/solids ratio of about 4 to 4.25/1. Rapid freezing will precede placement of trays into the freeze dryer. Freeze drying will follow standard schedules of platen temperature vs time with expected cycle time of 12-14 hours in our laboratory unit. Following drying, samples will be conditioned to 13-15% moisture for safe handling and then sealed in 6 mil plastic bags. Samples will be held at cold storage until submitted for manufacturing of experimental cigarettes.

E. Manufacture of Experimental Cigarettes - Eight types of experimental cigarettes are planned as follows:

	<u>Smoke Points</u>
1. Check (CK)	1 vs 3
2. Check, freeze dried (CKFD)	4 vs 6
3. Blend A, CK plus CKFD, 70%:30% by weight	1 vs 4
4. Heat treated (HT)	1 vs 2
5. Heat treated, freeze dried (HTFD)	1 vs 5
6. Blend B, HT plus HTFD, 70%:30% by weight	
7. Heat treated in laboratory (HTL)	
8. Heat treated in laboratory, freeze dried (HTLFD)	

IV. Analyses

A. Chemical Analyses of Tobacco Before (3) and After (6) Aging

<u>Constituents</u>	<u>Laboratory for Analysis</u>
Organic Acids	
Total Volatile Acids	
α -Amino Nitrogen	- Louillard - 30 gm
Water Soluble Acids	- Louillard - 20 gm
Total Volatile Bases	American
Nicotine	American
TVB - Nicotine	American
Sugars (before and after inversion)	Tob. Lab. (Weeks)
pH	American
Individual Alkaloids	Tob. Lab. (Weeks)
Polyphenols (total)	Tob. Lab. (Weeks)
Ind. Amino Acids	
Ash	American
Calcium	American
Other	Reynolds?

KEEP (P. 170112)

*Indis.?
also.*

B. Physical Properties

<u>Item</u>	<u>Laboratory for Analysis</u>
Pressure Drop	American
Circumference	American
Firmness	American
Color	American
Filling Power	Louillard - American
Moisture Equilibrium	Louillard - American
Other	particle size through screens - American

Possibility: Dr. Simon H. Wander - Dept. of Chemistry
Univ. of Oklahoma, Norman, Okla.
(Lab. Polyphenols)

October 27, 1970

Mr. J. M. Moseley, Manager
Basic Materials Research
The American Tobacco Company
Department of Research and Development
P. O. Box 799
Hopewell, Virginia 23860

Dear Marshall:

I appreciate receiving your letter of October 22, regarding results of filling power determinations on the shredded samples from the BAE 126 experiment.

The results are surprising, as you pointed out, in that the thermal treatment not only affects the filling capacity of the cured shred but also, apparently, the expansive effect achieved by freeze drying. I have pondered the question of what factors are really coming into play? Perhaps modification of solubility characteristics, chemical composition, or membrane properties are involved. We will need to discuss these in depth at our next meeting.

I hope that you have continued success in handling and processing the materials for cigarettes and look forward to hearing from you when they are ready.

With best personal regards,

Sincerely yours,

Bill
William H. Johnson,
Professor

WHJ/kp

Meeting with Imperial

Polyphenol Content--Freeze Drying Studies

Biological and Agricultural Engineering--126
1969-70

A. Types of Experimental Cigarettes

1. Check (CK)
2. Check, freeze dried (CKFD)
3. Blend A, CK plus CKFD, 70%:30% by weight
4. Heat treated (HT)
5. Heat treated, freeze dried (HTFD)
6. Blend B, HT plus HTFD, 70%:30% by weight
7. Heat treated in laboratory (HTL)
8. Heat treated in laboratory, freeze dried (HTLFD)

B. Chemical Analyses of Tobacco (1) Before and (2) After Aging

<u>Constituents</u>	<u>Laboratory for Analysis</u>
1. Organic Acids	Imperial Tob. Co.
2. Total Volatile Acids	
3. α -Amino Nitrogen	Lorillard Corp.
4. Water Soluble Acids	Lorillard Corp.
5. Total Volatile Bases	American
6. Nicotine	American, IMPERIAL
7. TVB - Nicotine	American,
8. Sugars (before and after inversion)	IMPERIAL
9. pH	AMERICAN
10. Individual Alkaloids	Tob. Lab. (NCSU)
11. Individual Polyphenols (total)	Tob. Lab. (NCSU)
12. Individual Amino Acids	Imperial
13. Ash-Calcium	
14. Chloride	
15. INDIVIDUAL POLYPHENOLS	IMPERIAL

C. Physical Properties

<u>Item</u>	<u>Laboratory for Analysis</u>
1. Pressure Drop	American
2. Circumference	American
3. Firmness	American
4. Color	American
5. Filling Power	Lorillard Corp., AMER
6. Moisture Equilibrium	Lorillard Corp., AMER.
7. Others	

Handwritten notes at the top of the page, partially obscured.

JR RALPH POWELL
RESEARCH DIRECTOR
W.D. HO WILLS
BRISTOL

BRIAN LOCKYEAR
TECHNICAL MANAGER
OGDEN'S
LIVERPOOL

Polymorph Content - Freeze Drying Studies
Biological and Agricultural Engineering
1959-70

A. Types of Experimental Cigarettes

1. Check (CK)
2. Check, freeze dried (CKFD)
3. Blend A, CK plus CKFD, 70%:30% by weight
4. Heat treated (HT)
5. Heat treated, freeze dried (HTFD)
6. Blend B, HT plus HTFD, 70%:30% by weight
7. Heat treated in Laboratory (HTL)
8. Heat treated in Laboratory, freeze dried (HTLFD)

B. Chemical Analyses of Tobacco (1) Before and (2) After Aging

Laboratory for Analysis Constituents

- | | |
|--|------------------|
| 1. Organic Acids | American |
| 2. Total Volatile Acids | Top. Lab. (NCSU) |
| 3. 2-Amino Nitrogen | Top. Lab. (NCSU) |
| 4. Water Soluble Acids | American |
| 5. Total Volatile Bases | American |
| 6. Nicotine | American |
| 7. TVE - Nicotine | American |
| 8. Sugars (before and after inversion) | American |
| 9. pH | American |
| 10. Individual Alkaloids | American |
| 11. Total Alkaloids (total) | American |
| 12. Individual Amino Acids | American |
| 13. Ash-Calcium | American |
| 14. Chloride | American |
| 15. Total Phosphorus | American |

C. Physical Properties

Laboratory for Analysis Item

- | | |
|-------------------------|----------|
| 1. Pressure Drop | American |
| 2. Circumference | American |
| 3. Firmness | American |
| 4. Color | American |
| 5. Blowing Power | American |
| 6. Moisture Equilibrium | American |
| 7. Others | American |

D. Smoke Analyses

<u>Constituents</u>	<u>Laboratory for Analysis</u>
1. Nicotine	Lorillard Corp.
2. TPM	Lorillard Corp.
3. Total Vapor Phase (Acrolein, Aldehydes)	
4. Total Phenols	<i>IMPER</i>
5. Individual Phenols	<i>IMPER.</i>
6. Hydrogen Cyanide	Lorillard Corp.
7. Carbon Monoxide	Lorillard Corp.
8. Nitric Oxide	
9. pH	
10. Total Aldehydes	
11. Total Volatile Bases	
12. Hydrogen Sulfide	
13. Benzopyrene	

Polyphenol Content--Freeze Drying Studies

Biological and Agricultural Engineering--126
1969-70

A. Types of Experimental Cigarettes

1. Check (CK)
2. Check, freeze dried (CKFD)
3. Blend A, CK plus CKFD, 70%:30% by weight
4. Heat treated (HT)
5. Heat treated, freeze dried (HTFD)
6. Blend B, HT plus HTFD, 70%:30% by weight
7. Heat treated in laboratory (HTL)
8. Heat treated in laboratory, freeze dried (HTLFD)

B. Chemical Analyses of Tobacco (1) Before and (2) After Aging

<u>Constituents</u>	<u>Laboratory for Analysis</u>
1. Organic Acids	
2. Total Volatile Acids	
3. α -Amino Nitrogen	Lorillard Corp.
4. Water Soluble Acids	Lorillard Corp.
5. Total Volatile Bases	American
6. Nicotine	American
7. TVB - Nicotine	American
8. Sugars (before and after inversion)	
9. pH	<i>American</i>
10. Individual Alkaloids	Tob. Lab. (NCSU)
11. Individual Polyphenols (total)	Tob. Lab. (NCSU)
12. Individual Amino Acids	
13. Ash-Calcium	
14. Chloride	<i>> L.M.</i>

C. Physical Properties

<u>Item</u>	<u>Laboratory for Analysis</u>
1. Pressure Drop	American
2. Circumference	American
3. Firmness	American
4. Color	American
5. Filling Power	Lorillard Corp., <i>Amer.</i>
6. Moisture Equilibrium	Lorillard Corp., <i>Amer.</i>
7. Others	
<i>Particle Size</i>	<i>American</i>

D. Smoke Analyses

<u>Constituents</u>	<u>Laboratory for Analysis</u>
1. Nicotine	Lorillard Corp.
2. TPM	Lorillard Corp.
3. Total Vapor Phase (Acrolein, Aldehydes)	
4. Total Phenols	
5. Individual Phenols	
6. Hydrogen Cyanide	Lorillard Corp.
7. Carbon Monoxide ← CO ₂ ?	Lorillard Corp.
8. Nitric Oxide	
9. pH	
10. Total Aldehydes	
11. Total Volatile Bases	
12. Hydrogen Sulfide	
13. Benzopyrene	

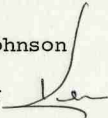
NORTH CAROLINA STATE UNIVERSITY | AT RALEIGH

SCHOOL OF AGRICULTURE AND LIFE SCIENCES

AGRICULTURAL EXPERIMENT STATION
Box 5847 Zip 27607

August 26, 1970

MEMORANDUM TO: W. H. Johnson

FROM: Kenneth R. Keller 

SUBJECT: Conference with John S. Campbell

This is to confirm our visit with John S. Campbell, American Leaf Organization, Imperial Tobacco Group, Ltd. on September 8 at 9 a.m. I will meet you in front of the Agricultural Engineering Building at 7:45. This should allow us ample time to meet with John at 9 o'clock.

KRK:sh

August 24, 1970

Mr. J. W. Moseley, Manager
Basic Materials Research
The American Tobacco Company
Dept. of Research & Development
P. O. Box 799
Hopewell, Virginia 23860

Dear Marshall:

I appreciate the time that you and Drs. Glock and Burke gave me Friday for further discussion and plans concerning the project on Polyphenol Content-Freeze Drying of Tobacco. Your further suggestions will be most helpful to us in regards to chemical analyses and evaluation.

In summarizing further plans at this stage, I made note that the freeze-dried samples will be evaluated for moisture contents as delivered, and equilibrated for EMC and filling capacity prior to cigarette manufacturing. You will attempt to make all cigarettes to uniform pressure drop within the limits of your equipment. Also, that the unused portion of CK and HT samples will be retained for possible additional runs or experiments at NCSU.


I hope that you find the samples satisfactory from the standpoints of filling capacity, shred separability, etc. I will be interested in knowing these results and will appreciate your giving me a call when you get to this stage. Also, if you need additional material processed, this can easily be done within a few days.

The proposed schedule of completing manufacture of the experimental cigarettes by the end of September is quite suitable.

Thank you again for your fine cooperation in this study. I hope everything can be arranged so that you will be able to make the trip to Hamburg.

With kind regards,

Sincerely yours,


William H. Johnson
Professor

WHJ/ser

cc: Dr. K. R. Keller

NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

SCHOOL OF AGRICULTURE AND LIFE SCIENCES

AGRICULTURAL EXPERIMENT STATION
Box 5847 Zip 27607

August 17, 1970

MEMORANDUM TO: W. H. Johnson

FROM: Kenneth R. Keller

SUBJECT: Suggestions by Drs. A. W. Spears and Lewis, Lorillard Corporation

Panelists Questions and Evaluation

1. Do the cigarettes differ?

- | | |
|------------------|----------------------|
| a. Harshness | e. Mildness |
| b. Strength | f. Draw |
| c. Weakness | g. Throat irritation |
| d. Tobacco taste | h. Peppery |

In other words, if the cigarettes differ, then use a number of questions to determine how they differ, such as:

Full bodied
Mellow taste
After taste
Non-harshness
Non-irritating
Burn rate

Dr. Spears suggested the use of a minimum number of samples.

Dr. Spears also suggested an evaluation of particle size re. physical properties.

See Dr. Weybrew re. his series of screens and techniques.

Use 100-gram samples -- shake for one minute.

KRK:sh

UNIFORM STRAIGHT BILL OF LADING- ORIGINAL- NOT NEGOTIABLE-DOMESTIC

RECEIVED, Subject to the classifications and tariffs in effect on the date of issue of this Bill of Lading.

OVERNITE TRANSPORTATION COMPANY

MAIN OFFICE: RICHMOND, VA.

CONSIGNEE Dr William H Johnson, Dept of Biological and Agricultural Engineering DATE December 29, 1960
North Carolina State University, Raleigh, N C

SHIPPER Dept of Research & Development, The American Tobacco Co, A Div of Amer Brands, Inc ORIGIN FF2 R-1490
Enon Church Road, Bermuda District, Chester, Va SHIPPER'S NO.

Route _____ Vehicle Initials _____ No. _____

Delivering Carrier _____ C.O.D. charge to be paid by Shipper Consignee

No. Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	* Weight (Subject to Correction)	Class or Rate	Check Column
1	F Bx Cigarettes, 25 Inches or More	24 Lbs		

**DO NOT
WRITE IN
THIS SPACE**

* If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."
 NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

If charges are to be prepaid, write or stamp here, "To be Prepaid."

PREPAID
Charges Advanced:

Received \$ _____
to apply in the prepayment of the charges on the property described hereon.

Agent or Cashier:

Subject to Section 7 of Conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
 The carrier shall not make delivery of the shipment with out payment of freight and all other lawful charges.

Signature of consignor:

Collect, On Delivery

This is to certify that the above articles are properly described by name and are packed and marked and are in proper condition for transportation according to the regulations prescribed by the Interstate Commerce Commission.

the property described above, in apparent good order, except as noted contents and condition of contents of packages unknown, marked, consigned, and destined as shown above which said company the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract agree to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway, route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

1 Per RESEARCH & DEVELOPMENT Shipper Per [Signature] Agent.
 Permanent Address of Shipper: AMERICAN TOBACCO COMPANY
A DIVISION OF AMERICAN BRANDS, INC.
P. O. BOX 799
HOPEWELL, VIRGINIA

UNIFORM STRAIGHT BILL OF LADING— ORIGINAL—NOT NEGOTIABLE—DOMESTIC

RECEIVED, Subject to the classifications and tariffs in effect on the date of issue of this Bill of Lading.

OVERNITE TRANSPORTATION COMPANY

MAIN OFFICE: RICHMOND, VA.

DEC 2, 1970

CONSIGNEE	STREET ADDRESS	DESTINATION	DATE
DR WILLIAM H JOHNSON, DEPT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING	NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NORTH CAROLINA		
SHIPPER	STREET ADDRESS	ORIGIN	SHIPPER'S NO.
DEPT RESEARCH & DEVELOPMENT, THE AMERICAN TOBACCO CO A DIVISION OF AMERICAN BRANDS INC.	ENON CHURCH ROAD, BERMUDA DISTRICT, CHESTER, VIRGINIA		FF 2 # R- 1277

Route	Vehicle Initials	No.	
Delivering Carrier	C.O.D. charge to be paid by	Shipper <input type="checkbox"/>	Consignee <input type="checkbox"/>

No. Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Subject to Correction)	Class or Rate	Check Column
1	F Bx Unmanufactured Tobacco	33		

**DO NOT
WRITE IN
THIS SPACE**

* If the shipment moves between two parts by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."
 NOIE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
 The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

<p>PREPAID</p> <p>Charges Advanced:</p>	<p>Received \$ _____ to apply in the prepayment of the charges on the property described hereon.</p> <p>Agent or Cashier: _____</p>	<p>Subject to Section 7 of Conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of the shipment with out payment of freight and all other lawful charges.</p> <p>Signature of consignor: _____</p>	<p align="center">Collect, On Delivery</p>
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This is to certify that the above articles are properly described by name and are packed and marked and are in proper condition for transportation according to the regulations prescribed by the Interstate Commerce Commission.

the property described above, in apparent good order, except as noted contents and condition of contents of packages unknown, marked, consigned, and destined as shown above which said company the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract agrees to carry to the usual place of delivery at said destination, if on its own railroad, water line, highway route or route, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

1 Per	<p align="center">DEPT. OF RESEARCH & DEVELOPMENT THE AMERICAN TOBACCO COMPANY Shipper A DIVISION OF AMERICAN BRANDS, INC. P. O. BOX 799 HOPSWELL, VIRGINIA</p>	<p align="right"><i>D. Smith</i> Agent.</p>	<p align="right"><i>Overnite</i></p>
Permanent Address of Shipper			

11/12/70

Dr. T.C. Tso. - Beltville, Md.

1200 cigarettes will be satisfactory !!

Dr. Dietrich Hoffmann

Div. of Environmental Toxicology

Am. Health Foundation

#2 East End Avenue

N. Y., N. Y. 10021

Cigarettes should be equilibrated before
any tests are made -

Mr. Mosely will supply additional cigarettes
of HT, plus 9 samples of unprocessed sheds -

Smoke Panel Evaluations -

2 cartons check = 400 CK

5 packs of each treat = 100 Treatment

- L.M. -
- Brill -
- Emp -

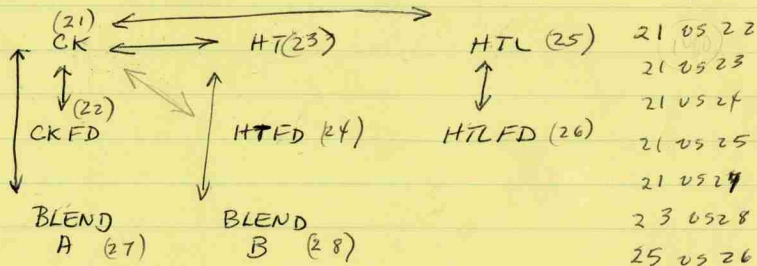
Possible Comparisons

21 21 US 22	(?) - ^{check us CK FD} F.D.	21(4) 22(1) 22(2)
21 US 23	- CK vs HT	25(2) 26(1) 27(1) 28(1)
21 US 25	- CK vs HTL	
21 US 27	- CK vs Blend	21 2000
23 US 28	- HT vs Blend	22 500
25 US 26	- HTL vs HT-FD	23 1000
		25 1000
		26 500
		27 500
		28 500

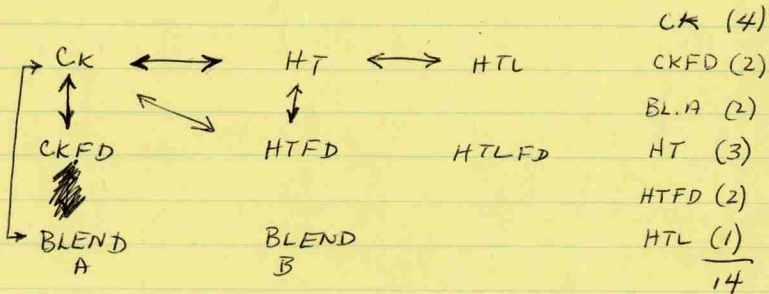
SMOKE PANEL DETERMINATIONS

80-100

PROPOSAL 1



PROPOSAL 2



Smoke Panel

American
Imperial
L. & Myers
Louillard
P. Morris
Universal Leaf
B. & Williamson

Chem. Analyses

American
L & M
Louillard
Imperial

Smoke Analyses

Louillard
L & Myers
Imperial

May 4, 1970

Mr. J. M. Moseley, Manager
Basic Materials Research
The American Tobacco Company
Dept. of Research and Development
P. O. Box 799
Hopewell, Virginia 23860

Dear Marshall:

Re: Meeting to Discuss Polyphenol Content - Freeze
Drying Study, BAE 126

Many thanks for your letter of April 30. May 12 is a
suitable date for Dr. Keller and me; therefore, we will plan
to see you in Richmond around 9:00 a. m. of the 12th. We will
plan to leave Richmond around noon.

With kindest regards.

Sincerely yours,

William H. Johnson
William H. Johnson
Professor

WHJ/pf

cc: Dr. K. R. Keller



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 799
HOPEWELL, VIRGINIA 23860

April 30, 1970

Dr. William H. Johnson
Department of Biological and
Agricultural Engineering
North Carolina State University
Box 5906
Raleigh, North Carolina 27607

Dear Bill:

Polyphenol Content-Freeze Drying Study, BAE-126

We have your letter of April 24, 1970, in which you propose a visit by yourself and Dr. Keller for the purpose of discussing cited project. Any of the proposed dates is suitable and I suggest that you and Dr. Keller plan to come up on May 12th.

We shall look forward to seeing you.

Sincerely,

J. M. Moseley, Manager
Basic Materials Research

JMM:jl

cc: Dr. Kenneth R. Keller

April 24, 1970

Mr. J. M. Moseley, Manager
Basic Materials Research
Department of Research and Development
The American Tobacco Company
P. O. Box 799
Hopewell, Virginia 23860

Re: Polyphenol Content-Freeze Drying Study, BAE 126

Dear Marshall:

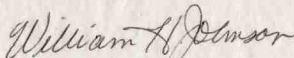
This is to acknowledge receipt of your letter of April 9, 1970, and to indicate that we have received the three, 30-lb lots of tobacco. I have placed the three lots in our storage room at 55°F, where they will be kept until our expanded freeze drying operation is underway. Hopefully, we can be in a position to begin processing by July 1.

In the meantime, I feel that it may be helpful to meet and discuss procedures and plans for processing. We also have a sufficient quantity of tobacco to enable preparation of perhaps a couple of blends, and should discuss this point. Dr. Keller and I would like, if possible, to visit you during the week of May 10. Either of the dates May 12, 13, or 14 would be suitable. If one of these days is agreeable with your schedule, please let us know as soon as possible and we will arrange to drive up.

Your cooperation in this project is greatly appreciated.

With best regards.

Sincerely yours,



William H. Johnson
Professor

WHJ/pf

cc: Dr. K. R. Keller



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 799
HOPEWELL, VIRGINIA 23860

April 9, 1970

Dr. W. H. Johnson
Department of Biological and
Agricultural Engineering
North Carolina State University
Box 5906
Raleigh, North Carolina 27607

Dear Dr. Johnson:

Polyphenol Content-Freeze Drying Study, BAE 126

We are shipping you today via Overnite Transportation Company 30 pounds from each of three lots of tobacco from the above cited experiment, which were identified in your letter of January 20, 1970. All three samples were subjected to a period of accelerated aging in the strip form, subsequently cut at approximately 32 cuts/inch, following which the moisture was reduced to about 12-1/2%. According to the experimental plan which accompanied your letter of October 15, 1969, we drew five-pound thief samples from each of the three lots, prior to aging, for chemical analysis. These are being held in a cold room at about 34°F pending your instructions. The remainder of the cut tobacco will be stored at atmospheric conditions pending your instructions. There was some loss during processing as reflected in the following tabulation of weights.

Sample	Description	Quantity Shipped	Quantity Retained	Total
		to NCSU (pounds)	at AT Co. (pounds)	
1	CK	30 - 10	90	120
2	HT	30 - 10	90	120
3	HTL	30	23	53

*↑ process only
20 lbs of HTL*

Sincerely,

J. M. Moseley, Manager
Basic Materials Research

JMM:jl

I. Introduction

During 1967 and 1968, laboratory and field investigations were conducted with emphasis on characterization of oxidative browning in flue-cured tobacco. Laboratory studies were aimed at evaluating effects of variety and leaf position on rate and extent of discoloration; whereas field curing studies were for the purpose of obtaining comparative chemical and smoke evaluation for control vs heat treated materials. Of particular interest was the result that polyphenols may be reduced up to 85% when oxidative browning occurs under optimal conditions. Furthermore, there was indication of slight reduction in nicotine levels.

Along separate lines, research in freeze drying had demonstrated marked modification of physical structure to provide filling capacity increases up to 100% or greater.

Both of the above research findings implied potential means for modifying smoke chemistry or smoke characteristics of interest to the tobacco industry. In the first case, it was considered that the heat treatment alone enables opportunity for evaluating the effect of either polyphenols or polymerized pigment on smoke phenol formation or other smoke constituents. With respect to freeze drying, modification of physical structure was considered important in modifying the nature of combustion and level of combustion products. TPM, in particular, should be reduced somewhat proportionately with reduction of tobacco per cigarette.

II. Objectives

1. To study the effects of thermal modification of leaf constituents in combination with physical structure changes with freeze drying.
2. To evaluate, as completely as possible, product characteristics on basis of chemical analyses of cured tobacco, manufacturing characteristics, smoke panel evaluations, and smoke chemistry.

III. Procedure

- A. Production of Tobacco - Tobacco (C 319, 1.5 acres) was grown at the Oxford Tobacco Research Station during 1969 under normal cultural practices including MH-30 for sucker control and with irrigation as required.
- B. Curing and Heat Treatment for Thermal Modifications - Tobacco was harvested at weekly intervals to provide 6 cures. At harvest the tobacco was randomized and strung on sticks to provide three main treatments as follows:
 1. Check (CK) - normally yellowed and dried by conventional flue-curing schedule.
 2. Heat treated in curing chamber (HT) - normally yellowed, heat treated in chamber following completion of yellowing, normal drying as in (1) above.
 3. Heat treatment in laboratory (HTL) - normally yellowed, heat treatment under infrared, normal drying as in (1) above.

All tobacco was yellowed in the same curing barn. Then tobaccos receiving heat treatment were removed, given heat treatments, and returned to the same barn for drying. This assured that heat treatment was the only variable imposed on the materials.

Heat treatment in ^{the} chamber was conducted within about 1 1/2 hours.

Tobacco was placed on two tiers within a small compartment bulk curer. The chamber was closed tightly and temperature advanced within about 30-40 minutes to 170°F for effective "triggering" of oxidative browning. The vents were then opened and the tobacco cooled to near ambient then removed and replaced in the main curing unit.

Heat treatment in ^{the} laboratory consisted of first turgoring leaves by immersing petioles in water, then submitting leaves to a sudden infrared heat treatment for 20 seconds sufficient to elevate leaf temperature to 170°F. The reaction was complete within 30 minutes at room temperature.

C. Post-Curing Handling of Tobacco - Tobacco for each treatment was composited over primings and blended together to form a homogeneous sample. Samples were held in cold storage from September - December, 1969. Samples were redried, separating lamina from midribs. Following redrying, samples were submitted to accelerated aging then shredded into cigarette rag by a cooperating company.

D. Freeze Drying of Cured Tobacco Shreds - A portion of each of the three samples have been returned to the laboratory for freeze drying, to effect change in physical structure. Five-pound ^{free} samples are being held in cold storage for chemical analyses, with evaluations on these lots to represent ~~before aging analyses.~~ before aging analyses. Tobacco to be freeze dried will be handled in such fashion as to minimize breakage of shreds. Pre-conditioning before freeze drying may be found necessary. Tobacco will be placed into trays to form

mats of approximately 1/2-inch thickness. Automatic turgor conditioning equipment will be used to establish a water/solids ratio of about 4 to 4.25/1. Rapid freezing will precede placement of trays into the freeze dryer. Freeze drying will follow standard schedules of platen temperature vs time with expected cycle time of 12-14 hours in our laboratory unit. Following drying, samples will be conditioned to 13-15% moisture for safe handling and then sealed in 6 mil plastic bags. Samples will be held at cold storage until submitted for manufacturing of experimental cigarettes.

E. Manufacture of Experimental Cigarettes - Eight types of experimental cigarettes are planned as follows:

1. Check (CK)
2. Check, freeze dried (CKFD)
3. Blend A, CK plus CKFD, 70%:30% by weight
4. Heat treated (HT)
5. Heat treated, freeze dried (HTFD)
6. Blend B, HT plus HTFD, 70%:30% by weight
7. Heat treated in laboratory (HTL)
8. Heat treated in laboratory, freeze dried (HTLFD)

IV. Analyses

A. Chemical Analyses of Tobacco Before (3) and After (6) Aging

<u>Constituents</u>	<u>Laboratory for Analysis</u>
Organic Acids	
Total Volatile Acids	American
α -Amino Nitrogen	
Water Soluble Acids	
Total Volatile Bases	American
Nicotine	American
TVB - Nicotine	American
Sugars (before and after inversion)	Tob. Lab (Weeks)
pH	
Individual Alkaloids	Tob. Lab. (Weeks)
Polyphenols (total)	Tob. Lab. (Weeks)
Ind. Amino Acids	
Ash	
Calcium	America
Other	

B. Physical Properties

<u>Item</u>	<u>Laboratory for Analysis</u>
Pressure Drop	- American (?)
Circumference	American (?)
Firmness	American (?)
Color	- American (?)
Filling Power	
Moisture Equilibrium	
Other	_____

C. Smoke Panel Tests

Paired analyses are proposed to obtain inferences for which is milder, which has better taste, and which is preferred. Additional comments on smoking characteristics will be helpful.

omit (D. Aroma Tests

Aroma tests are proposed to obtain ratings on volume and quality.

D. Smoke Analysis

<u>Constituents</u>	<u>Laboratory for Analysis</u>
Nicotine	
TPM	
Total Vapor Phase (Acrolein, Aldehydes)	
Total Phenols	
Individual Phenols	
Hydrogen Cyanide	
Carbon Monoxide	
Others	_____

Organic Acids
Oxalic, Malic, Citric

Philip Morris

Total Volatile Acids - B&W

α -amino Nitro }
water Sol. Acids } L & M

pH - L & M

Ind. Amino Acid - J.A. Waybren

Ash - American

Calcium - R.T.R.

Filling Power - (Emp)

Moist. Equil -

Get up meeting for 14th - Keller - Spears P. Lillard

Meeting with Mr. J. M. Moseley, American Tobacco Co., 5/12/47

1. Review Experimental Plan of October 15, 1969
QUANTITY OF TOBACCO; TYPES OF EXPERIMENTAL CIGARETTES. PROPOSED
2. PROCEDURES IN PROCESSING
Shred handling, tray filling, turgor conditioning, TC ratio, water temperature, freezing, freeze drying, reconditioning, package.
3. PROJECTED COMPLETION OF FREEZE-DRYING
4. PROJECTED MANUFACTURING OF CIGARETTES
5. ANALYSES
 - A. SAMPLES PRIOR TO AGING - 5 lb each —
Chemical Analyses: Type, By whom?
 - B. SAMPLES AFTER CIGARETTE MFG.
 1. Chemical Analyses
 2. Smoke Chemistry
 3. Smoking Evaluations
 - C. ARS COOPERATIVE ANALYSIS -
1500-2000 cigarettes Control — ~ 3-4 lb (7-10 cartons)
3,000-4000 cigarettes Freeze Dried — 4 lb (14-20 cartons)

Chemical Analyses

- Organic Acids - Phil Morris - "Ikeda"
- TV Acids - B&W.
- Amino Nitrogen - SIM
- TV B - Am To
- Nicotine - ~~Weyden~~ - Am To
- ~~TV B - Nicotin~~
- Sugar - before after conversion - ~~Weyden~~
- pH - L. i. m.
- Lqd. Alkaloids - Wekes
- Polyphenols - (Total) - Wekes MSU
- Ind. Amino acids - Joe Weyden
- ash - Am To.
- Calcium - - Rupolds -

9 samples 3 before and 6 after processing

Phys. Properties

- Manufac. Characteristics
- Color #mics
- Make to equal firmness
- Filling Power
- Moisture Equiv.
- pressure drop
- circumference
- firmness test

Phys. Me. as.

Imp. Toob. Co.

Smoker Analyses

- (5000 cigarettes) - Aroma
- Before & after lighting - 5000 Panel
- Nic. - Hydrogen cyanide (HCN)
- TPM - Carbon Monoxide - (CO)
- Total Phenols - Ind. Phenols -
- Total Phenols - ^{carcinogen} - aldehydes -

- Possibility of enzyme analysis -
- 3 samples after curing -

Smoke Analysis

Panel Observations - ~~_____~~

Cig A to B - Which is milder, Better taste, Preferred -
Comments -

~~_____~~

Filling Capacity - need one lb. (Imp)
American Will makes Tobacco cigarettes -

- Discussion on Blend -

CK	✓	
CK FD	✓	Blend
HT	✓	
HT FD	✓	
HT	✓	Blend
LHTFD	✓	

} 8 lots

- 30% by weight -

CKFD (30%) - CK (70)

50 lbs → Potential 15,000 cigarettes -

sending 1 carton each

- Minimum - Write to Mosley

- Procedure - condition - 13% → package to hold moisture -
- put in box - paper in box

Aroma - 50 gms - 14% moisture -

Rate aroma on Hedonic scale - Volume -

quality of - Full, Medium full, low, very low

Do other companies have aroma tests? Inquire

6000 cigarettes = 30 cartons

	<u>CK</u>	<u>BLEND</u>	<u>CKFD</u>	<u>HT</u>	<u>BL</u>	<u>HTFL</u>	<u>HTC</u>	<u>HTLFD</u>
USDA →	2000	3000	4000	2000	3000	4000	2000	4000
Company Eval. (Smoke Panel)	1000	1000	1000	1000	1000	1000	1000	1000

Smoke
Analysis

January 20, 1970

Mr. J. M. Moseley, Manager
Basic Materials Research
Department of Research and Development
The American Tobacco Company
P. O. Box 799
Hopewell, Virginia 23860

Dear Marshall:

I appreciate receiving your letter of January 16 with shipping instructions for the samples from the experiment BAE 126, Polyphenol content - Freeze Drying Study. The samples are being shipped today by motor freight, and you will note their identification as follows:

<u>Sample No.</u>	<u>Description</u>
1	Conventionally cured check (CK); wooden box labeled No. 1 Coker 319 check, 260 lb gross wt., 162 lb. net
2	Heat treatment in curing chamber (HT); wooden box labeled No. 1 Coker 319 Treated, 267 lb. gross wt., 151 lb. net
3	Heat treatment in laboratory (HTL); export type paper box labeled BAE 126 HTL, 151 lb. gross wt., 110 lb. net.

Samples 1 and 2 have been redried and stemmed and packed at about 12.6 percent moisture. Sample 3, which is still in the leaf form, will require laboratory redrying and stemming. As we had discussed earlier, 5 lb lots of each sample (CK, HT, and HTL) should be taken for chemical analyses prior to aging, and the remaining portions accelerated aged, then shredded. I would suggest that you obtain the 5 lb lots at the appropriate stage and we can confer later regarding chemical analyses to be conducted at N. C. State or by company participation.

Mr. J. M. Moseley
January 20, 1970
Page 2.

Following shredding, portions of each lot will be freeze-dried at N. C. State. You will note that we have increased the quantity of samples CK and HT to 162 lb CK and 151 lb HT. This will give us flexibility with sufficient quantity to prepare experimental cigarettes of a blend of CK and CKFD, HT and HTFD, or some other combination. We can discuss this facet of the experimental program as the work progresses.

With best regards,

Sincerely yours,

William H. Johnson
Professor

WHJ/fm

cc: Dr. K. R. Keller



W. H. Johnson

INVOICE

The American Tobacco Company

245 Park Avenue

New York, N. Y. 10017

VIRGINIA BRANCH

ISSUING OFFICE

To Dr. W.H. Johnson
North Carolina State University
Raleigh, North Carolina

April 9, **19 70**

3	Lots (Approx 30 Lbs Each) Cut Tobacco		Memo
	Experimental		
	Experiment BAE 126		
	To: Dept. of Biological and Agricultural Engineering		
	Our FF 2 No. R-6		
	1 F Bx 105Lb		
	Via: Overnite Transportation-Prepaid		
	DEPT. OF RESEARCH AND DEVELOPMENT ACCOUNT		

UNIFORM STRAIGHT BILL OF LADING - ORIGINAL - NOT NEGOTIABLE - DOMESTIC

RECEIVED, Subject to the classifications and tariffs in effect on the date of issue of this Bill of Lading.

OVERNITE TRANSPORTATION COMPANY

MAIN OFFICE, RICHMOND, VA.

APRIL 9, 1970

CONSIGNEE

DR W H JOHNSON, DEPARTMENT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING
 North Carolina State University, RALEIGH, NORTH CAROLINA

STREET ADDRESS

DEPARTMENT



SHIPPER

DEPT RESEARCH & DEVELOPMENT, THE AMERICAN TOBACCO CO
 A DIVISION OF AMERICAN BRANDS INC ENON CHURCH ROAD, BERMUDA DISTRICT, CHESTER, VA

SHIPPER'S NO. FT 2 # R- 6

Route

Vehicle Initials

No.

Delivering Carrier

C.O.D. charge { Shipper
 to be paid by { Consignee

No. Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Subject to Correction)	Class or Rate	Check Column
XXX				
1	F Bx Unmanufactured Tobacco	105		

DO NOT
 WRITE IN
 THIS SPACE

* If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."
 NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

If charges are to be prepaid, write or stamp here, "To be Prepaid"

Prepaid

Charges Advanced

Received \$ _____
 to apply in the prepayment of the charges on the property described hereon.
 Agent or Cashier

Subject to Section 7 of Conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
 The carrier shall not make delivery of the shipment without payment of freight and all other lawful charges.

Signature of consignor

Collect, On Delivery

This is to certify that the above articles are properly described by name and are packed and marked and are in proper condition for transportation according to the regulations prescribed by the Interstate Commerce Commission.

the property described above, in apparent good order, except as noted contents and condition of contents of packages unknown, marked, consigned, and destined as shown above which said company the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

DEPT. OF RESEARCH & DEVELOPMENT
 THE AMERICAN TOBACCO COMPANY
 A DIVISION OF AMERICAN BRANDS, INC.
 P. O. BOX 799

O. Smith 4/9/70
Overnite
 Agent.

1 Per EEC Permanent Address of STONEMILL, VIRGINIA Per _____



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 799
HOPEWELL, VIRGINIA 23860

January 16, 1970

Dr. W. H. Johnson
Department of Agricultural Engineering
North Carolina State University
Raleigh, North Carolina 27607

Dear Bill:

I enjoyed being with you at College Park. Our trucking address is

The American Tobacco Company
Department of Research and Development
Enon Church Road
Bermuda District
Chester, Virginia

The sooner you can ship the samples the better from our standpoint as we have some other samples that we wish to stem at the same time.

Sincerely,

J. M. Moseley, Manager
Basic Materials Research

JMM:jl



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 799
HOPEWELL, VIRGINIA 23860

October 21, 1969

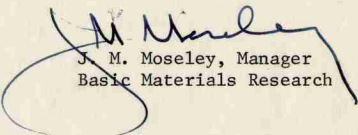
Dr. William H. Johnson
Department of Biological and
Agricultural Engineering
Box 5906
North Carolina State University
Raleigh, North Carolina 27607

Dear Bill:

We have your letter of October 15, 1969, and enclosed experimental plan for heat treatment and freeze-drying. We will be glad to take care of the accelerated aging and shredding and may be able to manufacture the cigarettes. I agree that it would be well to increase the size of samples CK and CKFD possibly two-fold in order to permit some flexibility in blending. The additional quantity of tobacco would pose no problem with us.

With best wishes,

Sincerely,


J. M. Moseley, Manager
Basic Materials Research

JMM:jl



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 799
HOPEWELL, VIRGINIA 23860

October 21, 1969

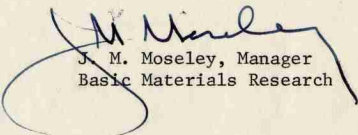
Dr. William H. Johnson
Department of Biological and
Agricultural Engineering
Box 5906
North Carolina State University
Raleigh, North Carolina 27607

Dear Bill:

We have your letter of October 15, 1969, and enclosed experimental plan for heat treatment and freeze-drying. We will be glad to take care of the accelerated aging and shredding and may be able to manufacture the cigarettes. I agree that it would be well to increase the size of samples CK and CKFD possibly two-fold in order to permit some flexibility in blending. The additional quantity of tobacco would pose no problem with us.

With best wishes,

Sincerely,


J. M. Moseley, Manager
Basic Materials Research

JMM:jl

October 15, 1969

Mr. J. M. Moseley, Manager
Basic Materials Research
Department of Research and Development
The American Tobacco Company
P. O. Box 799
Hopewell, Virginia 23860

Dear Marshall:

As a follow-up to our discussions during your recent visit to N. C. State University, I would like to outline the experiment BAE 126, Polyphenol Content-Freeze Drying Study, indicating our projected plans for analysis and requesting consideration by American Tobacco Company for assistance in certain phases of the project.

The main objective of this experiment is to integrate the treatments of polyphenol reduction during curing (by heat treatment of yellowed tobacco) and freeze-drying of the cured tobacco to achieve a range of both chemical and physical modifications which may be of particular interest.

During the summer of 1969, a 1 1/2-acre plot of C319 tobacco was produced at Oxford for this study. At harvest, the tobacco was strung on sticks with identification for three treatments:

1. Conventionally cured check (CK)
2. Heat treatment in the curing chamber (HT)
3. Heat treatment in the laboratory utilizing infrared equipment (HTL)

As pointed out, the heat treatments were applied to tobacco after completion of the coloring phase of curing. For each treatment, the tobacco from 6 primings has been blended and placed in cold storage for later processing and evaluation. After redrying and shredding, a portion of each treatment will be freeze-dried (FD) to effect further modification.

The accompanying diagram illustrates the experimental plan. I have already made arrangements for commercial redrying and stemming of the main samples; only the HTL sample of 112 lb will require laboratory redrying and

Mr. J. M. Moseley, Manager
October 15, 1969
Page 2

stemming. By our discussion, I would submit samples of CK and HT to you in the strip form and the HTL sample in the leaf form. Following redrying of the samples, it is proposed that 5 lb lots of CK; HT, and HTL be taken for chemical analyses before aging, whereas 80 lb lots will be submitted to accelerated aging, then shredded. Thirty lbs of each of these lots will be freeze-dried at N. C. State, then experimental cigarettes made from the six lots: CK, CKFD, HT, HTFD, HTL, AND HTLFD. We would eventually like to obtain through the N. C. State University Tobacco Laboratory and interested tobacco companies analyses of the products before aging and as prepared for cigarette manufacturing. In addition we would hope to obtain smoke panel evaluations and smoke analyses.

In discussing the plan with Dr. Keller, we feel there may be an advantage to increasing the size of samples CK and CKFD to enable preparing experimental cigarettes of a blend of freeze-dried and check material. For example, we could blend 1/3 FD by weight with 2/3 CK, or any suitable ratio. This is a point which we can discuss further. Our concern in that the 100% FD material may be rather extreme in terms of smoke panel interpretations.

I appreciate your interest and consideration for cooperating in this research and look forward to hearing from you.

Sincerely yours,

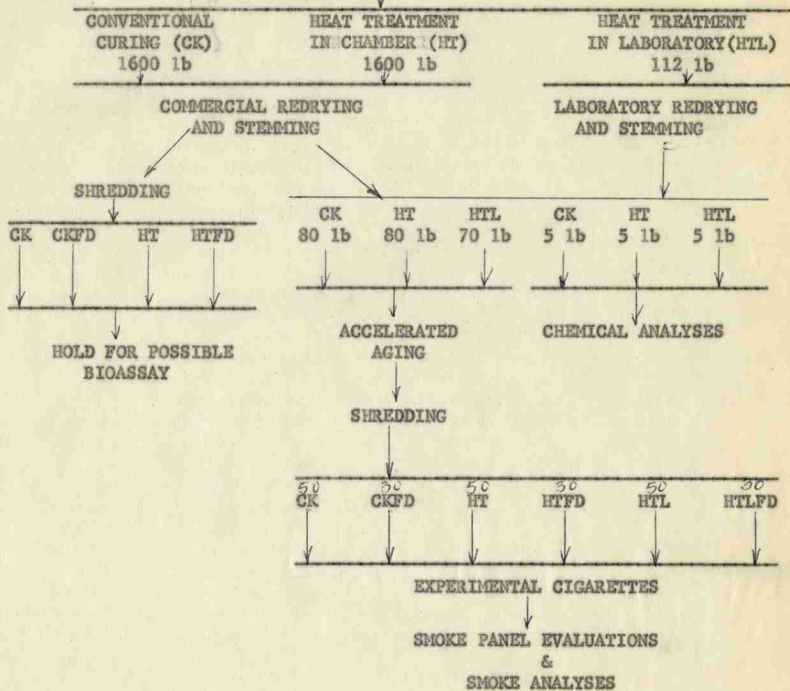
Bill
William H. Johnson
Professor

WHJ/fm

cc: Dr. K. R. Keller

EXPERIMENTAL PLAN

FIELD TOBACCO (C319)



- FOR BRINGING BACK TO RALEIGH - 11/20/69

CHECK - 165 >

HT - ~~20~~165 ?

Visit with J. M. Mosley 10/8/69

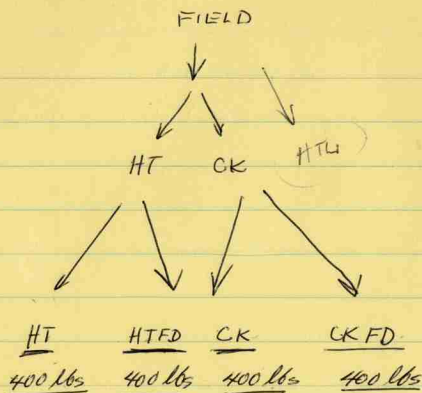
Discussed processing of samples & —
their possible cooperation relative —
to accel. aging, cig. mfg, & evaluations —

Will write a letter to J. Mosley
requesting assistance —

Meeting with J.M. Mosley 7/14/69

Roswell Park

40-60 ft²



→ 50 mg/gm
60% 20 mg/gm
32% 9 mg/gm

Composited over stalk

Accelerated Aging

(20 lbs) of HT & CK
10 lbs of ~~HTFD~~ HTFD shredded
20 lbs of HT & CK S

American will see if they can check on redrying -
blending & cutting -

Discussed Coop. work on Combustion temp -
Chemical anal.

1.5 Hours

FIELD EXPERIMENT

FARM CURING CH P.M.

SHREDDED FREEZE-DRYING

SAMPLE PREP

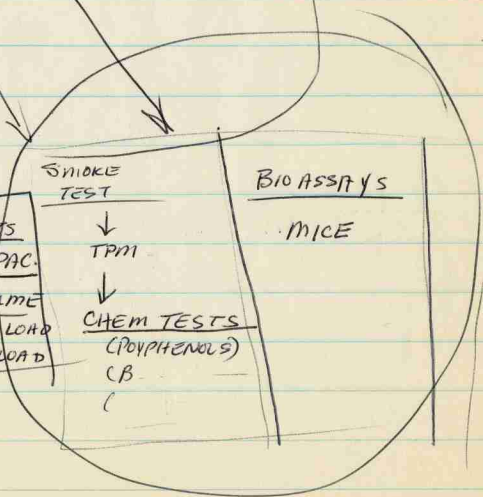
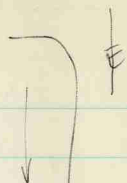
SMOKE TESTS
(By Panel)
By Tob. Companies

CHEM TESTS
BEFORE SMOKING
TOTAL SUGAR
TOTAL ALKALOIDS
TOTAL N

PHYS TEST
BURN TESTS
FILLING CAPAC.
SPEC. VOLUME
UNDER LOAD
W/O LOAD

SMOKE TEST
↓
TPM
↓
CHEM TESTS
(POLYPHENOLS)
(B
(

BIO ASSAYS
MICE



NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

SCHOOL OF AGRICULTURE AND LIFE SCIENCES

DEPARTMENT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING
Box 5906 Zip 27607

December 16, 1971

Mr. Gray M. Broaddus
1101 W. 43rd Street
Richmond, Virginia 23225

Dear Mr. Broaddus:

I appreciate very much receiving your kind invitation to attend the get-together for Marshall Moseley on December 20, but regret that it will be impossible for me to attend because of prior engagements.

A number of the men here at N. C. State are planning to go and I do wish it were possible for me to join them in recognition of Marshall and his many contributions to the tobacco industry. I have known Marshall for a number of years and have valued highly his friendship and his fine cooperative assistance with respect to the University's tobacco research program.

Please extend my best wishes to "Mose" and regrets for being unable to attend the get-together.

Sincerely yours,

William H. Johnson
Professor

WHJ/pt

As you no doubt know Mr. John Marshall Moseley retires at the end of this year.

Several of us who have worked with "Mose" over the years are planning a get together for him on December 20, 1971 as follows:

"The Bull Pen"
Buford Rd. at Midlothian Turnpike
Richmond, Virginia

Social Hour 6:30 p.m.
(Cash Bar \$0.75/drink)

Buffet Dinner
(\$4.00/ person)

We hope you will be able to attend.

RSVP

Gray M. Broaddus
1101 W. 43rd Street
Richmond, Virginia 23225

1-703-232-4647

Directions: Driving north on interstate 95 exit at 6, Chippenham Parkway. There is only one direction you can take at this point. Keep on Chippenham to Midlothian Turnpike (Route 60) - about 5 miles. Take a left on Midlothian and go to Buford Road - less than 1 mile. Turn right on Buford and The Bull Pen is located just to your left.

May 7, 1968

Mr. J. M. Moseley, Director
Agricultural Research
The American Tobacco Company
P. O. Box 799
Hopewell, Virginia 23860

Dear Mr. Moseley:

I would like to express appreciation for your cooperation in the rather extensive evaluations of the Infrared Drying Experiment of the 1966 crop. This information is of real interest and should serve to add additional insight as to the response of tobacco leaf under dynamic drying conditions.

With best regards.

Sincerely yours,

W. H. Johnson
Associate Professor

WHJ/fm



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

XXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
P. O. Box 799
Hopewell, Virginia 23860
April 3, 1968

Dr. W. H. Johnson, Associate Professor
Department of Biological and Agricultural
Engineering
P. O. Box 5906
North Carolina State University
Raleigh, North Carolina 27607

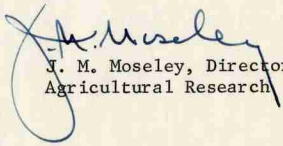
Dear Dr. Johnson:

We have your letter of March 28, 1968 and enclosed line graphs, showing the temperatures and humidity conditions during a normal curing, for which we thank you.

Our tests on the tobaccos from the infrared experiments in the 1966 season are nearing completion and we should be in position to report these results to you within the next two weeks.

With kind regards,

Sincerely,


J. M. Moseley, Director
Agricultural Research

JMM:jl

March 28, 1968

Mr. J. M. Moseley, Director
Agricultural Research
The American Tobacco Company
P. O. Box 799
Hopewell, Virginia 23860

Dear Mr. Moseley:

Dr. Hassler indicated that you are interested in a line graph showing dry bulb and wet bulb temperatures throughout a normal flue-curing cycle. I am enclosing one schedule by Bacon (I did the cross-hatching) and a second schedule which I have used in program curing studies at Oxford. Perhaps one of these will serve your needs.

Since I am writing, I would like to inquire as to whether any additional progress has been made in the evaluations on tobacco from the infrared experiment (see your letter of December 1, 1966). The work here on high temperature response of foliar materials has been moving along very satisfactorily and may relate to findings in this particular study.

With best regards.

Sincerely yours,

W. H. Johnson
Associate Professor

Enclosures



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

~~XXXXXXXXXX~~

~~XXXXXXXXXXXXXXXXXXXX~~

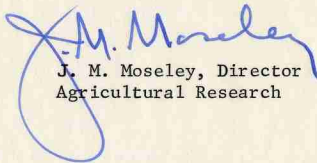
P. O. Box 799
Hopewell, Virginia 23860
March 25, 1968

Dr. Francis Hassler, Head
Department of Agricultural Engineering
North Carolina State University
Raleigh, North Carolina

Dear Dr. Hassler:

Several years ago, I obtained from your office a line graph showing dry bulb and wet bulb temperatures throughout a normal flue-curing cycle. I am unable to locate this graph and wonder if it would be possible to supply me with another or the data from which such a graph could be constructed.

Very truly yours,


J. M. Moseley, Director
Agricultural Research

JMM:jl

January 6, 1967

Mr. J. M. Moseley, Director
Agricultural Research
The American Tobacco Company
P. O. Box 1500
Richmond, Virginia 23212

Dear Mr. Moseley:

I was very pleased to receive your letter of December 1 concerning the experiment on infrared drying. On December 9, I left Calcutta for Tokyo and spent 9 days in Japan visiting with the Japan Monopoly Corporation and companies who are manufacturing bulk curing equipment. My stay in Japan was most interesting and enjoyable and I was amazed at the contrast between India to Japan. I was highly impressed with all the progress and activity in Japan. Since I arrived back in Raleigh on December 20 and then had Christmas holidays I did not see your letter until earlier this week.

Your comments on the color of the samples agrees with our general observations of the samples during curing. Less browning (discoloration) has been noted in the higher temperature infrared drying as compared to the lower temperature, perhaps as a result of more rapid desiccation and possible greater enzyme inactivation at the higher temperature. It will be interesting, with this in mind, to note any comparative differences between samples after accelerated aging.

On your procedure, I think the plans as outlined are certainly very thorough and cover the major aspects which might reveal any significant effects. Omitting curing No. 6 would appear to be the only way of assuring a fair appraisal since primings will be combined. You mentioned limiting all tests to curings 1 through 5. You might also wish to consider including priming 7, especially if you need the additional weight in samples (you may have already advanced too far in your procedure to do this). Other than this little comment everything looks fine and I hope the analyses prove to be fruitful.

Best wishes for 1967.

Sincerely yours,

W. H. Johnson
Associate Professor

WHJ/fm



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

P. O. BOX 1500
RICHMOND, VIRGINIA 23212
December 1, 1966

Dr. W. H. Johnson
Associate Professor
Department of Biological and
Agricultural Engineering
North Carolina State University
Box 5906
Raleigh, North Carolina 27607

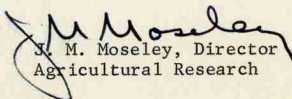
Dear Dr. Johnson:

This has reference to the samples from your experiments with infrared drying during the "killing-out" stage of the flue-curing process, as outlined in your letter dated September 9, 1966. The samples from the individual curings were inspected at Fuquay-Varina on October 25 and rated on the basis of color only. We are enclosing the results of this appraisal in summary form. The normally cured samples were, in most cases, judged to have the best color; and among the two infrared treatments, the samples dried at the higher temperature and shorter exposure were preferred in the majority of cases.

We inspected this tobacco upon receipt at the laboratory and after removal from the polyethylene bags. Under these conditions the color differences were even more apparent. We also observed that the infrared-treated tobacco was lacking in natural flue-cured aroma and possessed a weedy odor.

Inasmuch as curing No. 6 was missing from one of the experiments, we decided to limit all tests to curings 1 through 5. These primings will be combined to make nine samples for stripping, following which each of the nine will be sampled for chemical analysis, including total volatile bases, nicotine, nornicotine, sugar before and after inversion, starch, polyphenols, total nitrogen, protein nitrogen, ash, and alkalinity of water-soluble ash; and specific volume, moisture upon equilibration, color, and subjective aroma. After accelerated aging we propose to resample for aroma and combine replicates to make three samples for cigarette manufacture. We feel that, through a rather comprehensive system of testing such as I described, we can help to add to our rather meager knowledge of the flue-curing process. We will welcome your comments and suggestions - that is, assuming you survived your round-the-world trip.

Sincerely,


J. M. Moseley, Director
Agricultural Research

JMM:sh
Enclosure

INFRARED DRYING EXPERIMENTS
 Flue-Cured Tobacco - 1966 Crop
 Tobacco Experiment Station - Oxford, North Carolina

Relative Quality of Color

<u>Priming</u>	<u>Normal Drying</u>	<u>Infrared 5½ min., 160°</u>	<u>Infrared 2½ min., 185°</u>
1st Replication			
1	3	2	1
2	2	3	1
3	2	1	3
4	1	3	2
5	1	3	2
6	1	2	3
7	1	3	2
2nd Replication			
1	1	=	=
2	1	2	3
3	1	3	2
4	1	3	2
5	1	=	=
6	=	3	=
7	1	2	3
3rd Replication			
1	1	3	2
2	1	2	3
3	1	=	=
4	1	2	3
5	1	3	2
6	1	No Sample	2
7	1	3	2

September 9, 1966

Mr. J. M. Moseley, Director
Agricultural Research
The American Tobacco Company
400 Jefferson Davis Highway
Richmond, Virginia

Dear Mr. Moseley:

I wish to thank you for your interest in our study on rapid processing of yellowed leaf and your willingness to accelerate age and prepare cigarettes from tobacco samples from this work. I would like to describe briefly the tobacco used and the specific treatments involved.

Tobacco was grown at the Tobacco Research Station, Oxford under normal fertilization and cultural practices (including MH-30 for sucker control). The tobacco is of the breeding line 8038359. The season was very dry during June and July, and although irrigation was applied at about 1 inch/week, the tobacco still exhibited some of the characteristics generally associated with dry weather tobacco.

The procedure for this study was as follows: Tobacco was harvested in the normal manner, removing 2 - 4 leaves per priming at approximately weekly intervals. The tobacco was shuffled into three groups to provide uniform distribution for three curing treatments. Tobacco was then strung on sticks and yellowed under the same conditions of 90-95° F dry bulb temperature and 85-90 percent relative humidity. The distinctions between curing treatments were actually made after the yellowing phase.

Treatment C: Tobacco was "dried" under progressive temperature elevation and drying characteristic of conventional curing. Total drying time about 2 days.

Treatment H: Tobacco was rapidly dried under infrared energy to obtain leaf temperatures during drying of approximately 180 - 195° F. Drying time 115 - 140 seconds.

Mr. J. M. Moseley
Page 2.

Treatment L: Tobacco was dried under infrared energy of lower energy levels to obtain leaf temperatures during drying of approximately 155-165^o F. Drying time was 245 - 275 seconds.

Tobacco dried under infrared was strung on sticks and placed into a chamber at 120^o F to finish midrib drying.

The above procedure was repeated at weekly intervals to obtain ripe leaf at all stalk positions. Also three field replications were used.

In previous work we have been primarily concerned with the chemistry of the leaf cured by the rapid process method. What we are interested in here is to compare the smoking quality of cigarettes made from infrared dried tobacco with cigarettes made from normally dried tobacco.

As suggested in our telephone conversation, we can combine the tobacco from the three reps and all stalk positions for each treatment to give 3 samples of at least 50 lbs/sample. I am sure that this will simplify the procedure and evaluations considerably.

Mr. Stanley M. Leary, research engineer in the curing project here, will make arrangements to display the tobacco at the Durham display. He will contact you at the display regarding disposition of the samples.

With best regards,

Sincerely yours,

W. H. Johnson
W. H. Johnson
Associate Professor

WBJ/fm
cc: Stanley M. Leary

P. O. Box 5906
Raleigh, N. C. 27607

April 23, 1965

Dr. J. M. Moseley, Director
Agricultural Research
The American Tobacco Company
400 Jefferson Davis Highway
Richmond, Virginia

Dear Dr. Moseley:

This is to acknowledge receipt of your observations and analyses on our experimental tobacco from the Harvesting-Curing experiment of 1963, and to express our thanks and appreciation for your fine cooperation.

Your results will be important to the progress and planning of our research in tobacco curing, which is directed toward the development of improved methods and techniques based upon accumulated knowledge of leaf characteristics and behavior during farm processing.

Sincerely yours,

W. H. Johnson
Assistant Professor

Enclosures
WHJ:cm



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

400 JEFFERSON DAVIS HIGHWAY
RICHMOND, VIRGINIA 23224

April 21, 1965

Dr. W. H. Johnson
Assistant Professor
Department of Agricultural Engineering
Box 5906
North Carolina State
of the University of North Carolina
Raleigh, North Carolina 27607

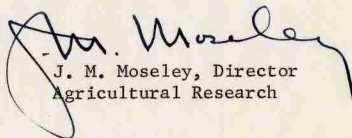
Dear Dr. Johnson:

We are giving you the results of analyses and tests on samples of flue-cured tobacco from you Harvesting X Curing Tests, 1963 Crop which were described in your letter of December 2, 1963. The samples were inspected by the writer and other Research and Development personnel upon receipt. In our judgment, the delayed harvest resulted in better quality. When all of the tobacco was harvested at one time, the top half was extremely poor.

Late harvest generally resulted in decrease in per cent ash and TVB minus nicotine and an increase in per cent nicotine, per cent sugar, and per cent starch. The increases in sugar and starch were contrary to the results which were found in the time of harvest experiments. In as much as the samples were under code, we are unable to make any interpretation of the analytical data with respect to the method of curing.

We trust that our findings will be of interest.

Sincerely,


J. M. Moseley, Director
Agricultural Research

JMM:td

Enclosure

FLUE-CURED TOBACCO HARVESTING X CURING TESTS
North Carolina Agricultural Experiment Station - 1963 Crop

<u>Treatment</u>		<u>% Moist. Equil. @ 60% RH</u>	<u>Spec. Vol. ccs/.33g.</u>	<u>Color (Agtron 5015-5048.5)</u>	<u>% Total Volatile Bases</u>	<u>% Nicotine</u>	<u>% TVB-Nic.</u>
<u>Variety 38359 - Curing Method #1</u>							
V1-A-1	6 Harvests	12.0	1.09	53	.603	3.90	.193
V1-B-1	3 " (1,3,5)	11.7	1.11	55	.596	3.86	.191
V1-C1-1	2 " (1,5)	12.3	1.06	54	.573	3.69	.186
V1-C2-1	2 " (3,6)	11.9	1.10	58	.560	3.86	.155
V1-D1-1	1 " (3)	11.1	1.15	53	.560	3.69	.173
V1-D2-1	1 " (5)	11.7	1.10	57	.563	3.92	.151
V1-E1-1	1 " (2)	11.7	1.20	54	.579	3.19	.244
V1-E2-1	1 " (4)	11.0	1.30	60	.624	3.89	.216
	Average	11.7	1.14	56	.582	3.75	.188
<u>Variety 38359 - Curing Method #2</u>							
V1-A-2	6 Harvests	11.8	1.04	48	.595	3.81	.195
V1-B-2	3 " (1,3,5)	11.8	1.07	47	.573	3.61	.194
V1-C1-2	2 " (1,5)	12.1	1.00	44	.513	3.18	.179
V1-C2-2	2 " (3,6)	11.9	1.00	47	.503	3.40	.146
V1-D1-2	1 " (3)	11.4	1.06	47	.563	3.45	.201
V1-D2-2	1 " (5)	12.2	1.02	50	.541	3.79	.143
V1-E1-2	1 " (2)	11.8	1.12	49	.569	2.91	.263
V1-E2-2	1 " (4)	11.1	1.20	58	.553	3.50	.185
	Average	11.8	1.06	49	.551	3.46	.188

FLUE-CURED TOBACCO HARVESTING X CURING TESTS
North Carolina Agricultural Experiment Station - 1963 Crop

<u>Treatment</u>	<u>Ratio Nic/TVB</u>	<u>% Total Sugars as Dextrose</u>	<u>% Ash</u>	<u>Alk No. Water Sol. Ash</u>	<u>% Starch</u>	<u>Level of Aroma (1)</u>
<u>Variety 38359 - Curing Method #1</u>						
V1-A-1 6 Harvests	.68	16.3	13.35	5.4	3.00	0.5
V1-B-1 3 " (1,3,5)	.68	16.2	12.87	5.4	3.36	0.5
V1-C1-1 2 " (1,5)	.68	18.4	13.80	6.5	2.47	0.0
V1-C2-1 2 " (3,6)	.72	17.9	12.97	4.3	3.34	0.0
V1-D1-1 1 " (3)	.69	14.3	13.29	5.4	2.64	1.0
V1-D2-1 1 " (5)	.73	19.1	12.31	4.3	3.34	-0.5
V1-E1-1 1 " (2)	.58	15.7	13.84	5.9	2.72	1.5
V1-E2-1 1 " (4)	.65	11.7	13.93	5.4	2.62	2.0
Average	.68	16.2	13.30	5.3	2.94	.6
<u>Variety 38359 - Curing Method #2</u>						
V1-A-2 6 Harvests	.67	16.7	12.87	4.9	2.99	0.0
V1-B-2 3 " (1,3,5)	.66	16.3	13.66	5.9	2.81	1.5
V1-C1-2 2 " (1,5)	.65	18.4	13.36	5.7	3.17	-1.0
V1-C2-2 2 " (3,6)	.71	20.5	12.17	5.4	4.57	1.0
V1-D1-2 1 " (3)	.64	14.0	13.72	5.4	3.41	4.0
V1-D2-2 1 " (5)	.74	19.4	12.06	4.4	3.30	0.0
V1-E1-2 1 " (2)	.54	15.1	14.16	4.3	2.64	3.0
V1-E2-2 1 " (4)	.67	14.0	13.20	5.4	2.83	1.5
Average	.66	16.8	13.15	5.2	3.22	1.3

(1) Consensus of Eight Observers, Hedonic Scale

Full = 8; Med. Full = 4; Med. = 0; Med. Low = -4; Low = -8.

FLUE-CURED TOBACCO HARVESTING X CURING TESTS
North Carolina Agricultural Experiment Station - 1963 Crop

<u>Treatment</u>	% Moist. Equil. Spec. Vol. Color (Agtron			% Total Volatile	%	%
	<u>@60% RH</u>	<u>ccs/.33g.</u>	<u>5015-5048.5)</u>	<u>Bases</u>	<u>Nicotine</u>	<u>TVB-Nic.</u>
<u>Variety NC 95 - Curing Method #1</u>						
V2-A-1 6 Harvests	12.0	1.00	46	.618	4.34	.162
V2-B-1 3 " (1,3,5)	12.3	0.97	39	.638	4.32	.184
V2-C1-1 2 " (1,5)	13.0	0.97	37	.596	3.95	.181
V2-C2-1 2 " (3,6)	12.5	0.97	46	.611	4.36	.153
V2-D1-1 1 " (3)	12.0	1.06	36	.627	3.87	.221
V2-D2-1 1 " (5)	12.6	0.97	49	.569	4.01	.148
V2-E1-1 1 " (2)	11.9	0.95	38	.657	3.57	.282
V2-E2-1 1 " (4)	12.7	1.07	43	.732	4.71	.237
Average	12.4	1.00	42	.631	4.14	.196
<u>Variety NC 95 - Curing Method #2</u>						
V2-A-2 6 Harvests	12.8	0.94	48	.624	4.50	.151
V2-B-2 3 " (1,3,5)	12.8	0.97	40	.642	4.26	.195
V2-C1-2 2 " (1,5)	13.0	0.96	43	.627	4.31	.174
V2-C2-2 2 " (3,6)	13.0	0.92	43	.589	4.35	.132
V2-D1-2 1 " (3)	12.5	1.00	37	.607	3.98	.189
V2-D2-2 1 " (5)	12.8	0.91	39	.594	4.24	.149
V2-E1-2 1 " (2)	12.1	1.07	40	.660	3.74	.267
V2-E2-2 1 " (4)	12.3	1.03	43	.658	4.27	.210
Average	12.7	0.98	42	.625	4.21	.183

FLUE-CURED TOBACCO HARVESTING X CURING TESTS
North Carolina Agricultural Experiment Station - 1963 Crop

<u>Treatment</u>	<u>Ratio Nic/TVB</u>	<u>% Total Sugars as Dextrose</u>	<u>% Ash</u>	<u>Alk. No. Water Sol. Ash</u>	<u>% Starch</u>	<u>Level of Aroma (1)</u>
<u>Variety NC 95 - Curing Method #1</u>						
V2-A-1 6 Harvests	.74	26.0	12.30	5.7	4.33	3.0
V2-B-1 3 " (1,3,5)	.71	20.0	12.53	6.0	3.95	-0.5
V2-C1-1 2 " (1,5)	.70	21.5	12.50	6.0	3.53	3.5
V2-C2-1 2 " (3,6)	.75	22.1	11.06	4.3	3.61	-1.5
V2-D1-1 1 " (3)	.65	17.4	12.44	4.9	4.23	-0.5
V2-D2-1 1 " (5)	.74	22.9	10.41	8.7	4.86	0.0
V2-E1-1 1 " (2)	.57	17.2	12.93	4.3	3.58	-0.5
V2-E2-1 1 " (4)	.68	15.1	12.14	4.6	3.86	0.5
Average	.69	20.3	12.04	5.6	3.99	.5
<u>Variety NC 95 - Curing Method #2</u>						
V2-A-2 6 Harvests	.76	22.1	11.92	4.9	4.23	0.5
V2-B-2 3 " (1,3,5)	.70	19.9	12.12	5.2	3.88	1.5
V2-C1-2 2 " (1,5)	.72	20.7	12.22	5.1	3.88	1.5
V2-C2-2 2 " (3,6)	.78	23.3	11.16	4.6	4.24	2.5
V2-D1-2 1 " (3)	.69	19.4	12.57	5.7	5.27	2.0
V2-D2-2 1 " (5)	.75	23.2	10.31	5.2	4.94	-1.0
V2-E1-2 1 " (2)	.60	15.7	13.34	6.2	4.03	1.5
V2-E2-2 1 " (4)	.68	16.7	11.66	4.6	4.22	1.0
Average	.71	20.1	11.91	5.2	4.34	1.2

(1) Consensus of Eight Observers, Hedonic Scale

Full = 8; Med. Full = 4; Med. = 0; Med. Low = -4; Low = -8.

FLUE-CURED TOBACCO HARVESTING X CURING TESTS
North Carolina Agricultural Experiment Station - 1963 Crop

<u>Treatment</u>	% Moist. Equil. @ 60% RH	Spec. Vol. ccs/.33g	Color (agtron 5015-5048.5)	% Total Volatile Bases	% Nicotine	% TVB-Nic.
<u>Summary by Treatment</u>						
(2 Methods X 2 Curings)						
6 Harvests	12.2	1.02	49	.610	4.14	.174
3 " (1,3,5)	12.2	1.03	45	.612	4.01	.191
2 " (1,5)	12.6	1.00	45	.577	3.78	.180
2 " (3,6)	12.3	1.00	49	.566	3.99	.147
1 " (3)	11.8	1.07	43	.589	3.75	.195
1 " (5)	12.3	1.00	49	.567	3.99	.148
1 " (2)	11.9	1.09	45	.616	3.35	.264
1 " (4)	11.8	1.15	51	.642	4.09	.213

<u>Treatment</u>	Ratio Nic/TVB	% Total Sugars as Dextrose	% Ash	Alk No. Water Sol. Ash	% Starch	Level of Aroma (1)
<u>Summary by Treatment</u>						
(2 Methods X 2 Curings)						
6 Harvests	.71	20.3	12.61	5.2	3.64	1.0
3 " (1,3,5)	.69	18.1	12.80	5.6	3.50	0.8
2 " (1,5)	.69	19.8	12.97	5.8	3.26	1.0
2 " (3,6)	.74	21.0	11.84	4.7	3.94	0.5
1 " (3)	.67	16.3	13.01	5.4	3.89	1.6
1 " (5)	.74	21.2	11.27	5.7	4.11	-0.4
1 " (2)	.57	15.9	13.57	5.2	3.24	1.4
1 " (4)	.67	14.4	12.73	5.0	3.34	1.3

(1) Consensus of Eight Observers, Hedonic Scale
Full = 8; Med. Full = 4; Med. = 0; Med. Low = -4; Low = -8.

December 3, 1957

Dr. H. R. Hanmer,
Director of Research,
The American Tobacco Company
Richmond 24, Virginia

Dear Dr. Hanmer:

This is to acknowledge receipt of your observations and analyses on our experimental tobaccos, and to express our thanks and appreciation for your efforts in this matter.

Your results will mean much to the progress and planning of our research in tobacco curing, which is directed to the realization of practical assets for both the producer and manufacturer.

Very truly yours,

F. J. Hassler,
Professor

FJH/mcc

December 2, 1963

Dr. J. M. Moseley
Assistant to Vice President
The American Tobacco Company
400 Jefferson Davis Highway
Richmond 24, Virginia

Dear Dr. Moseley:

We are sending you either today or tomorrow samples from the Harvesting-Curing Experiment conducted at Oxford, N. C., during 1963. As discussed with you at the Durham display, the experiment for 1963 followed the same plan as that of 1962 with the exception that a second variety, NC 95, was included along with the 38359 breeding line.

The tobacco was grown under normal cultural practices including normal fertilization, topped at 16-18 leaves, and MH-30 for sucker control. A rather lengthy period of dry weather was experienced during the early part of the growing season.

The experiment consisted of eight harvesting treatments for two varieties followed by bulk and conventional curing.

<u>Treatment</u>	<u>Description</u>
A	6 harvests (conventional), 2-3 leaves/priming
B	3 harvests; 5, 6, and 5 leaves
G1	2 harvests; 8 and 8 leaves (early)
C2	2 harvests; 8 and 8 leaves (late)
D1	1 harvest; 16 leaves at 1 priming (early), cured together
D2	1 harvest; 16 leaves at 1 priming (late), cured together
E1	1 harvest; 16 leaves at 1 priming (early), cured bottom (5), middle (6), and top (5) leaves separately
E2	1 harvest; 16 leaves at 1 priming (late), cured bottom (5), middle (6), and top (5) leaves separately.

The following table shows the schedule for harvesting and curing the various treatments.

Dr. J. M. Moseley
 December 2, 1963
 Page 2

Week of Harvest	Treatments within Curing Compartments			
	1	2	3	4
1	A	B	G1 (bot)	
2	A	E1 (bot)	E1 (mid)	E1 (top)
3	A	B	G2 (bot)	D1
4	A	E2 (bot)	E2 (mid)	E2 (top)
5	A	B	G1 (top)	D2
6	A		G2 (top)	

For the two varieties, eight curing compartments or units were required for each curing method.

After curing, the tobacco was rearranged according to treatment and then farm graded. The 32 samples being sent to you are approximately 5 lb. composites of each treatment. Sample designations are as follows:

Treatment	Variety 1 (38359)		Variety 2 (NC 95)	
	Curing Method		Curing Method	
	1	2	1	2
A	V1-A-1	V1-A-2	V2-A-1	V2-A-2
B	V1-B-1	V1-B-2	V2-B-1	V2-B-2
C1	V1-G1-1	V1-G1-2	V2-G1-1	V2-G1-2
C2	V1-C2-1	V1-C2-2	V2-C2-1	V2-C2-2
D1	V1-D1-1	V1-D1-2	V2-D1-1	V2-D1-2
D2	V1-D2-1	V1-D2-2	V2-D2-1	V2-D2-2
E1	V1-E1-1	V1-E1-2	V2-E1-1	V2-E1-2
E2	V1-E2-1	V1-E2-2	V2-E2-1	V2-E2-2

Note that curing method is coded, where 1 or 2 may refer to either method of curing.

We are very interested in having the same chemical and physical determinations performed as for the 1962 experiment and would like to request also, if possible, evaluations on percent starch and level of aroma.

We sincerely appreciate your cooperation in evaluating these samples.

Sincerely yours,

W. H. Johnson
 Assistant Professor

WHJ:kr

November 8, 1962

Mr. J. M. Moseley
Department of Research and Development
The American Tobacco Company
400 Jefferson Davis Highway
Richmond 24, Virginia

Dear Mr. Moseley:

At the recent display of experimental tobacco at Durham on October 30-31, you indicated an interest in performing chemical and/or smoking evaluations on samples from the harvesting-curing experiment. I am sending today, by truck, composite samples as requested.

I should perhaps relate to you the methods and procedures for the harvesting-curing experiment. As discussed previously with you, the purpose of the experiment was (1) to test the feasibility of reducing the number of harvestings in order to increase the efficiency of harvesting machinery, and (2) to determine the influence of the range of ripeness with the 38359 line on curing response in bulk and conventional curing. Dr. Leon Moore at Oxford had noted that the 38359 line appeared to have more "field-holding" characteristics than other experimental lines.

The tobacco was grown under recommended cultural practices, normal fertilization, topped at 16-18 leaves, hand suckered, etc., and weather conditions were generally very favorable.

The experiment was designed for eight harvesting treatments as follows:

<u>Harvesting Treatment</u>	<u>Description</u>
A	6 harvests (conventional), 2-3 leaves/priming
B	3 harvests; 4, 6, and 6 leaves
C1	2 harvests; 7 and 9 leaves (early)
C2	2 harvests; 7 and 9 leaves (late)
D1	1 harvest; 16 leaves at 1 priming (early), all cured together
D2	1 harvest; 16 leaves at 1 priming (late), all cured together
E1	1 harvest; 16 leaves at 1 priming (early), cured in 3 compartments--bottom 4, middle 6, and top 6 leaves
E2	1 harvest; 16 leaves at 1 priming (late), cured in 3 compartments--bottom 4, middle 6, and top 6 leaves

Mr. J. M. Moseley
November 8, 1962
Page 2

The following table shows the manner in which the treatments were made during the harvesting season.

Week of Harvest	Treatments within Curing Compartments (either bulk or conventional)			
	1	2	3	4
1	A	B	C1	--
2	A	E1 (bottom)	E1 (middle)	E1 (top)
3	A	B	C2 ---	D1
4	A	E2 (bottom)	E2 (middle)	E2 (top)
5	A	B	C1	D2
6	A	-	C2 ---	--

After curing, the tobacco was graded and assembled together for each treatment. The samples which you will receive are 10 lb. composites of each treatment. The small tags on smaller portions within each sample give the grades within a particular treatment. Each grade was pulled in proportion to the total amount of tobacco for that grade. The notation EC and CC refers to bulk cured and conventionally cured; e.g., E1 means CC

treatment E1, conventionally cured. With eight treatments and two curing methods, you have a total of sixteen samples.

We will appreciate receiving a copy of the results of any chemical, physical and smoking evaluations that you may perform on the samples.

Sincerely yours,

William H. Johnson
Assistant Professor

WHJ:skr
Copy to Mr. J. M. Carr
Oxford Tobacco Research Station
Oxford, N. C.

Copy to Ervin Humphries

March 14, 1958

Mr. J. M. Moseley
Assistant to Director of Research
THE AMERICAN TOBACCO COMPANY
Research Laboratory
400 Petersburg Turnpike
Richmond 24, Virginia

Dear Mr. Moseley:

We are enclosing several tables showing the averages of physical measurements on thirteen samples of flue-cured tobacco. Since you may wish to look further at the individual measurements, we have included a copy of the raw data. The tobacco samples are also being sent to you, by separate mail, at this time.

After receiving the samples, all leaves were individually tagged, and 2" diameter plugs were removed from the leaf section on or near the 4th lateral vein from the butt. The plugs were kept in small envelopes having the same markings as the leaves. It might be well to describe our marking system. The first number, not counting zero, is the group number, either 1 or 2. Group 1 corresponds to the low moisture group while group 2 corresponds to the high moisture group. The last number, from 0-9, is the leaf number. Numbers located between the group and leaf numbers are the sample numbers, ranging from 1-13. For example, number 2123 refers to group 2, sample 12, leaf 3.

Several physical measurements were made on the samples. The technique employed in the beta transmission measurement was to compare the time (secs.) required to count 2000 beta particles from an uncovered source with the time required when a tobacco sample shielded the source. Differential dielectric properties, ΔC and ΔQ , for our measurements are changes produced in the electrical circuit when tobacco was inserted between the plates of a parallel-plate condenser. The fluorescent measurement was made by placing the sample in a box such that the leaf surface was exposed to ultraviolet light. Visible light was fluoresced from the leaf surface then measured with a sensitive multiplier Photometer. Both top and bottom surfaces were exposed in making this measurement. The last measurement, reflectance, was made by reading the % reflection at wave lengths of 500, 600, and 700 $m\mu$ with a rapid - scanning spectrophotometer.

Note that we have included a summary of sample averages for all the readings plus this same information arranged according to the magnitude of measurements. It appears that there may be a correlation between the weight (g/100 in² wet basis) and the beta transmission. Possibly, less-apparent correlations also exist. There may be merit in comparing one or more measurements with individual leaves

3/13/58

for detecting certain quality characteristics. We would like to point out that we feel that no valid comparisons can be made between group 1 and group 2. In addition to the samples being inadequately equilibrated at two levels of relative humidity, we found that common grounding of instruments before beginning group 2 shifted the readings on some of the instruments, especially the Q-meter (for C and Q) and the Photometer (fluorescence). Within-group comparisons, however, can be made.

We will be very interested in any further analyses that you might make on the samples, or in any results or conclusions that you may be able to draw from these measurements. Since we have not, as yet, been successful in gaining chemical analyses for correlation with physical measurements, we feel that there could well be possibilities here. We will be glad to furnish any further information on the description or operation of the instruments.

Very truly yours,

William H. Johnson
William H. Johnson
Research Instructor

Wiley H. Henson, Jr.
Wiley H. Henson, Jr.
Research Agricultural Engineer

WHJ-WHH:as

Encl.

cc: Dr. F. J. Hassler

PHYSICAL MEASUREMENTS - SAMPLES OF 2 IN. DIAMETER PLUGS TAKEN FROM WHOLE LEAVES FLUE-CURED TOBACCO

Sample Number	Beta Transmission (ΔT)*		Capacitance (ΔC **		"Quality" Factor (ΔQ ***	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
1	.077	.063	1.91	2.70	4.87	9.26
2	.092	.060	2.80	2.93	6.48	11.62
3	.120	.089	3.29	3.36	6.38	11.35
4	.081	.079	3.01	2.95	5.21	8.99
5	.078	.076	3.30	3.44	7.78	12.06
6	.070	.071	3.18	3.51	6.70	12.58
7	.059	.065	2.61	2.42	6.08	9.04
8	.093	.093	3.19	2.76	5.28	7.18
9	.065	.060	2.85	3.40	8.20	14.45
10	.050	.069	2.25	2.33	5.08	8.99
11	.046	.046	2.41	1.76	6.37	8.26
12	.068	.057	2.86	2.43	7.10	10.77
13	.101	.093	3.06	3.00	6.61	8.52

* Time (minutes) for counting 2000 beta particles with tobacco sample shielding the beta source less the time for counting 2000 beta particles from the unshielded source.

** Differential capacitance in mmfd caused by insertion of sample between plates of a parallel plate condenser.

***Differential "quality" factor caused by insertion of sample between plates of a parallel plate condenser.

Note: the average higher level of readings in group 2 resulted from common grounding of instruments.

PHYSICAL MEASUREMENTS - SAMPLES OF 2 INCH DIAMETER PLUGS

TAKEN FROM WHOLE LEAVES FLUE-CURED TOBACCO

Sample Number	FLUORESCENCE*								
	Group 1			Group 2 **			% Reflectance (Group 2)		
	Top	Bottom	Difference	Top	Bottom	Difference	500 mu	600 mu	700 mu
1	33.3	69.0	35.7	18.1	31.2	13.1	12.5	41.1	55.0
2	42.8	67.2	24.4	28.8	43.1	14.3	19.8	49.5	64.0
3	43.3	71.4	28.1	24.8	38.8	14.0	14.5	45.1	57.6
4	53.0	72.7	19.7	32.7	42.3	9.6	14.2	45.5	56.5
5	35.8	44.0	8.2	27.5	33.5	6.0	12.3	38.5	51.7
6	65.6	81.7	16.1	33.7	39.4	5.7	19.6	49.9	63.0
7	44.2	73.3	29.1	28.0	34.0	6.0	15.9	47.8	60.2
8	35.6	43.1	7.5	35.3	42.2	6.9	20.1	51.7	62.5
9	25.5	44.3	18.8	27.6	39.0	11.4	16.7	45.5	56.9
10	34.8	58.6	23.8	38.1	56.8	18.7	20.7	53.4	63.3
11	27.7	49.3	21.6	28.0	46.8	18.8	20.2	51.8	63.5
12	16.8	24.2	7.4	22.3	28.3	6.0	16.9	40.4	54.0
13	26.6	37.1	10.5	31.6	39.5	7.9	13.8	38.0	50.5

* To convert these readings to microlumens, multiply by 2×10^{-3} .

** Replacement of the bulb for ultra-violet light caused a lower level of readings for Group 2.

PHYSICAL MEASUREMENTS ON FLUE-CURED TOBACCO

ARRANGED FROM LOW TO HIGH VALUES

Ranked Number	BETA TRANSMISSION (ΔT)				CAPACITANCE (ΔC)			
	Group 1	Sample Number	Group 2	Sample Number	Group 1	Sample Number	Group 2	Sample Number
1	.046	11	.046	11	1.91	1	1.76	11
2	.050	10	.057	12	2.25	10	2.33	10
3	.059	7	.060	9	2.41	11	2.42	7
4	.065	9	.060	2	2.61	7	2.43	12
5	.068	12	.063	1	2.80	2	2.70	1
6	.070	6	.065	7	2.85	9	2.76	8
7	.077	1	.069	10	2.86	12	2.93	2
8	.078	5	.071	6	3.01	4	2.95	4
9	.081	4	.076	5	3.06	13	3.00	13
10	.092	2	.079	4	3.18	6	3.36	3
11	.093	8	.089	3	3.19	8	3.40	9
12	.101	13	.093	13	3.29	3	3.44	5
13	.120	3	.093	8	3.30	5	3.51	6

PHYSICAL MEASUREMENTS ON FLUE-CURED TOBACCO ARRANGED FROM LOW TO HIGH VALUES

QUALITY FACTOR (ΔQ)

<u>Ranked Number</u>	<u>Group 1</u>	<u>Sample Number</u>	<u>Group 2</u>	<u>Sample Number</u>
1	4.87	1	7.18	8
2	5.08	10	8.26	11
3	5.21	4	8.52	13
4	5.28	8	8.99	10
5	6.08	7	8.99	4
6	6.37	11	9.04	7
7	6.38	3	9.26	1
8	6.48	2	10.77	12
9	6.61	13	11.35	3
10	6.70	6	11.62	2
11	7.10	12	12.06	5
12	7.78	5	12.58	6
13	8.20	9	14.45	9

PHYSICAL MEASUREMENTS ON FLUE-CURED TOBACCO ARRANGED FROM LOW TO HIGH VALUES

FLUORESCENCE

<u>Ranked Number</u>	<u>GROUP 1</u>				<u>GROUP 2</u>			
	<u>Top</u>	<u>Bottom</u>	<u>Diff.</u>	<u>Sample Number</u>	<u>Top</u>	<u>Bottom</u>	<u>Diff.</u>	<u>Sample Number</u>
1	16.8	24.2	7.4	12	33.7	39.4	5.7	6
2	35.6	43.1	7.5	8	22.3	28.3	6.0	12
3	35.8	44.0	8.2	5	28.0	34.0	6.0	7
4	26.6	37.1	10.5	13	27.5	33.5	6.0	5
5	65.6	81.7	16.1	6	35.3	42.2	6.9	8
6	25.5	44.3	18.8	9	31.6	39.5	7.9	13
7	53.0	72.7	19.7	4	32.7	42.3	9.6	4
8	27.7	49.3	21.6	11	27.6	39.0	11.4	9
9	34.8	58.6	23.8	10	18.1	31.2	13.1	1
10	42.8	67.2	24.4	2	24.8	38.8	14.0	3
11	43.3	71.4	28.1	3	28.8	43.1	14.3	2
12	44.2	73.3	29.1	7	38.1	56.8	18.7	10
13	33.3	69.0	35.7	1	28.0	46.8	18.8	11

PHYSICAL MEASUREMENTS ON FLUE-CURED TOBACCO ARRANGED FROM LOW TO HIGH VALUES

% REFLECTANCE (GROUP 2)

<u>Ranked Number</u>	<u>500MU</u>	<u>Sample Number</u>	<u>600MU</u>	<u>Sample Number</u>	<u>700MU</u>	<u>Sample Number</u>
1	12.3	5	38.0	13	50.5	13
2	12.5	1	38.5	5	51.7	5
3	13.8	13	40.4	12	54.0	12
4	14.2	4	41.1	1	55.0	1
5	14.5	3	45.1	3	56.5	4
6	15.9	7	45.5	4	56.9	9
7	16.7	9	45.5	9	57.6	3
8	16.9	12	47.8	7	60.2	7
9	19.6	6	49.5	2	62.5	8
10	19.8	2	49.9	6	63.0	6
11	20.1	8	51.7	8	63.3	10
12	20.2	11	51.8	11	63.5	11
13	20.7	10	53.4	10	64.0	2



The American Tobacco Company

DEPARTMENT OF RESEARCH AND DEVELOPMENT

400 JEFFERSON DAVIS HIGHWAY
RICHMOND 24, VIRGINIA

December 9, 1959

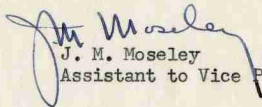
Mr. William H. Johnson
Research Instructor
Department of Agricultural Engineering
North Carolina State College
Raleigh, North Carolina

Dear Mr. Johnson:

We have your letter of November 20, 1959, concerning the samples from your bulk curing experiments that were displayed at Durham. These samples have been received and we are proceeding with our laboratory evaluation.

With kind regards,

Sincerely,



J. M. Moseley
Assistant to Vice President

JMM:emv

NORTH CAROLINA STATE COLLEGE

RALEIGH

DEPARTMENT OF
AGRICULTURAL ENGINEERING

November 20, 1959

Dr. J. M. Moseley
Asst. to Director of Research
The American Tobacco Company
Research Laboratory
400 Petersburg Turnpike
Richmond 24, Virginia

Dear Dr. Moseley:

In our discussion during the Durham display of Experiment Station Tobacco at the Starbrick Warehouse on November 3, you indicated an interest in performing chemical and smoking evaluations on bulk and conventionally cured tobacco from our curing tests of 1959. We are sending eight samples to you under separate cover.

I should perhaps relate to you the history of the tobacco and the preparation of samples. The tobacco, McNeairs' 121, was grown and cured at the Tobacco Research Station, Oxford, N. C. We were somewhat disappointed this year with the quality of tobacco which was introduced into our curing tests. Heavy rainfall during June and early July caused extremely rapid growth so that by time of harvest in late July, the leaves exhibited a thin, green, and field-burned appearance. Much of the leaf material was consequently discarded before the first curing. The field tobacco then began ripening more rapidly than normally; thus only four cures were necessary for the 1959 season.

The primary objective of this curing study was to note the relative curing characteristics of conventional and bulk cured tobacco, and to make pertinent physical and chemical evaluations of the cured samples. We would like to request all major chemical, physical, and smoking evaluations which might be important in comparing the bulk curing process with the conventional. In other words, we would like essentially the same analyses as those performed for us last year.

Intact bulk curing was investigated in a pilot curing plant having a chamber size of 10' x 12' x 6 $\frac{1}{2}$ ' and a capacity for curing up to 1000 lbs. cured tobacco. The general description of the curing system is given in the enclosed paper, with the exception that three tiers were used rather than two. Tobacco was bulked into loading racks (each rack holding the equivalent of 12 sticks of conventionally strung tobacco), then cured with indirectly heated forced air.

Small barns, each having a capacity of 18 sticks were used to provide conventionally cured control samples.

Temperature schedules were essentially the same for both curing methods.

Each of the samples forwarded to you consists of approximately 5 lbs. tobacco from a given curing. Tobacco was taken from all grades within a given cure in proportion to the quantity of tobacco in that grade, in order to get a representative composite sample.

A description of the samples is as follows:

<u>Sample or Tag Number</u>	<u>Description</u>	
1	Intact bulk cured	Cure 1
2	"	Cure 2
3	"	Cure 3
4	"	Cure 4
5	Conventionally cured	Cure 1
6	"	Cure 2
7	"	Cure 3
8	"	Cure 4

We wish to express our appreciation for the fine cooperation that you and others in the American Tobacco Company have given in performing these and other evaluations.

Sincerely yours,

William H. Johnson
Research Instructor

CC: F. J. Hassler
W. H. Henson, Jr.
R. W. Watkins

Enclosure

WHJ:mac

UNIFORM STRAIGHT BILL OF LADING — Original — Not Negotiable — Domestic

OVERNITE TRANSPORTATION CO.

Carrier

Shipper's No.

Agent's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

From N. C. State College, Agr. Engr. Dept., P. O. Box 5906, Raleigh, N. C. Date March 13, 19 58
 at Raleigh, North Carolina

The property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as including any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination, if on its own railroad, water line, highway route or route, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party of any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assign.

Consigned to Dr. J. M. Moseley, Assistant to Director of Research, THE AMERICAN TOBACCO COMPANY
 Research Laboratory

Destination 400 Petersburg Turnpike City Richmond 24, County Virginia State

Routing COLLECT ON DELIVERY

Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery \$ _____ and remit to: _____

C. O. D. charge { Shipper
 to be paid by { Consignee

No. Packages	Street	City	State	*Weight (Sub. to Car.)	Class or Rate	Check Column
2	cartons tobacco samples					

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
 The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)
 If charges are to be prepaid, write or stamp here "To Be Prepaid."

Received \$ _____ to apply a prepayment of the charges on the property described herein.

Agent or Cashier

For (The signature here acknowledges only the amount prepaid)

Charges Advanced

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."
 NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____

per _____
 Shipper, Per _____

Agent, Per 2 Miller 1

Permanent address of shipper, _____

