

RJIR

SECRET

No. 15 By _____

IMPLICATIONS AND ACTIVITIES ARISING FROM CORRELATION

OF SMOKE pH WITH NICOTINE IMPACT, OTHER

SMOKE QUALITIES, AND CIGARETTE SALES

50931 4122

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IMPLICATIONS AND ACTIVITIES ARISING FROM CORRELATION OF SMOKE pH WITH
NICOTINE IMPACT, OTHER SMOKE QUALITIES, AND CIGARETTE SALES

I. INTRODUCTION; OBJECTIVES:

This year the continuing, vigorous sales growth of various competitive cigarette brands, especially Marlboro and Kool, prompted an intensive study of the physical and chemical properties of those brands as compared with our brands. This was aimed at (1) identifying any significant property differences which might correlate with market performance, (2) measuring and monitoring such differences, and (3) learning how such differences are achieved, permitting us to achieve similar effects in our existing or new brands, if desired.

II. HISTORICAL DATA, TRENDS AND BRAND COMPARISONS

In seeking out significant property differences, we gathered available historical and current data on our brands and competitive brands, and made comparisons. It soon became apparent that in recent years, corresponding to recent sales performance, the most significant difference between our brands and Philip Morris brands and Kool has been in the area of smoke pH.

It will be recalled that smoke pH is a means for expressing, on a 0-14 scale, the degree of acidity or alkalinity of the smoke system. As smoke pH increases the system becomes more alkaline, and as smoke pH decreases the system becomes more acidic. Chart I* illustrates the pH concept, Chart II shows typical smoke pH curves from which average values are derived, and Chart III shows typical smoke pH data for various tobacco materials and products. Current data on smoke pH and related properties of our brands and competitive brands are given in Appendix I.

Our data show that smoke from our brands, and all other significant competitive brands, in recent years has been consistently and significantly lower in pH (less alkaline) than smoke from Marlboro and to a lesser degree Kool. Chart IV shows averaged smoke pH data for WINSTON vs. Marlboro over the years, Chart V shows a SALEM vs. Kool comparison, and Charts VI and VII show smoke pH data for some other major brands. All evidence indicates that the relatively high smoke pH (high alkalinity) shown by Marlboro (and other Philip Morris brands) and Kool is deliberate and controlled. This has raised questions as to: (1) the effect of higher smoke pH on nicotine impact and smoke quality, hence market performance, and (2) how the higher smoke pH might be accomplished.

*Charts I - XIII appear on pages 6 - 18.

III. SMOKE pH AND "FREE" NICOTINE

In essence, a cigarette is a system for delivery of nicotine to the smoker in attractive, useful form. At "normal" smoke pH, at or below about 6.0, essentially all of the smoke nicotine is chemically combined with acidic substances, hence is non-volatile and relatively slowly absorbed by the smoker. As the smoke pH increases above about 6.0, an increasing proportion of the total smoke nicotine occurs in "free" form, which is volatile, rapidly absorbed by the smoker, and believed to be instantly perceived as nicotine "kick". Chart VIII shows how proportion of "free" nicotine increases as pH goes higher.

Marlboro and Kool deliver about the same amounts of total smoke nicotine as do our comparable brands (Charts IX and X). However, Marlboro smoke is typically at pH 6.8-7.3, and Kool smoke is typically at 6.4-6.6, as compared with WINSTON smoke at pH 5.8-6.0 and SALEM smoke at pH 6.0-6.2. Thus, Marlboro and Kool smokes contain more "free" nicotine than our comparable brands, hence would be expected to show more instantaneous nicotine "kick" than our brands. Charts XI and XII show these relationships, along with some comparative sales data to be discussed later.

As a result of its higher smoke pH, the current Marlboro, despite a two-thirds reduction in smoke "tar" and nicotine over the years, calculates to have essentially the same amount of "free" nicotine in its smoke as did the early WINSTON. Over the same period, with some reduction in smoke pH and about two-thirds reductions in smoke "tar" and nicotine, the calculated amount of "free" nicotine in WINSTON smoke has decreased by about two-thirds. Thus, currently the calculated amount of "free" nicotine in Marlboro smoke is almost three times the amount in WINSTON smoke. In Kool vs. SALEM comparisons, much the same pattern emerges over time, although the differences are not as pronounced.

IV. SMOKE pH AND OTHER SMOKE QUALITIES

In addition to enhancing nicotine "kick", increasing the pH (increasing alkalinity) of smoke above about 6.0 causes other changes, particularly when the increase in smoke pH is achieved by adding ammonia to the blend. As smoke pH increases, in general stemmy taste, mouth irritation, flue-cured flavor and Turkish flavor are diminished, and burley flavor and character are enhanced. It should be noted, however, that if the smoke pH goes much above 7 at normal total smoke nicotine levels (1.1-1.6 µg/cigt.), the amount of "free" nicotine becomes high, and this may cause harshness to the throat. These changes in smoke qualities with changes in smoke pH are illustrated in Chart VIII.

V. MARKETING CORRELATIONS AND IMPLICATIONS

Putting all of this together, we see that Marlboro (and other Philip Morris brands) as compared with WINSTON, our other brands and most other brands on the market shows: (1) higher smoke pH (higher alkalinity), hence increased amounts of "free" nicotine in smoke, and higher immediate nicotine "kick", (2) less mouth irritation, less stemmy taste and less Turkish and flue-cured flavor, and (4) increased burley flavor and character. Kool differs from SALEM in much the same way; however, the differences are not as great and the different levels of menthol and other factors tend to blur the picture.

These differences in nicotine impact and other smoke qualities arising from smoke pH increases would be expected to give rise to differences in consumer response, hence market performance. Our preliminary correlations strongly suggest that this is the case and that the vigorous, sustained growth in sales of Marlboro (and other Philip Morris brands) and Kool correlates closely with the increased smoke pH, hence increased "free" nicotine and nicotine impact of those brands. The accompanying reduction in mouth irritation and stemmy taste, and the increased burley character may also be factors.

Chart XI compares regular WINSTON to regular Marlboro in terms of smoke pH, calculated amount of "free" nicotine in smoke, and annual sales, for recent years. Chart XII compares regular SALEM to regular Kool in the same way. Chart XIII suggests that market performance of various brands correlates positively with total amount of "free" smoke nicotine, and that all brands surveyed having over about 35 micrograms of "free" nicotine/cigarette increased in market share in the period studied.

Subsequent detailed analysis by Marketing Research of our pH and "free" nicotine data along with sales data and other factors has confirmed the strongly positive correlation between "free" nicotine in smoke (determined by pH and total nicotine in smoke) and market share performance. Memoranda in Appendix II summarize the work of Marketing Research.

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VI. PRESENT RJR BRAND ACTIVITY

If our data, correlations and conclusions are valid, then what has emerged is a rather new type of cigarette, represented by Marlboro and Kool, with high nicotine "kick", burley flavor, mildness to the mouth, and increased sensation to the throat, all largely the result of higher smoke pH. There is evidence that other brands which are selling well also have some of these attributes, particularly increased "free" nicotine impact. Because brands of the new type continue to show vigorous growth in sales; because a high proportion of beginning smokers are learning to like Marlboro, the leading brand of the new type; and because we have no current brand in this newly identified, major segment of the market; it has become appropriate for us to consider moving our present brands in the direction of the new type of cigarette and/or creating new products to compete directly in that area of the market.

Currently, Research, Tobacco Development and Marketing are collaborating on a series of tests aimed at exploring the newly-identified area of the market. The three basic types of products being prepared for evaluation are: (1) direct matches of Marlboro (NFO 10/15) and Kool (NFO 12/3), (2) WINSTON KING (NFO 10/15) and CAMEL FILTER (NFO 10/15) maintaining basic integrity but with smoke pH same as Marlboro, and (3) SALEM KING (NFO 12/3) maintaining basic integrity and menthol level but matching Kool in smoke pH. Work is planned, but NFO target dates are not yet established, for evaluation of similar smoke pH changes in DORAL and VANTAGE.

Additionally, a series of WINSTON-type cigarettes with step-wise increases in smoke pH, with the top-step well above the smoke pH of Marlboro, will be made for evaluation in the first quarter of 1974. Panel testing of these cigarettes should provide information on: (1) the minimum smoke pH change detected by the consumer, (2) changes in satisfaction factors and other smoke qualities associated with small pH changes, (3) the preferred pH range for smoke of a given, normal nicotine content, and (4) the break-over point, beyond which increasing the smoke pH gives smoke which is undesirable and too harsh to inhale.

A memorandum describing these activities and schedules in more detail appears as Appendix III.

VII. RESEARCH ACTIVITIES, CURRENT AND PLANNED

As its part in this collaborative effort, Research has: (1) collected, correlated, interpreted and described to Management data on smoke pH of various brands, (2) developed and put into routine use improved methods for measurement of smoke pH, (3) discovered and reproduced the additives and procedures necessary to prepare the G-7 type of material used to increase the smoke pH of Marlboro, and (4) monitored, on a continuous basis, smoke pH and related properties of Marlboro, other Philip Morris brands, Kool, our brands, and some other competitive brands. Additionally, Research has substantial work in progress on (1) determining how smoke pH elevation and control are achieved in Kool, (2) developing a method for measuring pH of pipe smoke, (3) studying how smoke composition and other things change as pH is changed, and (4) evaluating various methods whereby smoke pH may be increased, with emphasis on ammonia treatments of stem materials.

Methods which may be used to increase smoke pH and/or nicotine "kick" include: (1) increasing the amount of (strong) burley in the blend, (2) reduction of casing sugar used on the burley and/or blend, (3) use of alkaline additives, usually ammonia compounds, to the blend, (4) addition of nicotine to the blend, (5) removal of acids from the blend, (6) special filter systems to remove acids from or add alkaline materials to the smoke, and (7) use of high air dilution filter systems. Methods 1-3, in combination, represent the Philip Morris approach, and are under active investigation. The remaining methods appear less attractive or less practical, and are currently receiving less attention.

Thus in this continuing, collaborative effort, Research is providing measurements, data, interpretations, new information and discoveries, and technical consultation to TPD, Marketing, and others. We anticipate continued intensive effort in this potentially fruitful area throughout 1974.



Claude E. Teague, Jr.

:jhb

Xc: Dr. Murray Senkus

CHART I

pH CONCEPT AND SCALE

DEFINITION: pH IS A MEANS FOR EXPRESSING, ON A 0-14 SCALE, THE DEGREE OF ACIDITY OR ALKALINITY OF A SYSTEM.

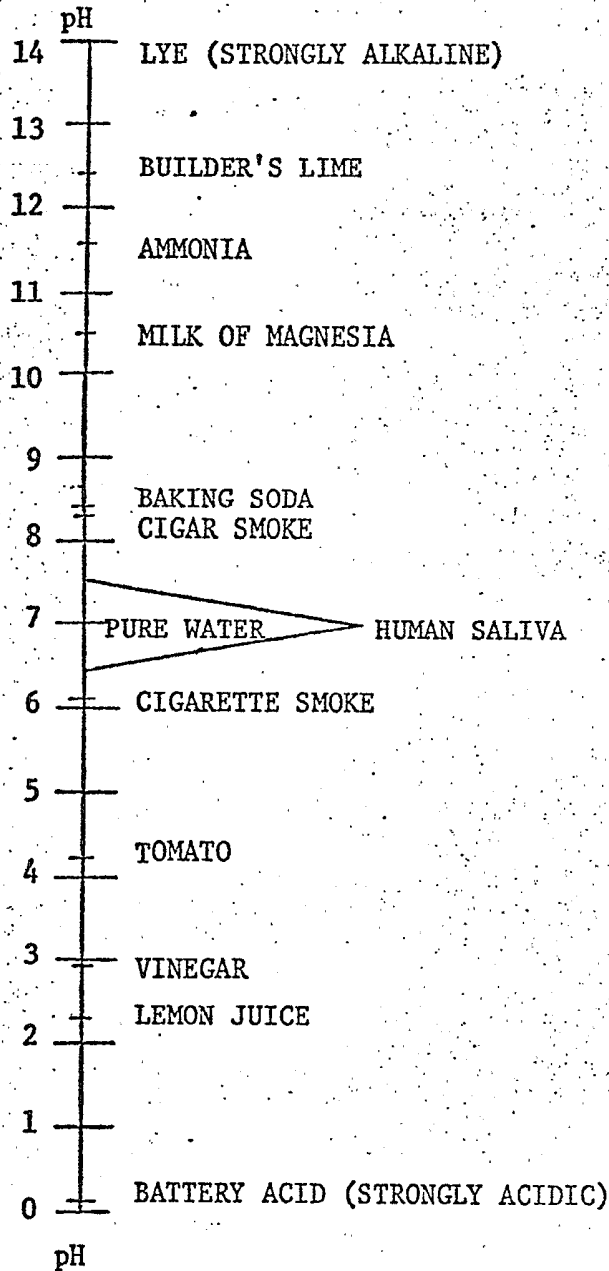


CHART II

PUFF-BY-PUFF pH VALUES:
1972 WINSTON AND MARLBORO 85

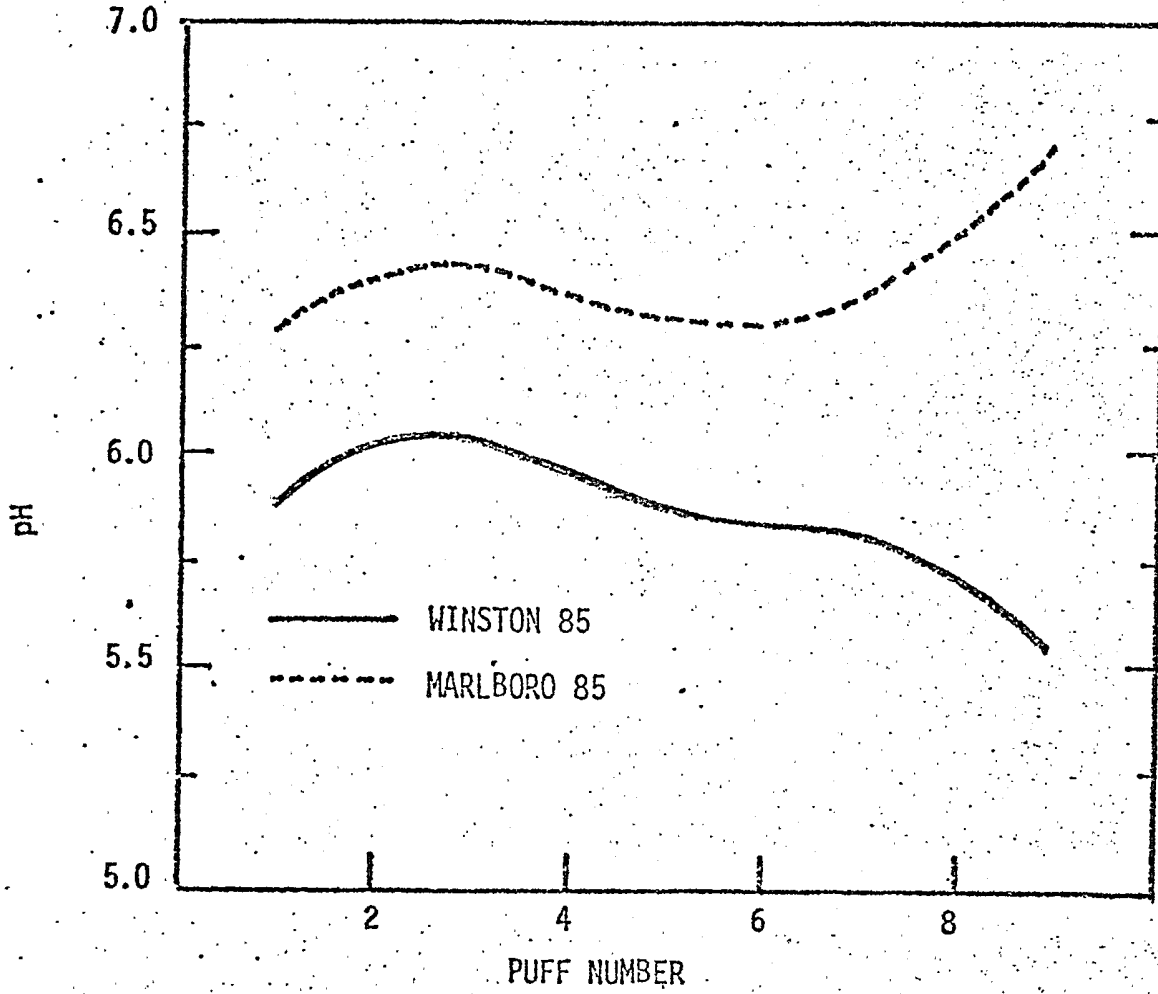
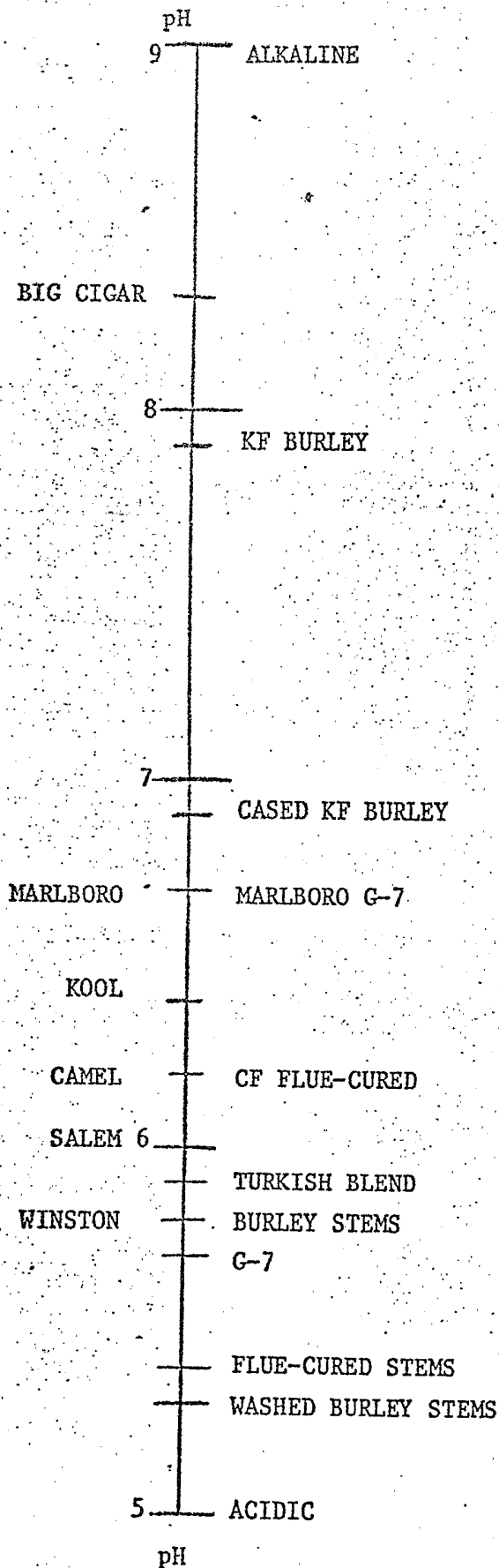
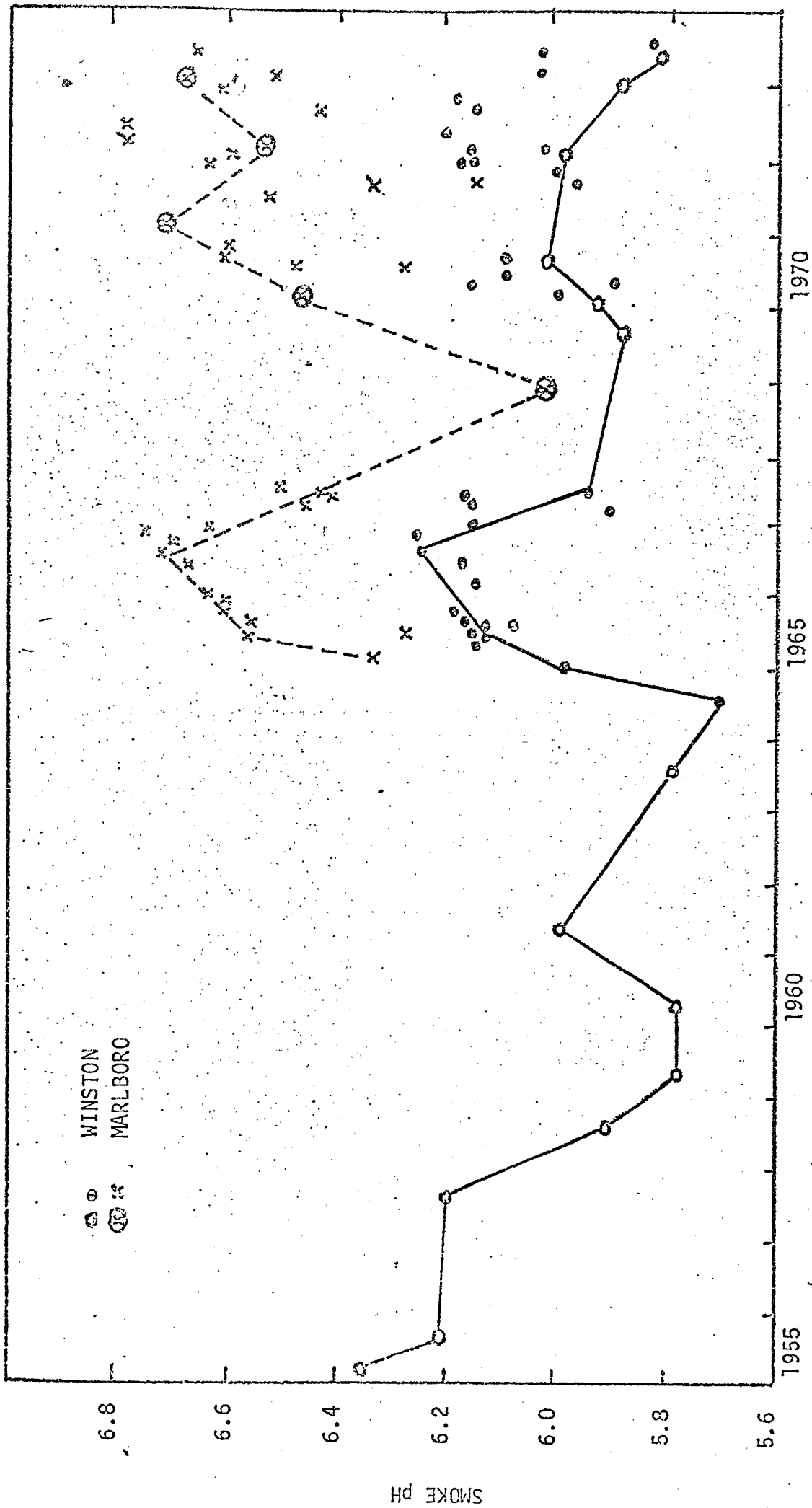


CHART III

AVERAGE MAXIMUM SMOKE pH OF TOBACCO MATERIALS AND PRODUCTS

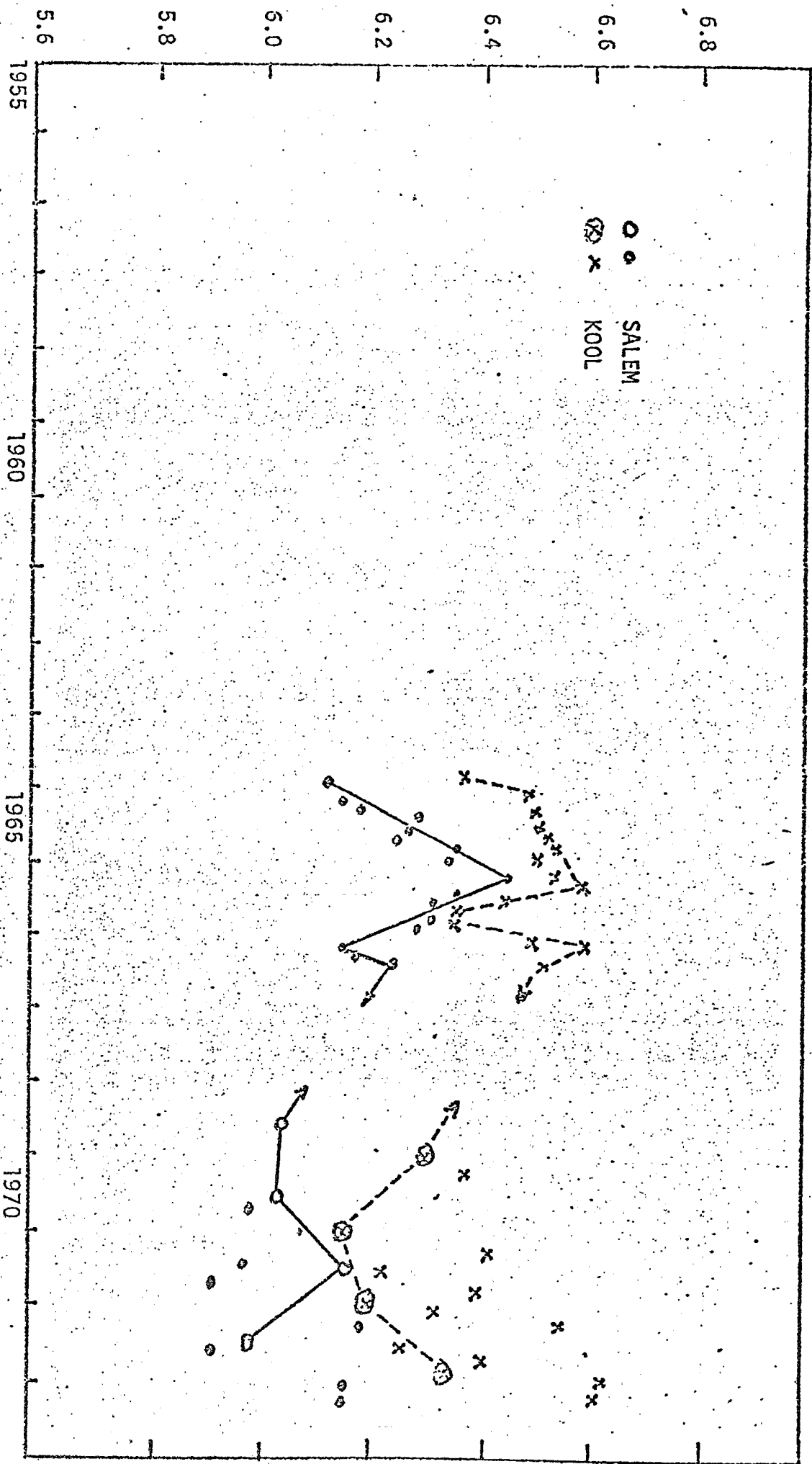


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WINSTON VS MARLBORO: SMOKE pH VS YEAR OF MANUFACTURE

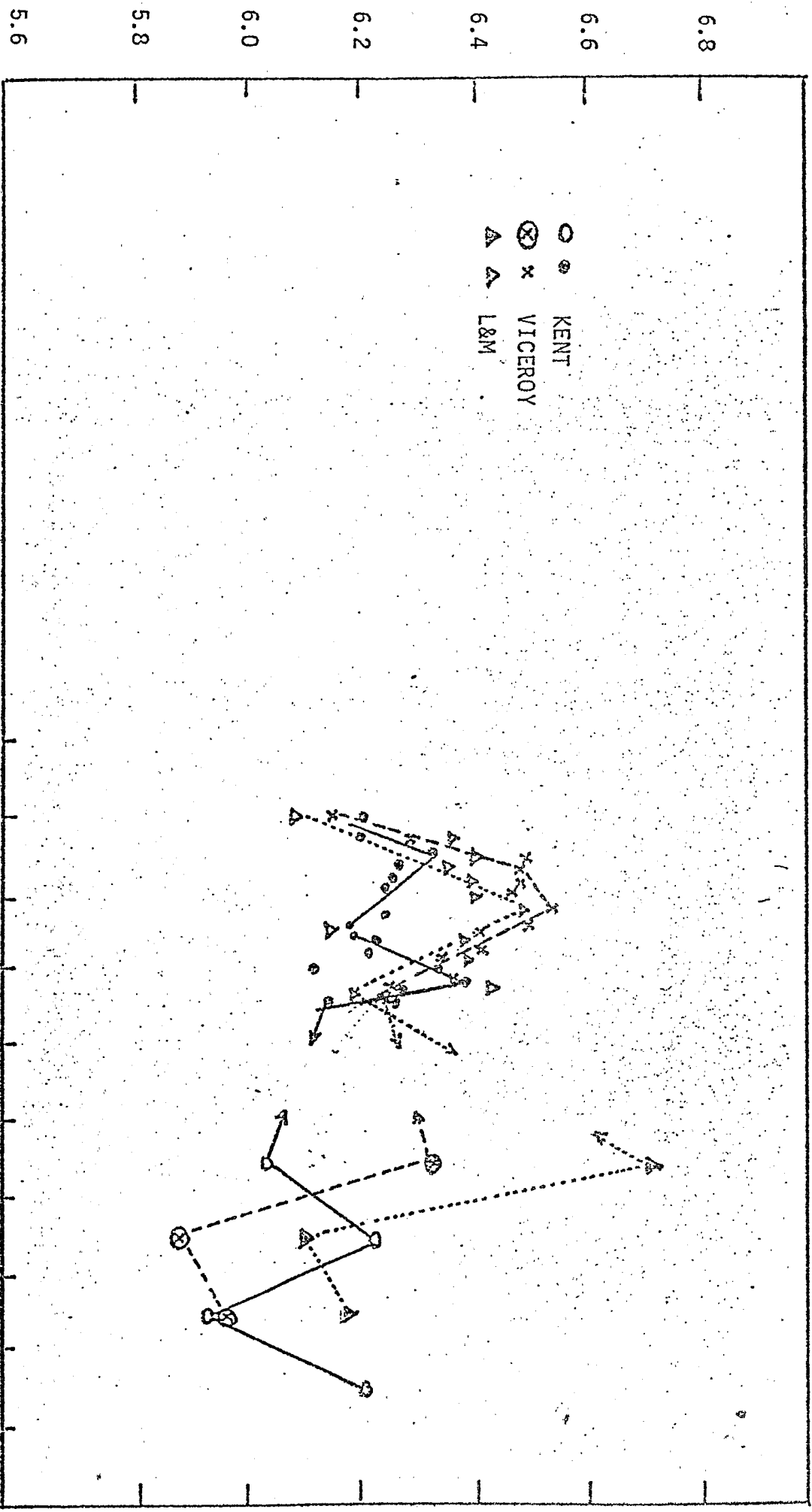
SMOKE pH



SALEM VS KOOL: SMOKE pH VS YEAR OF MANUFACTURE

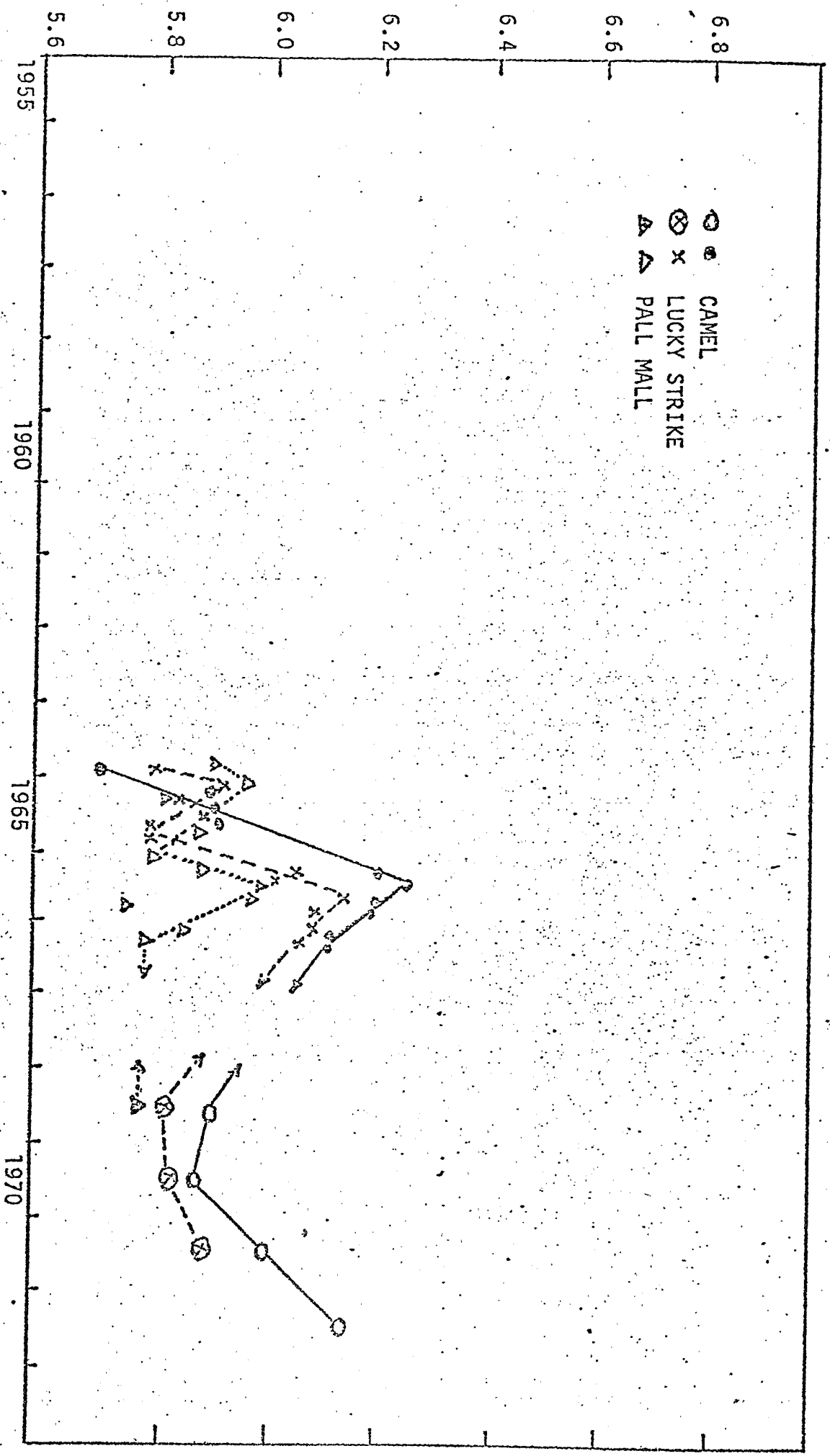
CHART V

SMOKE pH



YEAR OF MANUFACTURE
1965
1970
FILTER CIGARETTE: SMOKE pH VS YEAR OF MANUFACTURE

SMOKE pH

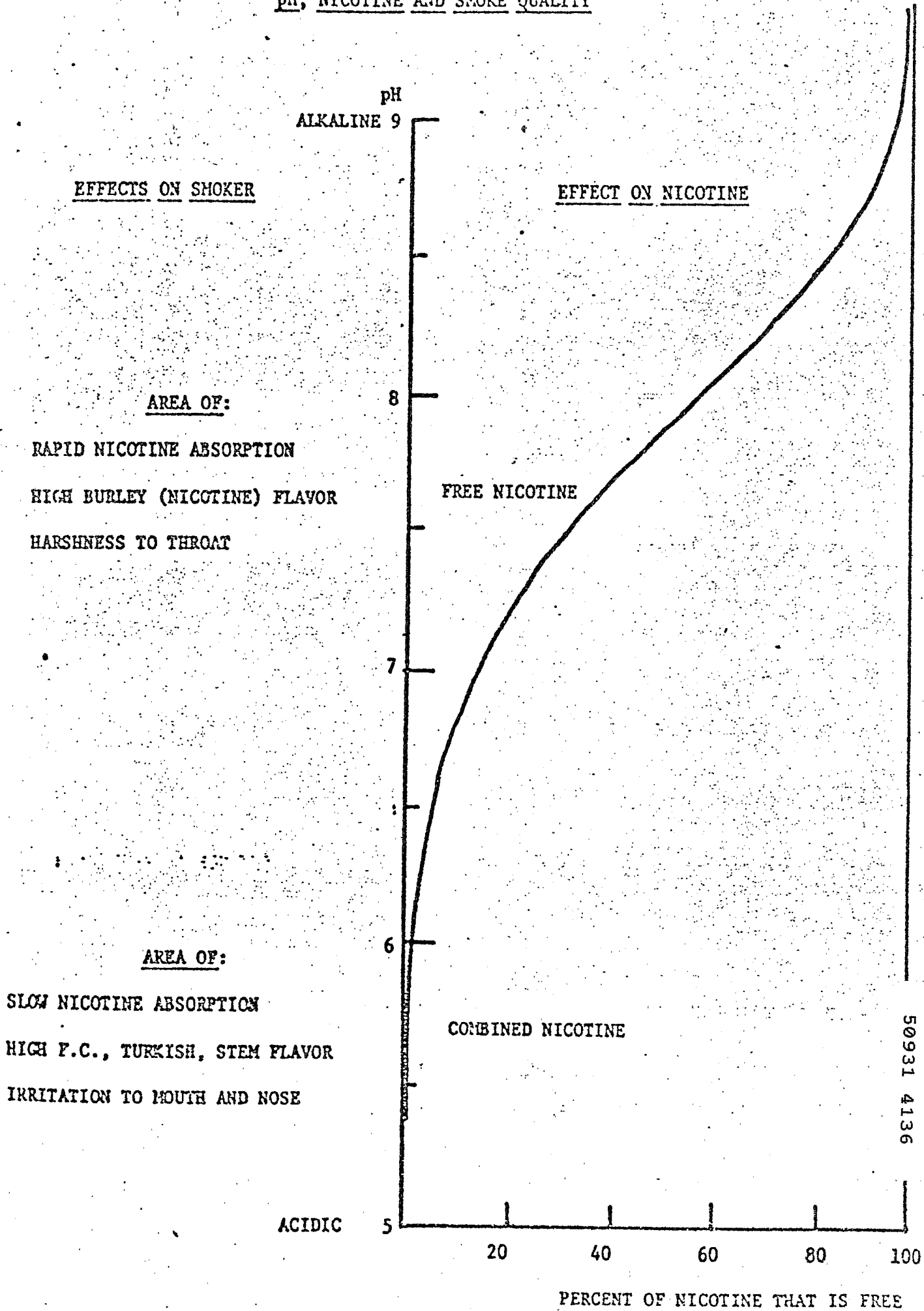


YEAR OF MANUFACTURE

NONFILTER CIGARETTES: SMOKE pH VS YEAR OF MANUFACTURE

CHART VIII

pH, NICOTINE AND SMOKE QUALITY



FTC "TAR", MG/CIGARETTE

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WINSTON

MARLBORO

1960

1965

1970

NICOTINE IN SMOKE, MG/CIGARETTE

WINSTON

MARLBORO

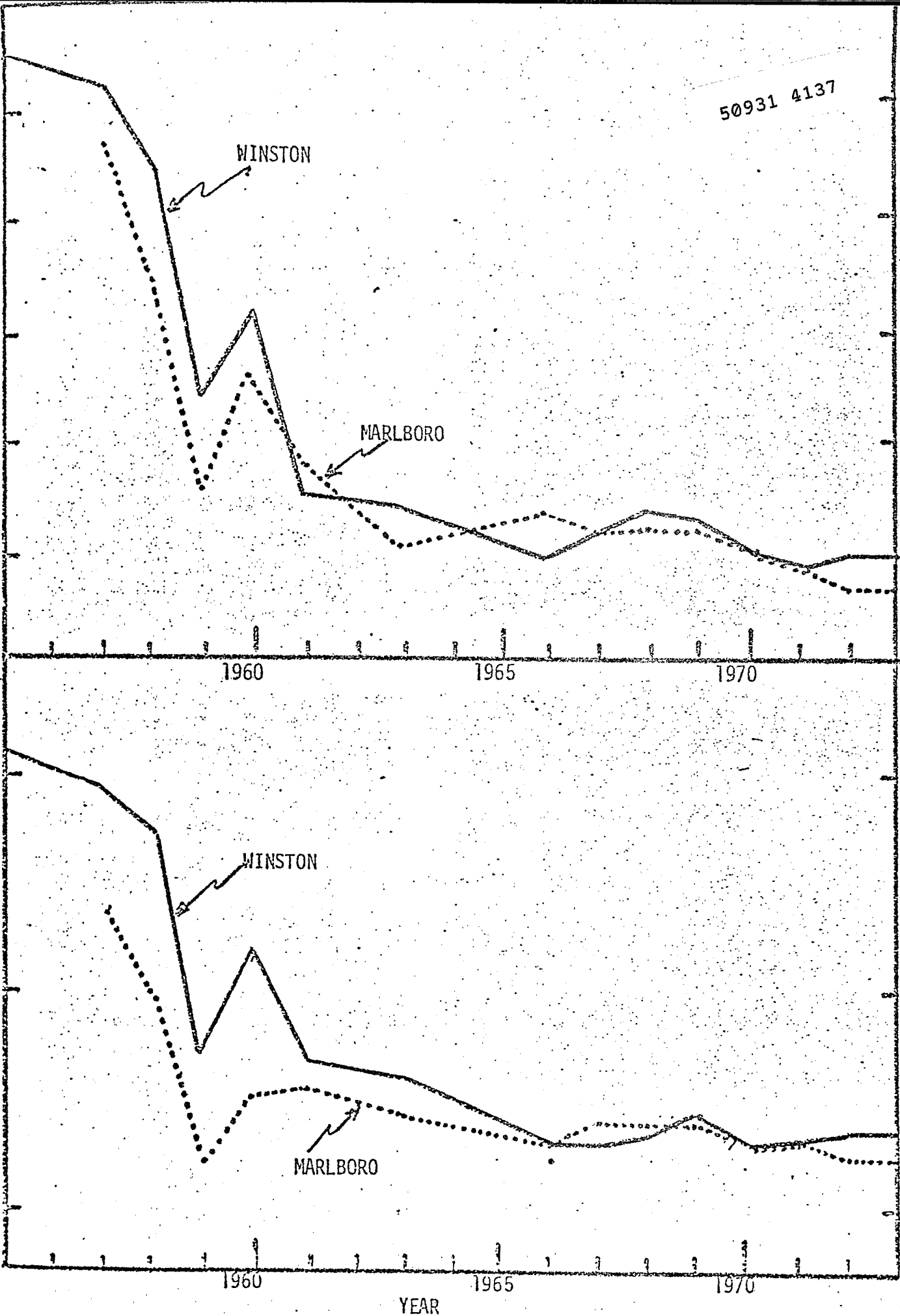
1960

1965

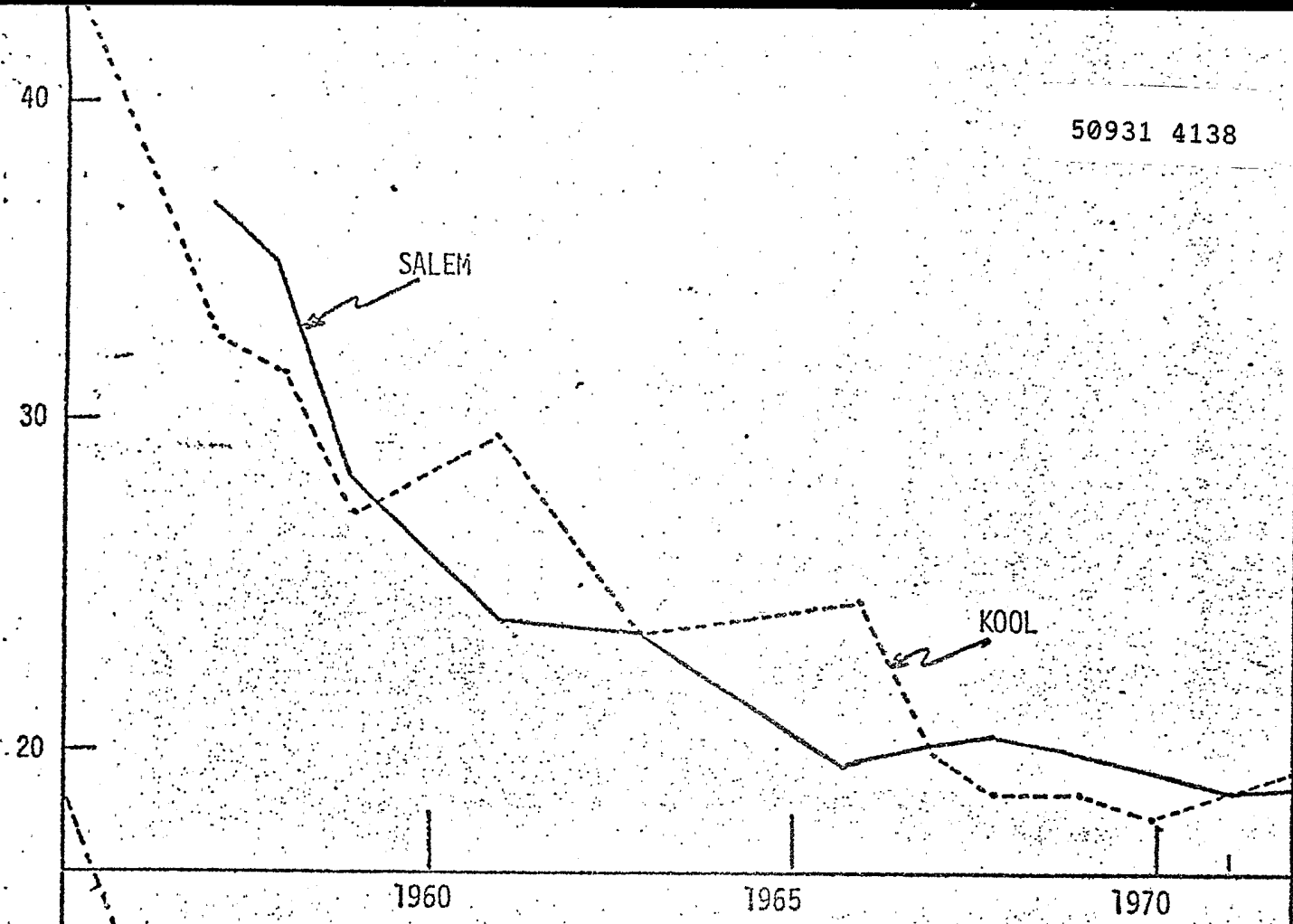
1970

YEAR

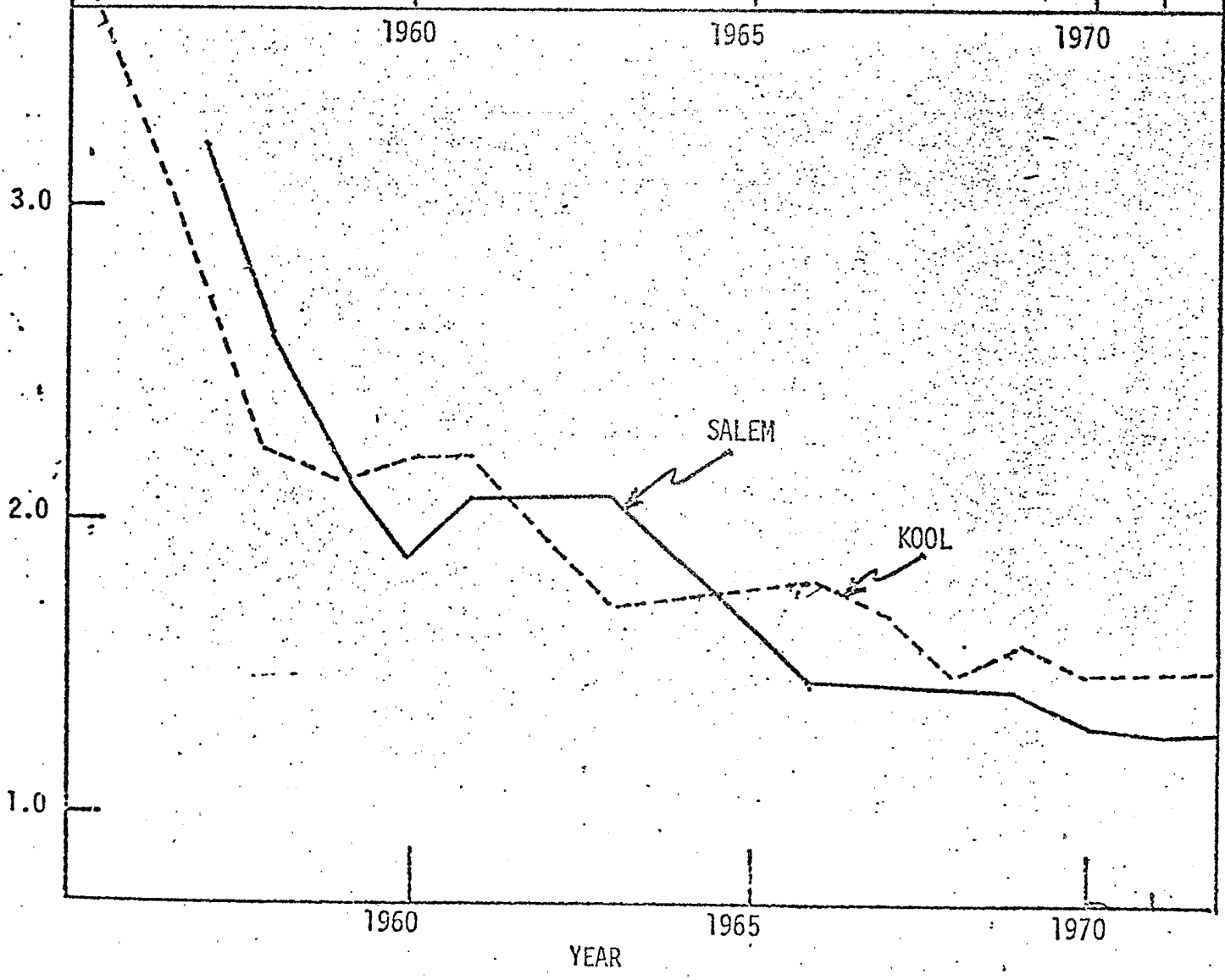
FIG. : FTC "TAR" AND SMOKE NICOTINE - MARLBORO VS WINSTON



FTC "TAR", MG/CIGT.



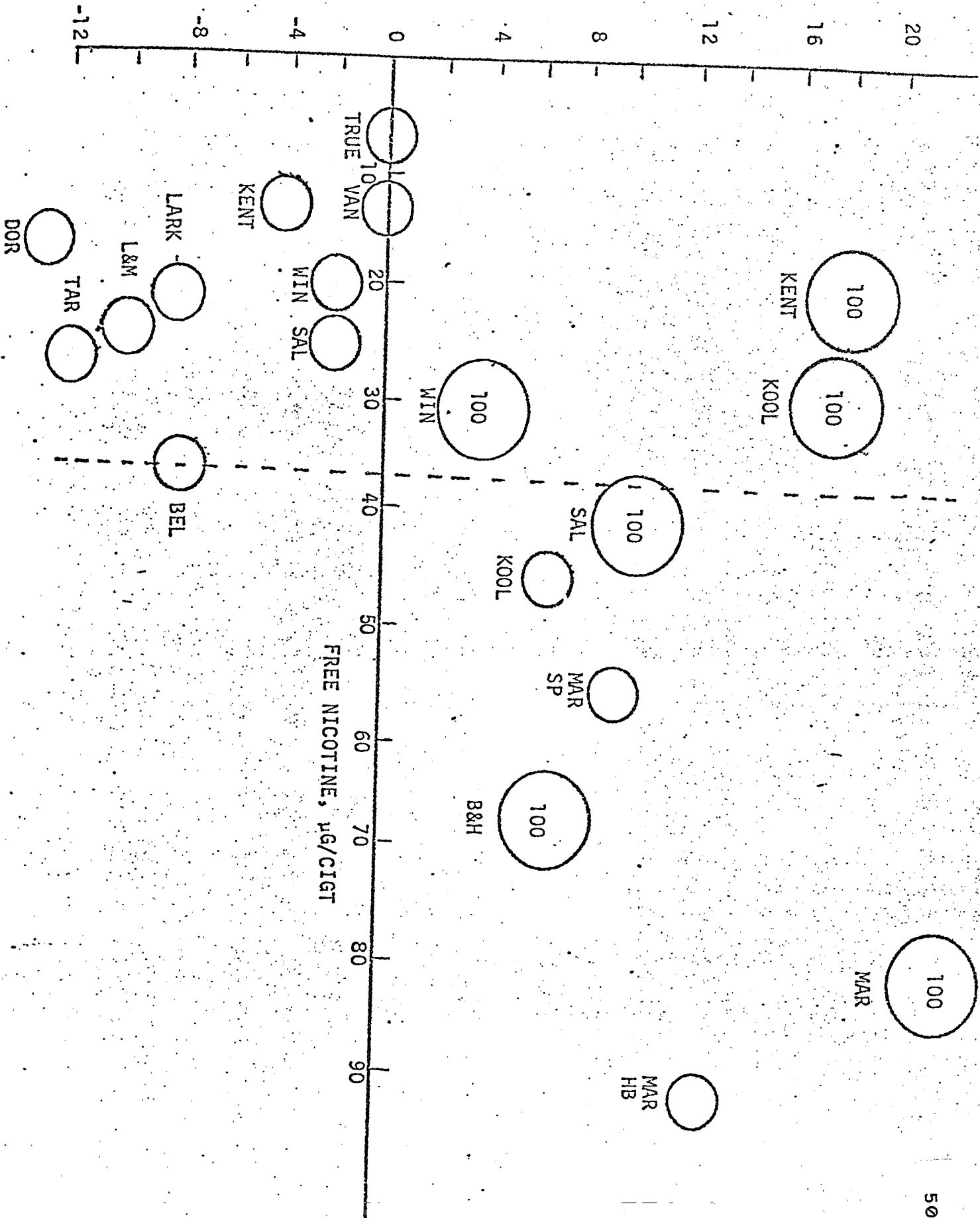
NICOTINE IN SMOKE, MG/CIGT.



YEAR

CHART XIII

CHANGE IN MARKET SHARE: 1971-1972, %



RJR

CONFIDENTIAL

July 12, 1973

Mr. W. S. Smith, Jr.

Free nicotine does help explain the differences in performance between Winston, Marlboro, Salem and Kool but not all of the difference.

We have reviewed free nicotine, advertising expenditures, and 100mm spin-off data for Winston, Marlboro, Salem and Kool from 1963 through 1972 and found that the difference in share performance of the 85mm styles of each brand is affected by all of the above factors independently and collectively.

Together these three factors statistically explain 97% of the variability between share performance of Winston and Marlboro (King and Box). They explain 95% of the variability between Salem and Kool.

The variability due to "free nicotine" was significant and its contribution was over and above that of advertising expenditures and 100mm spin-off.

Other factors which we reviewed but which did not seem to correlate favorably were:

- combined nicotine,
- tar,
- nitrogen, and
- sugar.

Ammonia and out-of-stock conditions look promising, but we have only limited data on both.

Our analysis suggests that pH does not correlate as closely with share performances as does free nicotine. Our emphasis should be directed toward free nicotine while pH would provide us with a measure of or tool to effect free nicotine. We will conduct correlations between performance and pH if you desire.

R. A. Blevins, Jr.

RAB:fm

- CC: Mr. W. D. Hobbs
- Mr. C. A. Tucker
- Mr. C. E. Teague, Jr.

50931 4140

*Claude
Heath*

August 10, 1973

Mr. R. A. Blevins, Jr.

Re: CORRELATION OF pH AND SHARE OF MARKET PERFORMANCE

The correlation of pH and SOM performance holds, but only for those brands having the same nicotine levels. In the analysis of differences in performance between WINSTON and Marlboro and between SALEM and Kool, pH does correlate equally as well with performance as does free nicotine. The total nicotine in WINSTON and Marlboro and in SALEM and Kool is almost equal.

Re. (X) Since pH is a measure of the percent of free nicotine and since the amount of free nicotine present would then depend on the total amount of nicotine, two brands with the same pH could have different amounts of total nicotine and, therefore, different amounts of free nicotine.

Jerry R. Moore
Marketing Research Department

JRM:vhl

July 3, 1973

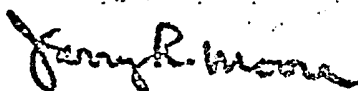
Mr. R. A. Blevins, Jr.

Re: CORRELATION OF SMOKE BALANCE FACTORS WITH SOM TRENDS

A preliminary correlation study of smoke balance factors (free nicotine, combined nicotine, tar, nitrogen, ammonia, and sugar) with SOM trends for WINSTON 85's vs. Marlboro 85's and SALEM 85's vs. Kool 85's from 1963 to 1972 confirms the correlation of free nicotine to sales previously reported by Research. Differences in SOM for each year between WINSTON 85's and Marlboro 85's and between SALEM 85's and Kool 85's were correlated with differences in the smoke balance factors (see Table I attached). A correlation of approximately .40 is significant at the 80% level of significance.

While the correlations of differences in SOM with various smoke balance factors (particularly free nicotine) are suggestive, there are other factors, such as differences in advertising expenditures, and differences in SOM of the 100's for the brands also significantly correlated with differences in SOM. Assuming that cause and effect relationships do exist, it is not possible with available data to separate the effects of smoke balance factors and other factors.

In spite of the confounding of effects, a regression model including differences in free nicotine, advertising expenditures, and SOM of the 100's with difference in SOM as the dependent variable resulted in 97% of the variability explained in the case of WINSTON 85's vs. Marlboro 85's and 95% of the variability explained in the case of SALEM 85's vs. Kool 85's. In both cases, free nicotine contributed significantly to the model over and above the other factors.

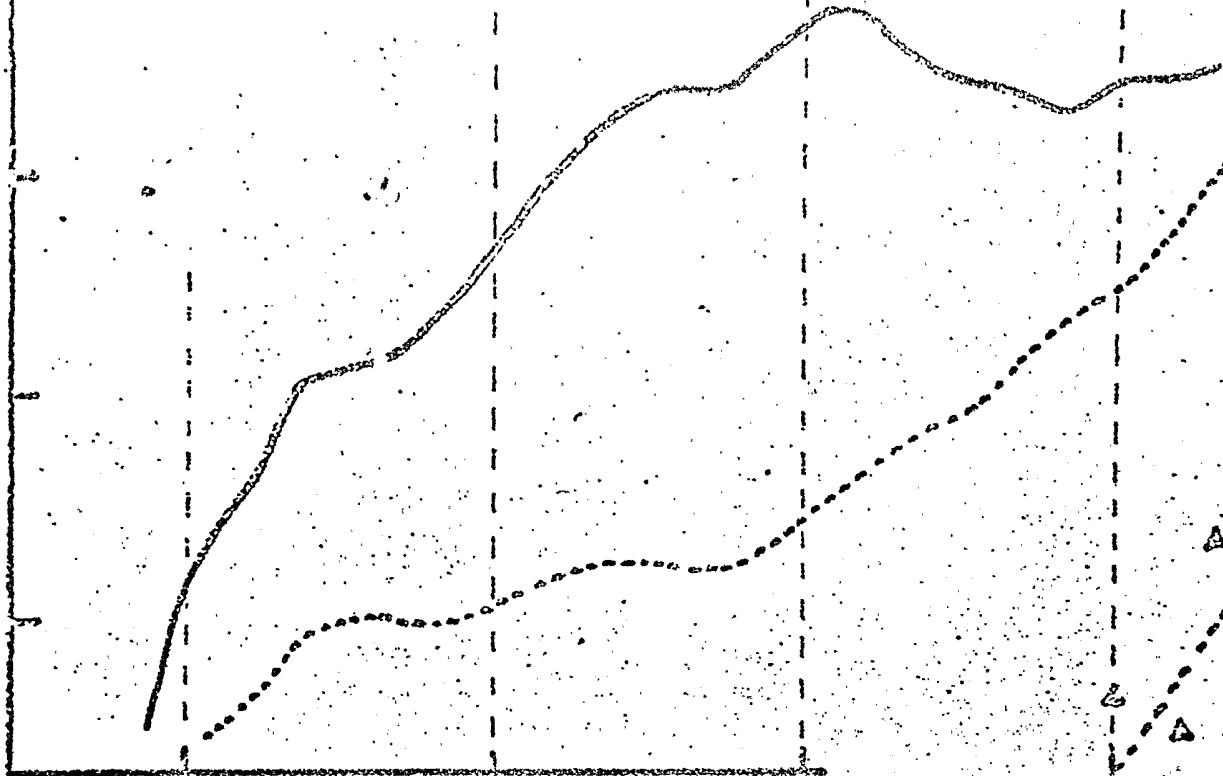


Jerry R. Moore

JRM:vl
Attachment

ANNUAL SALES, BILLIONS

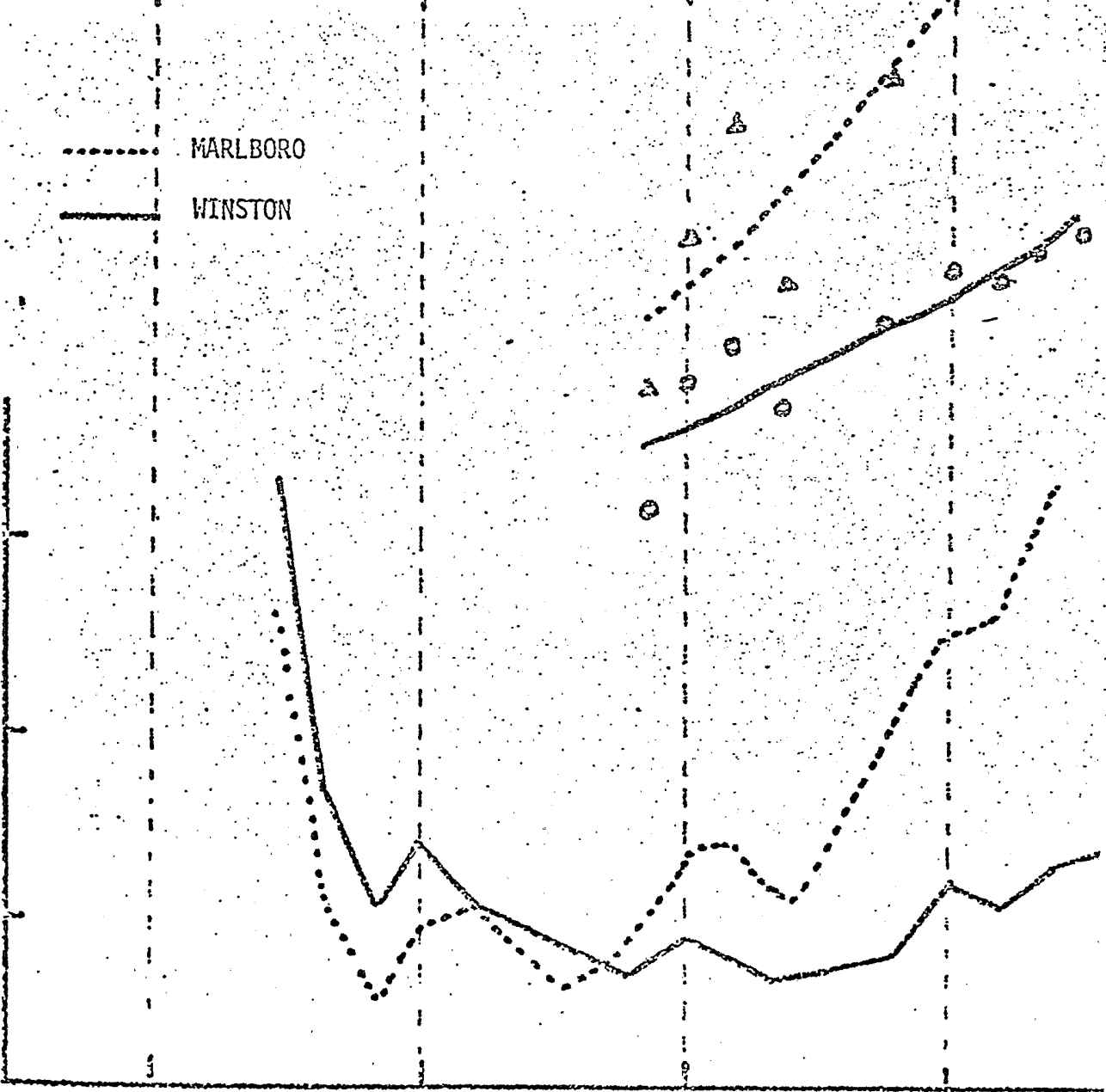
60
40
20



--- MARLBORO
— WINSTON

FREE NICOTINE IN SMOKE, $\mu\text{G}/\text{CIGARETTE}$

60
40
20



50931 4143

1955 1960 1965 1970

6.8
6.6
6.4
6.2
6.0
5.8

CHART XII

CIGARETTES SOLD, BILLIONS

60
40
20

SALEM

KOOL

--- KOOL
— SALEM

KOOL

SALEM

6.8
6.6
6.4
6.2
6.0

FREE NICOTINE, $\mu\text{C}/\text{CIGARETTE}$

60
40
20

KOOL

SALEM

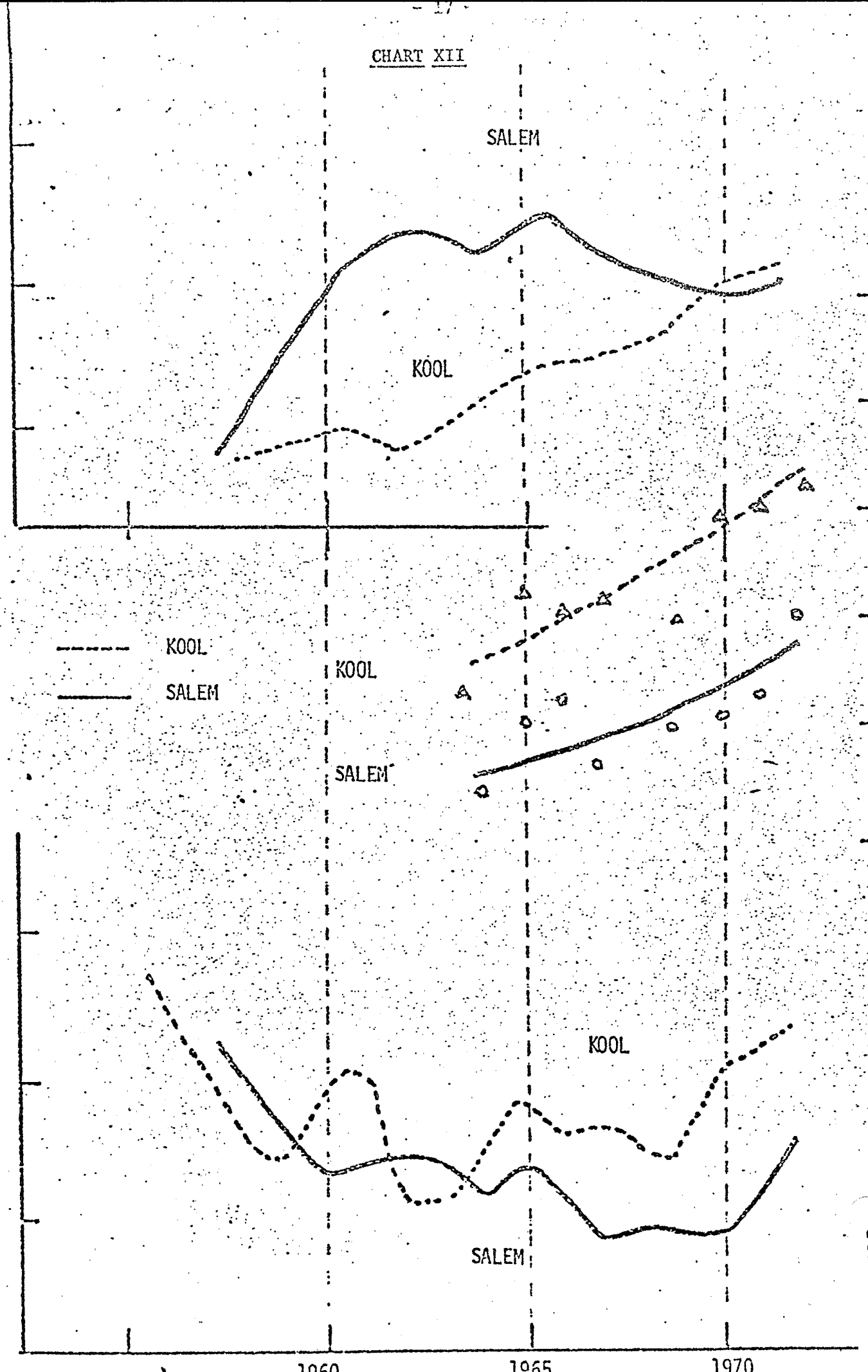
1960

1965

1970

YEAR

50931 4144



*Dr. Senkus
Request*

August 14, 1973

SECRET

Mr. Wm. D. Hobbs:

Re: Tobacco Development Product Direction

The attached represents the Marketing Department's understanding of agreed to product objectives for Tobacco Development's direction. If they meet your approval, we request that you forward to Tobacco Development and coordinate with Dr. Senkus of Research.

As agreed, this research program should also answer the question on the maximum acceptable level of Ph that optimizes tobacco satisfaction. Marketing believes that this testing program should be developed between Tobacco Development and Research and coordinated through Marketing Research by them. We would appreciate being kept informed of the progress in this area.

Should you have any questions or comments, please advise.

T. E. Sandefur, Jr.

J. F. Hind

2344

Attachment

SECRET

SECRET

PRODUCT DEVELOPMENT DIRECTIONS TO TD

No. 204 BY *jsd/ym*

August 13, 1973

50931 4146

Item	Brand/Style	Development Directions	Action Standard*	Due Date
	WINSTON King	Maintain basic integrity of current WINSTON King blend with adjusted PH factor towards Marlboro King.	<ol style="list-style-type: none"> 1) Parity or better against current Blend among WINSTON King smokers. 2) Parity or better against Marlboro among Marlboro smokers. 3) Better against Marlboro among other NFF smokers. 	NFO test mail-out 10/15.
	CAMEL Filter	Maintain basic integrity of current CAMEL Filter blend with adjusted PH factor towards Marlboro King.	<ol style="list-style-type: none"> 1) Parity or better against current Blend among CAMEL Filter smokers. 2) Parity or better against Marlboro among Marlboro smokers. 3) Better against Marlboro among other NFF smokers. 	NFO test mail-out 10/15.
	Significantly Revise CAMEL Filter	Replicate the Marlboro blend in all respects.	<ol style="list-style-type: none"> 1) Parity or better against current Blend among CAMEL Filter smokers. 2) Parity or better against Marlboro among Marlboro smokers. 3) Better against Marlboro among other NFF smokers. 	NFO test mail-out 10/15.
	SALEM King	Maintain basic integrity of current SALEM King blend with adjusted PH factor towards KOOL King. It would not be a KOOL King in that it would retain its relatively lower menthol level.	<ol style="list-style-type: none"> 1) Parity or better against current Blend among SALEM King smokers. 2) Parity or better against KOOL among KOOL smokers. 3) Better against KOOL among other NF menthol smokers. 	NFO test mail-out 12/3.

Priority	Brand/Style	Development Directions	Action Standard*	Due Date
A	SALEM King	Duplicate smoking characteristics of SALEM Super King and adjust pH factor towards Kool King. It would not be a Kool King in that it would retain its relatively lower menthol level.	<ol style="list-style-type: none"> 1) Product acceptable to current SALEM King smokers. 2) Partly or better against Kool King among Kool King smokers. 3) Better than Kool King among other NF menthol smokers (Delaix, Newport, etc.) 	NFO test mail-out 12/3.
A	New King Size Menthol	Duplicate Kool King in every respect in tobacco taste and menthol level.	Better than Kool King on an undifferentiated and identified/concept basis among Black Kool King smokers.	NFO test mail-out 12/3.
A	WINSTON King	Sweater WINSTON.	<ol style="list-style-type: none"> 1) Partly or better against current WK among WK smokers. 2) Partly or better against Marlboro King among MB smokers. 3) Better than MK among other NFF smokers. 	NFO test mail-out 9/15.
A	DORAL Regular/Menthol	Improved smoking satisfaction.	<ol style="list-style-type: none"> 1) Partly against current DORAL among DORAL smokers. 2) Partly against True among True smokers. 3) Better against Kent among NFF smokers. 	
A	VANTAGE King/Menthol	Review to ensure best smoking satisfaction, specifically an acceptable pH level. While there is no evidence of a product problem, we believe it worthwhile to review its smoking characteristics in view of recent pH analyses.		

Priority _____ Brand/Style _____ Development Directions _____ Action Standard* _____ Due Date _____

B SALEM Super King
 Review to ensure best smoking satisfaction, specifically an acceptable pH level. While there is no evidence of a product problem, we believe it worthwhile to review its smoking characteristics in view of recent pH analysis.

D WINSTON Menthol
 Improved smoking satisfaction. Better than current WM among WM smokers.

A NTP - filter
 120mm long, 21mm circumference, 30mm filter - Normal Flavor Filter - smoking qualities/satisfaction. Product Manager to determine. Concept test 9/6; NFO Mailout 12/10.

A NTP - menthol
 120mm long, 21mm circumference, 30mm filter - high menthol level for extra coolness and good tobacco taste satisfaction. Product Manager to determine. NFO mailout 12/10.

A ZAP
 Initial prototype blends to be based on competitive cigar evaluations. Product Manager to determine. 9/1/73
 Brand will forward more precise direction as soon as MRD research on consumer attitudes toward cigar product attributes are available.

*Outside blind panel testing will be used unless otherwise noted.

APPENDIX I

CURRENT DATA ON RJR AND

COMPETITIVE BRANDS

SAMPLE	DATE	MEG.	LENGTH	PPG	TPM	NIC.	H ₂ O	FTC "TAR"	X MIN.	X MAX.
CAMEL 70MF	8/73		23	8.2	26.6	1.55	2.9	22.1	5.65	5.99
CAMEL 85F	8/73		28	9.7	23.7	1.29	3.9	18.5	5.79	6.08
WINSTON 80FCP	8/73		26	9.4	26.3	1.37	4.9	20.1	6.02	6.33
WINSTON 85F	8/73		27	9.7	25.8	1.39	4.5	19.9	5.86	6.23
WINSTON 100F	8/73		33	10.5	22.8	1.27	2.9	18.6	5.72	6.06
WINSTON 100MF	8/73		34	10.4	22.7	1.35	2.7	18.7	5.99	6.31
SALEM 85MF	8/73		28	9.4	23.7	1.28	3.8	18.6	5.73	6.13
SALEM 100MF	8/73		34	10.4	22.6	1.32	2.8	18.5	6.00	6.27
TEMPO 85CVF	8/73		33	8.5	11.6	0.78	1.1	9.7	6.24	6.56
DORAL 85VF	8/73		33	9.6	17.2	1.05	1.9	14.3	5.88	6.20
DORAL 85MVF	8/73		33	9.5	16.9	1.06	1.8	14.1	5.88	6.14
VANTAGE 85F	8/73		33	8.5	12.7	0.78	1.4	10.5	5.78	6.21
VANTAGE 85MF	8/73		33	8.4	12.8	0.77	1.4	10.7	5.93	6.37
Lucky Strike ZONE	8/73		23	8.9	31.0	1.64	4.1	25.3	5.88	6.21
Pa11 Ma11 85NF	8/73		23	10.3	32.2	1.79	3.7	26.7	5.96	6.22
Pa11 Ma11 100F	9/73		33	10.8	25.2	1.53	3.4	20.3	5.87	6.20
Tarvylon 85CF	9/73		27	10.3	28.2	1.50	5.2	21.6	5.84	6.23
L & M 85F	8/73		27	8.8	23.8	1.35	4.0	18.4	5.83	6.26
Lark 85CF	7/73		28	8.1	21.2	1.20	3.2	16.8	5.56	5.96
Marlboro 80FCP	7/73		26	8.9	22.5	1.12	3.7	17.7	6.06	6.82
Marlboro 85F	9/73		28	8.6	21.8	1.15	3.2	17.4	6.21	6.74
Parliament 85F	7/73		33	8.1	17.2	0.84	2.2	14.2	5.76	6.47
Benson & Hedges 100F	8/73		35	9.2	21.9	1.18	2.8	17.9	6.19	6.83
Benson & Hedges 100MF	9/73		35	9.3	22.7	1.21	3.0	18.5	6.26	6.88
Kent 85F	8/73		27	9.1	20.2	1.00	3.4	15.7	5.99	6.39
Kent 100F	8/73		33	10.0	21.5	1.19	2.6	17.7	5.96	6.32
True 85VF	7/73		33	7.6	13.2	0.73	1.5	11.0	5.71	5.96
True 85MVF	9/73		33	8.1	14.1	0.77	1.4	11.9	5.94	6.42

FORM 1620

50931 4150

Q.P.C.
9/1-8/73

SAMPLE

DATE, MFG.

LENGTH

PPC

TPM

NIC.

H₂O

FTC "TAR" X MIN.

X MAX.

50931 4151

SAMPLE	DATE, MFG.	LENGTH	PPC	TPM	NIC.	H ₂ O	FTC "TAR" X MIN.	X MAX.	
Vicroy 85F	8/73	29	8.5	19.4	1.03	2.9	15.5	5.73	6.28
Kool 85MF	9/73	29	8.0	19.1	1.19	2.4	15.4	6.35	6.56
Kool 100MF	8/73	35	9.3	21.0	1.24	2.6	17.2	6.13	6.56
Raleigh 85F	9/73	29	8.3	18.4	1.06	2.6	14.8	5.92	6.40
Belair 85MF	7.73	29	8.0	19.1	1.06	2.7	15.3	5.76	6.16

FORM 1620

Q.M.
9/28/73

APPENDIX II

MEMORANDA FROM MARKETING RESEARCH.

TABLE I. CORRELATION OF SOM DIFFERENCES WITH DIFFERENCES IN SMOKE BALANCE FACTORS

WINSTON 85's Vs. Marlboro 85's

	<u>SOM</u>	<u>Free Nicotine</u>	<u>Combined Nicotine</u>	<u>Tar</u>	<u>Sugar</u>	<u>Nitrogen</u>	<u>Ammonia</u>	<u>Advertising Expenditures</u>	<u>SOM 100's</u>
SOM	1.00	.82	.57	-.59	.04	.87	.10	.62	-.7
Free Nicotine		1.00	-.72	-.55	NA	.69	NA	.57	-.4
Comb. Nicotine			1.00	.67	NA	-.29	NA	NA	-.4
Tar				1.00	NA	-.29	NA	.42	-.8
Sugar					1.00	NA	NA	NA	NA
Nitrogen						1.00	NA	NA	NA
Ammonia							1.00	NA	NA
Advertising								1.00	NA
SOM 100's									1.00

SALEM 85's Vs. Kool 85's

	<u>SOM</u>	<u>Free Nicotine</u>	<u>Combined Nicotine</u>	<u>Tar</u>	<u>Sugar</u>	<u>Nitrogen</u>	<u>Ammonia</u>	<u>Advertising Expenditures</u>	<u>SOM 100's</u>
SOM	1.00	.42	.15	-.60	.11	NA	NA	.85	-.9
Free Nicotine		1.00	NA	-.10	NA	NA	NA	.59	-.2
Comb. Nicotine			1.00	NA	NA	NA	NA	NA	NA
Tar				1.00	NA	NA	NA	-.33	.7
Sugar					1.00	NA	NA	NA	NA
Nitrogen						1.00	NA	NA	NA
Ammonia							1.00	NA	NA
Advertising								1.00	NA
SOM 100's									1.00

50931 4153

APPENDIX III

PRESENT BRAND ACTIVITY