Compiled and edited by

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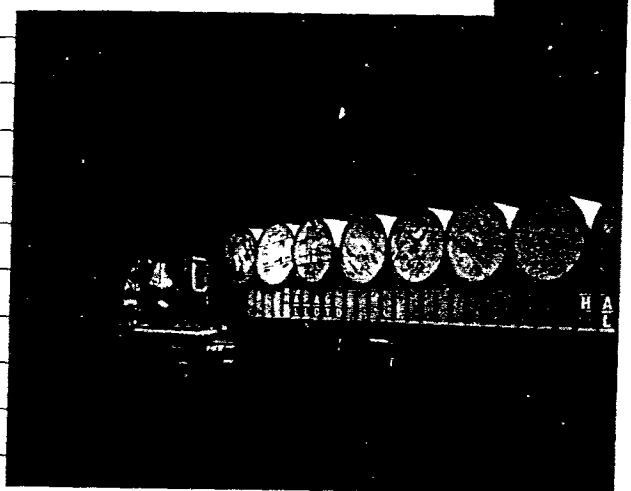
Philip Morris U.S.A.

Research Center

Dictionary of Tobacco Terminology



EDITION 2

DICTIONARY
OF
TOBACCO TERMINOLOGY

2nd Edition

Compiled and edited
by
Marian Zalis DeBardeleben

Send comments in care of the Editor to: Philip Morris Research Center, Technical Information Section, P. O. Box 26583, Richmond, Virginia 23261.

Cover design by Donald M. Denny,
Philip Morris Training Center
Art Department.

To my son, Nathan

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INTRODUCTION

Since preparation of the first edition of this dictionary, generic cigarettes have been introduced, Ernst Voges has presented the scientific world with his *Tobacco Encyclopedia* (Mainz: Mainzer Verlagsanstalt, 1984), and the power of information has been recognized and publicized around the world. This is not, of course, to ignore all the major events that touched history during the past five years.

The decision to produce a second edition of the *DICTIONARY OF TOBACCO TERMINOLOGY* was purely an economic one: supply and demand. The demand since initial publication was overwhelming, and the supply has been exhausted. We chose to re-edit rather than reprint so that we could include new terms introduced to this special field of technology, incorporate changes recommended by our readers and reviewers, and expand our coverage of the leaf aspects of the cigarette industry.

As before our emphasis remains on the cigarette industry in the United States. Definitions, illustrations, and tables were gathered in the same manner: from the published literature, from the experience of Philip Morris employees, and from official standards. Appreciation for all the assistance received is again acknowledged here. Special acknowledgment is due once more to Anne T. Donathan for her patience and unfailing energy in preparing the manuscript and to James E. Day for his advice and expertise with the illustrations. Similar recognition goes to my colleagues for their contributions and critiques and especially to Murray D. Rosenberg, James L. Charles, Max Hausermann, and Kenneth S. Houghton for their support.

M. Z. DeBardeleben

March 1987

INTRODUCTION
to first edition

Every specialized field has its own language. And most of these fields have dictionaries, handbooks, and encyclopediae that document, identify, or explain the uniqueness of their terminology. This is a dictionary for the tobacco industry.

The idea of such a dictionary is not new. In 1954 Raymond Jahn prepared his *Tobacco Dictionary*, published in New York by the Philosophical Library. It is an historical work in content, including many terms that have long been archaic. It is non-specific in its coverage of the tobacco industry: chewing and smoking tobacco, snuff, cigarettes. It has been out of print for many years, and its use today must be primarily for the archivist or historian in the field.

Over a decade ago Ernst Voges and Otto Wöber published a *Tabaklexicon* (Mainz: Mainzer Verlagsanstalt, 1968), a handsome volume of definitions, descriptions, and pictures that reads like a textbook arranged in alphabetic order. As with Jahn's work, it is not specific to one area of the tobacco industry, and, unfortunately for many Americans, it is written entirely in German. Voges, editor-in-chief of *Tabak-Journal International*, currently is publishing in English installments of his "Tobacco Encyclopedia," again an all-encompassing compilation of terms and phrases, names and places relevant to the tobacco industry as a whole.

This dictionary differs from the above two basically by the nature of the group for whom it was developed. The Philip Morris Research Center is a multidisciplinary congregation of scientists and engineers working primarily on the development and improvement of our product: cigarettes. It is the result of numerous years of questions to the Philip Morris Technical Information Facility for definitions, descriptions, explanations, and the like. What began as a compilation of answers for ready reference use internally in the department has developed into an annual updated publication for wide-

spread corporate use. While its value to newcomers to the field of tobacco research was not a surprise, its place in the cross-disciplinary interaction among our scientists and engineers was a rewarding discovery.

Definitions have been gathered from the open literature, have been pulled from the experience of Philip Morris employees, and have been collected from published standards. This dictionary will continue to be updated as tobacco technology evolves and as new areas of research become relevant. While it originally compiled terms pertinent only to cigarette technology and manufacturing, it has already begun to touch on areas of interest to the leaf buyer and processor. All comments and suggestions about its content are welcome.

Most of the sketches and tables used throughout this book have been excerpted from the published literature. Appreciation for use of these is acknowledged here. All have been reproduced with permission of the copyright holder. Special acknowledgment is due Anne T. Donathan for her patient advice and assistance and James E. Day for preparing the illustrations. Similar recognition goes to my colleagues for their contributions and especially to Harry G. Daniel, Paul A. Eichorn, Thomas S. Osdene, Robert B. Seligman and Frank E. Resnik for their support.

M. Z. DeBardeleben

May 1980

LIST OF FIGURES ACCOMPANYING DEFINITIONS

DEFINITIONS

1A1, 1A2, 1A3, 1A4 ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

2A1 ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

ACREAGE ALLOTMENT ..... See: TOBACCO ALLOTMENT.

ACTIVATED CARBON ..... An amorphous form of carbon which is specially treated to produce a very large surface area, ranging from 300 to 2000 m^2/g. The large surface area means that the internal pore structure has been very highly developed, providing activated carbon with the ability to adsorb gases and vapors from gases, and dissolved or dispersed substances from liquids. Almost any carbonaceous material of animal, vegetable, or mineral origin can be converted into activated carbon through proper treatment. There are two distinct types of activated carbon recognized commercially: *Liquid Phase*, or decolorizing, carbons which are generally light, fluffy powders; *Gas Phase*, or vapor adsorbent, carbons which are hard, dense granules or pellets.

AGEING ..... Generally applied only to cigarette tobaccos; a mild state of fermentation, carried out under compressed conditions for several years, with a moisture content ranging from 10-13%. Loss of dry matter is about 1-2% for flue-cured and 3-4% for air-cured leaves. Natural ageing is a time-consuming operation and experiments have been done on a FORCED AGEING process. See also: FORCED AGEING.

AIR CURING ..... See: CURING.

AIR DILUTION ..... The dilution of the MAINSTREAM smoke with air from the atmosphere; the percent of a 1050 cc/min rate of flow that is drawn in through the dilution system. Air dilution is affected by the natural POROSITY and by the PERFORATIONS of the cigarette paper and/or the tipping paper. In the latter case it is known as FILTER DILUTION. Also called CIGARETTE VENTILATION. See

also: AIR PERMEABILITY, DIFFUSION, DEGREE OF VENTILATION.

AIR PERMEABILITY ..... Of cigarette paper in ml/min/cm², the volume of air in ml (20 °C, 760 torr, 55-65% RH) that passes through 1 cm² of a flat specimen of the paper in 1 minute when a negative pressure of 100 mm water column (in the case of normal and naturally porous papers) or 25 mm water column (in the case of perforated papers) is applied to one side of the specimen. In the latter case, the value obtained should be multiplied by 4. There are two kinds of air permeability: POROSITY and PERFORATION, q.v.

AIR POLLUTION DAMAGE ..... See: WEATHER FLECK.

AIR SPACE ..... See: PORE VOLUME.

ALKALOID ..... A basic substance of plant origin which contains a cyclic nitrogenous nucleus. Tobacco alkaloids are, for the most part, 3-pyridyl derivatives. Some, however, are acidic in nature. The most abundant alkaloid in tobacco is NICOTINE, q.v.

ALKALOID RETENTION ..... By a filter, where alkaloid retention is R: the percentage of the total alkaloid entering the filter that is retained by the filter. See CORESTA Standard Method #13, Figure 1.

ALKALOID SERIES CIGARETTES ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

ALLOTMENT ..... See: TOBACCO ALLOTMENT.

ALTOSID ..... See: METHOPRENE.

ANGULAR LEAF SPOT ..... See: BLACK FIRE.

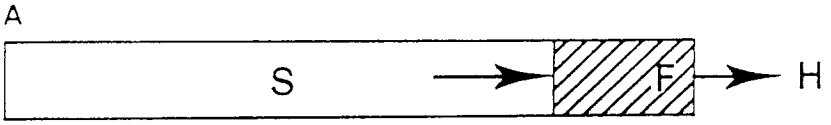


Figure 1

ALKALOID RETENTION. From *CORESTA Bulletin*, #2 (1969), p. 15. Reprinted with permission of CORESTA.

$$R = \frac{F}{H + F} \cdot 100\% = \frac{F}{S} \cdot 100\%,$$

where F = alkaloid retained by the filter, and
where S = alkaloid entering the filter, and
where H = alkaloid in the mainstream smoke.

ANTHRACNOSE ..... *Colletotrichum sp.*; a plant bed fungus-caused disease characterized by small circular spots and stunting of the tobacco plant.

AROMA ..... Generally refers to the distinctive pleasing odor or smell that may derive from either leaf tobacco or tobacco smoke. See also: FLAVOR.

AROMATIC OILS ..... Components that may contribute to the AROMA because they are volatile or available through distillation.

AROMATIC TOBACCO ..... See: ORIENTAL TOBACCO.

ASH ..... The solid residue of a burned cigarette. See also: COAL.

ASH ADHERENCE ..... See: COAL STRENGTH.

AUCTION ..... A warehouse sale where tobacco farmers sell their leaf to the highest bidder. The bidders are buyers for manufacturers, dealers, and exporters, as well as independent dealers or speculators. Also referred to as the LEAF MARKET.

AUTOMATIC SMOKING MACHINE . . . . . See: SMOKING MACHINE.

BACK-BURNING . . . . . A test of the burning properties of cigarette paper, consisting of recording the number of seconds a vertically held piece of paper takes to burn a certain measured distance.

BACTERIAL WILT . . . . . See: GRANVILLE WILT.

BALE . . . . . 1) A 50- to 75-pound case of unfermented tobacco; EXTRUDED TOBACCO, q.v. 2) The rectangular packaging of leaf on the farm; BURLEY FARM BALE, q.v. 3) A 1000-pound rectangular case of cellulose acetate filter tow.

BALL MILL TEST . . . . . A method for checking the STEM (VEIN) content in STRIP. Strip is dried and put in a ball mill. The mill is rotated until the LAMINA is pulverized. The pulverized lamina is screened out and the stem material left is weighed. From the original weight of the strip, the percent of the stem material may be calculated.

BALLOT . . . . . A 25- to 30-pound case of unfermented ORIENTAL tobacco.

BARN ROT . . . . . A fungus-caused disease resulting in a soft rot at the base of the MIDRIB which extends up the leaf and discolors the web to a dark brown; a significant factor in curing losses.

BARN SPOT . . . . . See: FROG EYE.

BIDI . . . . . A form of cigarette found in India; consists of granulated tobacco rolled in a section of Indian ebony leaf and tied with thread. Also called BIRI, BEEDI.

BIRDS EYE . . . . . The right angle or diagonal slice through a STEM that provides a thin cross-section.

BLACK FAT ..... A unique tobacco exported to West African countries. It consists of One Sucker dark air-cured leaf and Kentucky and Tennessee fire-cured, aged until very dark. Before shipment it is sprayed with mineral oil to add sheen. It is used for pipe smoking, chewing tobacco, snuff, and oftentimes for money.

BLACK FIRE ..... *Pseudomonas angulata*; a bacterium-caused disease resulting in angular lesions up to 1/3-inch in diameter. Also called ANGULAR LEAF SPOT.

BLACK LEAF 40 ..... An insecticide; a solution consisting of water and nicotine 40% by weight in the form of nicotine sulfate. Concentrated formulations of nicotine insecticides have been discontinued from use in most countries.

BLACK ROOT ROT ..... *Thielayiopsis basicola*; a fungus-caused decay characterized by blackening of tobacco roots. Symptoms are more prevalent in cool weather and in high pH soils.

BLACK SHANK ..... *Phytophthora parasitica var. Nicotianae*; one of the most destructive tobacco diseases. It is caused by a soil fungus that attacks the roots and basal parts of the stem at any stage of growth.

BLACK TOBACCO ..... A type of dark tobacco grown mainly, but not exclusively, in the South American and Central American countries as well as in Cuba, Spain, and France. The strong varieties are usually used as cigar fillers. Black tobacco which is SUN-CURED (cured in the open air) is known as "dark air-cured." Light varieties, such as Paraguay and its hybrids, are mostly AIR-CURED in barns. Light black tobaccos are used in some cigarette blends in European countries. PERIQUE (grown in Louisiana) is a black tobacco used in pipe tobacco blends. See also: BLOND TOBACCO.

BLEND ..... A mixture of different grades and/or types of tobacco and/or reconstituted tobacco and/or nontobacco

smoking materials. American cigarette blends* contain 40-75% flue-cured, 14-45% burley, 1-5% Maryland, 5-15% Oriental, and 5-20% reconstituted tobacco. The first truly blended cigarette in the U.S. to receive general acceptance was Camel, introduced by R. J. Reynolds in 1914 and sold in packs of twenty for 10¢. *[E.L. Wynder & D. Hoffmann's *Tobacco and Tobacco Smoke* (New York: Academic, 1967), p.41] See also Figure 2.

Table I: Approximate Chemical Composition of Blended Cigarette Tobacco

Component	Percent by Weight
Carbohydrates	
Sugars	12.5
Cellulose	10.0
Pectic substances	8.5
Starch, pentosans	2.5
Water	12.0
Proteins & Amino Acids	
Proteins	6.0
Free amino acids	2.5
Bases	
Volatile bases	2.0
Nicotine	1.5
Waxes and resins	8.0
Metals	5.0
Phenols	6.5
Acids	9.0
Lignin	3.5
Humectants	3.0
Flavorants	2.5
Inorganic anions	1.5
Other	3.5
Total	100.0

Figure 2

BLENDED CIGARETTE TOBACCOS. From M. Samfield in *Tobacco International*, Vol. 177, #12 (13 June 1975), 38-47. Reprinted with permission of Lockwood Trade Journal, Inc.

BLIGHT . . . . . See: WEATHER FLECK.

BLOND TOBACCO . . . . . By way of contrast with BLACK TOBACCO, blond tobaccos are the BURLEY and FLUE-CURED tobaccos so popular in the United States. See also: BLACK TOBACCO.

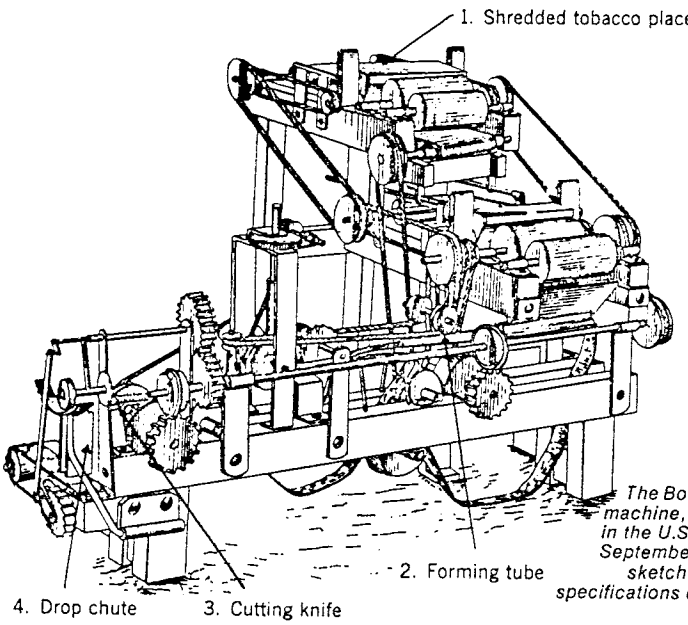
BLOOM . . . . . See: TOBACCO FLOWER.

BLUE MOULD . . . . . *Peronospora tabacina*; a fungus which attacks tobacco in the seedbeds; prevalent in nearly all growing areas. Also called DOWNY MILDEW.

BODIED LEAF . . . . . See: LEAF.

BODY . . . . . 1) The thickness and density of leaf, or weight per unit of surface. 2) A smoke flavor term implying fullness.

BONSACK CIGARETTE MACHINE . . . . . The first ROD MAKER registered with the U. S. Patent Office, 4 September



The Bonsack cigarette machine, first registered in the U.S. Patent Office, September 4, 1880. This sketch is copied from specifications of the March 8, 1881 patent.

Figure 3

BONSACK CIGARETTE MACHINE. Sketch made by The Tobacco Institute, Washington, D.C.

1880 (issued 8 March 1881). Devised by James Bonsack of Virginia, the making machine was used by Duke & Sons in their Durham cigarette factory. See Figure 3.

BRIGHT ..... See: FLUE-CURED TOBACCO. See also: VIRGINIA TOBACCO.

BRIGHT LEAF ..... FLUE-CURED or VIRGINIA leaf; also the leaves on a burley plant below the RED LEAF. See: BURLEY, FLUE-CURED.

BROOMRAPE ..... *Orobanche sp.*; a parasite attaching itself to tobacco roots; found worldwide, including Africa, Asia, Europe, and Latin America, as well as the blue-grass region of Kentucky.

BROWN LEAF ..... Leaves naturally brown in color, either because they have had too much nitrogen and have not matured properly on the plant or because they have been poorly cured. Brown tobacco is further classified as: 1) LIVE DEAD, i.e., tobacco that smokes well regardless of its brown color, and 2) DEAD DEAD, i.e., brown tobacco that is mostly dead tissue, lacks oil, and fractures easily.

BROWN ROOT ROT ..... Brown discoloration and decay of the root system which has been associated with NEMATODES and the decomposed residue of the previous crop. See also: NEMATODE.

BROWN SPOT ..... *Alternaria alternata*; a very destructive fungus-caused disease attacking maturing tobacco leaves, characterized by a brown spot; common on FLUE-CURED tobacco when the harvest period is wet.

BROWNING ..... An error in the flue curing process that produces a low quality brown leaf; occurs when the temperature is advanced to too high a level at too rapid a rate while the leaf still contains excessive moisture. Also called SCALDING.

BRUCKNER MILDNESS EQUATION . . . . . As devised by H. Bruckner in 1936 [*Die Biochemie des Tabaks* (Berlin: Paul Parey, 1936), 296-300], a higher value means milder tobacco:

$$\frac{\text{SUGAR + STARCH}}{\text{CELL MEMBRANE SUBSTANCE}} =$$

$$\frac{\text{OXALIC ACID}}{\text{CITRIC ACID}} + \frac{\text{SUGAR + STARCH + OXALIC ACID}}{\text{ASH}}$$

BRUCKNER QUALITY INDEX . . . . . As devised by H. Bruckner in 1936 [*Die Biochemie des Tabaks* (Berlin: Paul Parey, 1936), 296-300], with a quality index of 199.2 for upper and middle leaves and an index of 127.3 for lower ones:

$$\frac{\text{SUM OF QUALITY-PROMOTING SUBSTANCE} \times 400}{\text{SUM OF QUALITY-RESTRICTING SUBSTANCES}} =$$

$$\frac{\text{(SUGAR + STARCH + OXALIC ACID + TANNINS + RESINS)} \times 400}{\text{CELL MEMBRANE SUBSTANCE} + \text{ASH} + \text{CITRIC ACID} + \text{NITROGENOUS COMPOUNDS} + \text{pH VALUE}}$$

BUDWORM . . . . . *Heliathis virescens*; a tiny worm born of a moth who lays her eggs in the tobacco bud, causing moderate damage to the plant.

BULK . . . . . A stack of cigar-wrapper leaf that is fermented before packing and storage.

BULK CURING . . . . . A curing process employed for FLUE-CURED tobacco. Leaf is suspended in the curing atmosphere in bulk. Humidity and temperature control are made precise through the use of a forced draft which passes the heated air in a vertical plane through the tightly packed leaves in a completely closed system. Experiments have been performed on the bulk curing of MARYLAND and ORIENTAL tobaccos as well, but to date the results have not proven acceptable. Also called COMPACT CURING and INTACT CURING. See Figure 4.

BULK DENSITY . . . . . The weight/volume of uncompacted tobacco leaf or FILLER; g/cc. Bulk density is measured by

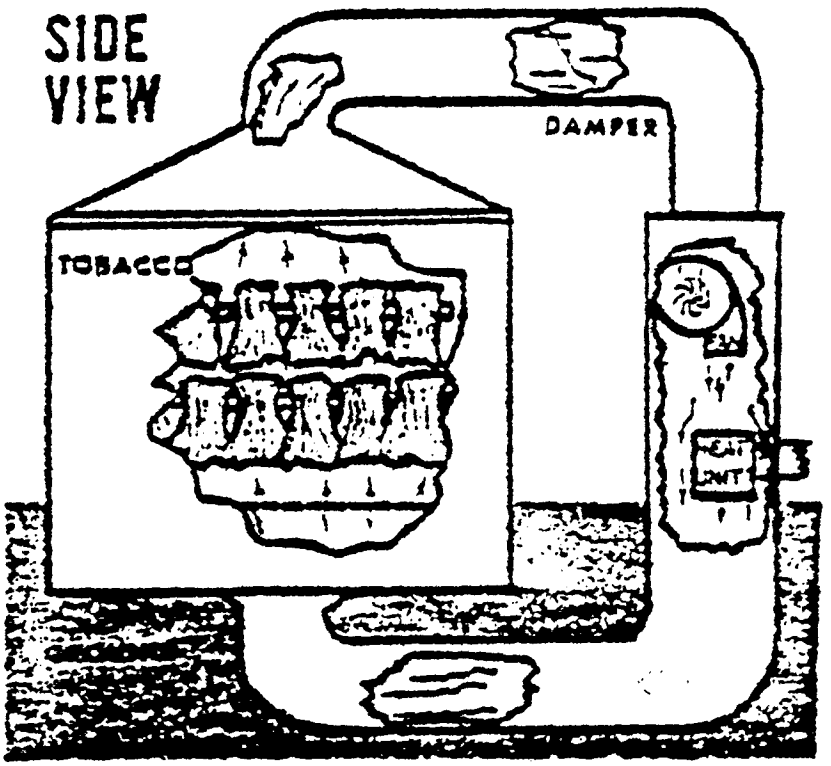


Figure 4

BULK CURING. From *Agricultural Research*, Vol. 8, #6 (December 1959), p. 6.

filling a cylinder of known volume with tobacco and then weighing the tobacco. Since bulk density is a function of packing density, the tobacco is allowed to drop freely into the cylinder through a funnel. Bulk density, therefore, differs from SPECIFIC VOLUME in that the volume of the tobacco shreds as well as the air between and around them is measured. It differs from CYLINDER VOLUME in that the tobacco is not compressed. As bulk density decreases, FILLING POWER increases. For example, as reported in mg/cm^3 by Lorenz and Seehofer in 1964, at 6.7% moisture:

	With Stems	*Without Stems*
Flue-cured	369	334
Burley	340	296
Oriental	387	—

See also: SPECIFIC VOLUME, FILLING POWER, CYLINDER VOLUME.

BULKER . . . . . A silo used for blending or as a holding place for large amounts of tobacco to allow time for moisture or flavor equilibration.

BULKING . . . . . 1) The storage of cut tobacco in carts or holding units (bulkers) before it is sent to the making floor. This allows the tobacco to become more uniform in moisture content. 2) The storage of tobacco on the farm prior to classification.

BUNDLE . . . . . Similar to a HAND, q.v., except containing 10-30 leaves, depending on tobacco type and accepted marketing procedures.

BUNDLE-PICKING . . . . . In a REDRYING plant, the removal of HANDS of tobacco during sorting that do not match the particular grade being prepared for storage.

BURLEY . . . . . An AIR-CURED tobacco. Burley tobacco is grown in rich limestone soils, primarily in Kentucky and Tennessee. It is light brown to reddish brown in color and has a somewhat greater FILLING POWER than FLUE-CURED tobacco. See Figure 5. Burley is light in body, with a low sugar content and high alkaloid content. Burley smoke is more basic (pH) than that of FLUE-CURED tobacco. See Appendix II.

BURLEY FARM BALE . . . . . BURLEY tobacco which is not made into HANDS and which is packaged by the farmer so the tips overlap in the center, with the butts at both sides. Such leaf can be TIPPED through the center of the bale. Standard dimensions: 0.3 m high by 0.9 m long by 0.6 m wide.

BURN CAPACITY . . . . . The surface, mass, or length of a burned cigarette; expressed as a percent of the whole used for the measurement.

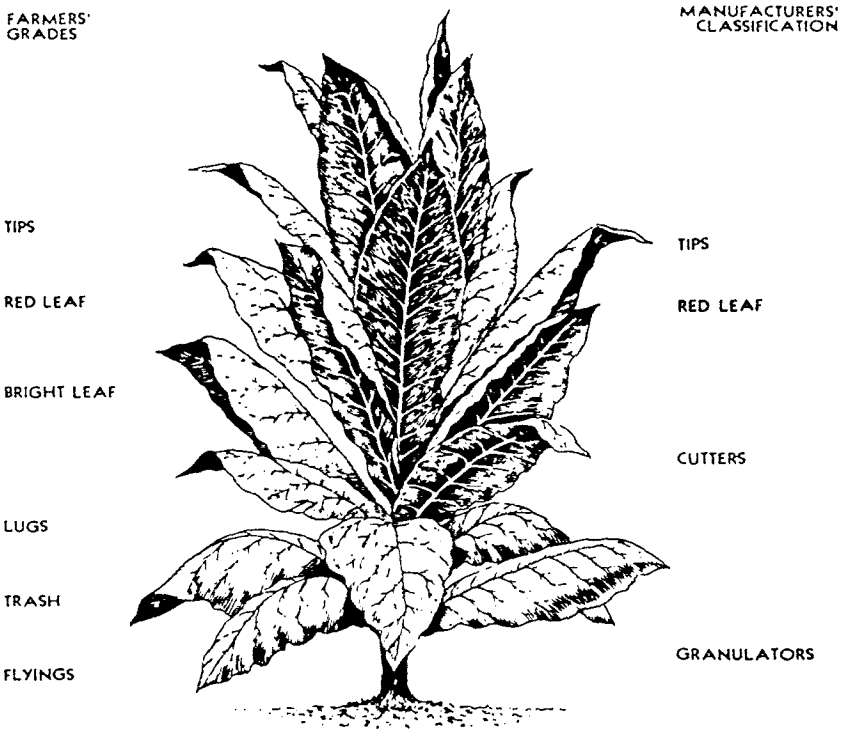


Figure 5

BURLEY TOBACCO. From J. M. Moseley, W. R. Harlan, and H. R. Hanmer in *Industrial & Engineering Chemistry*, Vol. 43 (1951), 2343-2347. Reprinted with permission of the American Chemical Society.

BURN RATE . . . . . See: STATIC BURNING RATE.

BURNING ZONE TEMPERATURE . . . . . The temperature of a burning cigarette at the point where the coal meets the paper; measured by infrared or with thermocouples. Reported during puffing to be 850-900 °C. See Figure 6. See also: COAL, PEAK COAL TEMPERATURE.

BUTT LENGTH . . . . . The length of butt remaining after smoking a cigarette on a smoking machine. The CORESTA

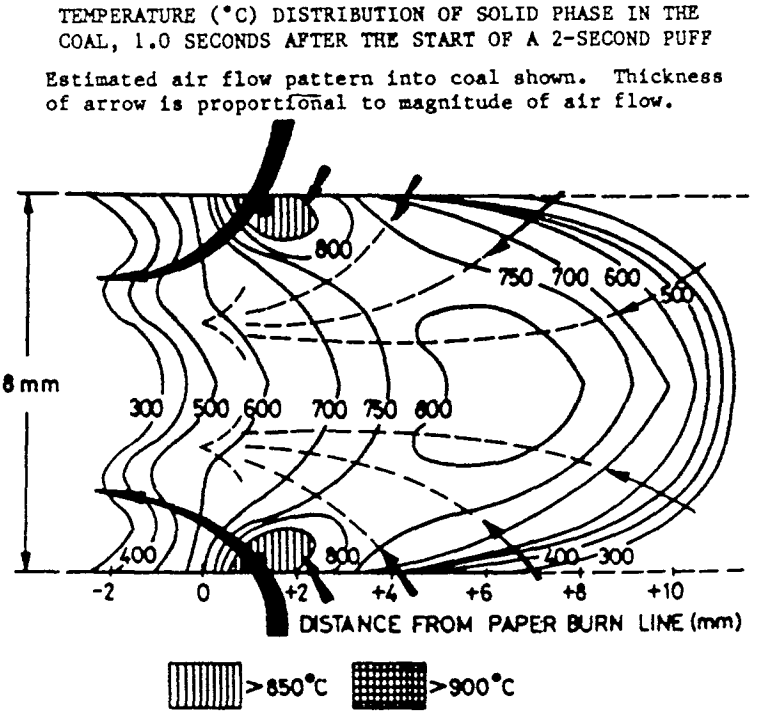


Figure 6

BURNING ZONE TEMPERATURE. From R. R. Baker in *Recent Advances in Tobacco Science*, Vol. 6 (1980), 184-224. Reprinted with permission of the author.

butt length standards are as follows: a butt length of 23 mm, except for cigarettes with filter length exceeding 15 mm (which should be smoked to length of filter + 8 mm) and cigarettes with extra long filter tipping (which should be smoked to length of tipping + 3 mm).

CA . . . . . CELLULOSE ACETATE, q.v.

CMV . . . . . CUCUMBER MOSAIC VIRUS, q.v.

CSC . . . . . CIGARETTE SMOKE CONDENSATE, q.v.

CV . . . . . CYLINDER VOLUME, q.v.

CWS . . . . . COLD WATER SOLUBLES, q.v.

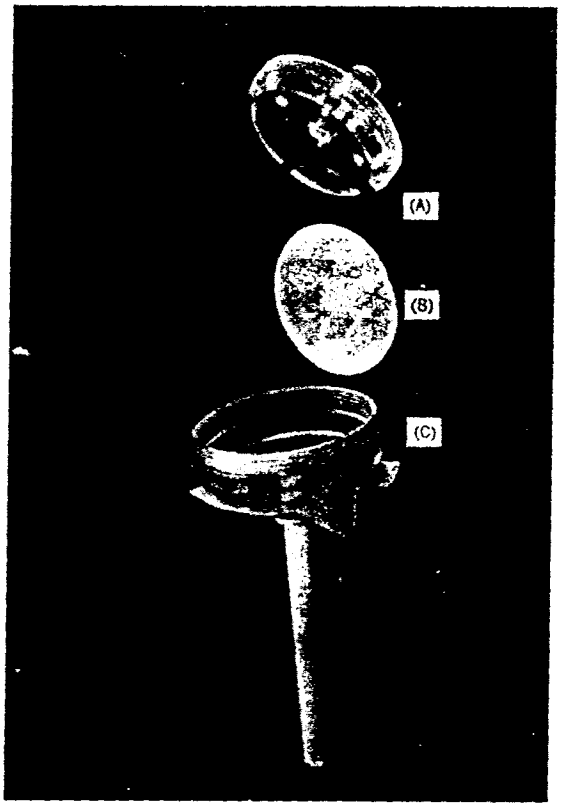


Figure 7

CAMBRIDGE FILTER ASSEMBLY: (A) = O-ring; (B) = filter disc; (C) = rubber membrane. From *Encyclopedia of Industrial Chemical Analysis*, Vol. 10 (New York: Interscience, 1970), p. 11. Reprinted with permission of John Wiley & Sons, Inc.

CAMBRIDGE FILTER . . . . . A trapping device developed in 1959 and used universally on smoking machines for the collection of particulate matter; consists of discs 44 mm in diameter from CM 113A fiberglass sheet (Cambridge Filter Corp., Syracuse, NY). Specifications: it shall collect at least 99.9% of all particles over 0.3 μm in diameter and 99.2% of 0.1 μm diameter particles at a flow rate of 28 linear ft/min; have a maximum pressure drop not exceeding 93 mm of water at 28 ft/min; contain not more than 5% of the acrylic-type binder. See Figure 7.

CARDING . . . . . A process in cigarette making that combs or separates and untangles the shreds in FILLER. The carding machine is a toothed device, inside the cigarette making machine itself, comprised of a carding drum and a PICKER ROLL.

CARTON . . . . . See CIGARETTE CARTON.

CASE . . . . . The condition of tobacco with regard to its moisture content. Tobacco in proper keeping condition is said to be "in case." When too wet, it is "in high case."

CASE-HARDENING . . . . . A phenomenon caused by overdrying, resulting in the formation, on the surface of tobacco, of a layer of impervious material, thereby impeding the diffusion of moisture.

CASE PACKER . . . . . A machine that packages cartons of cigarettes into corrugated cases for shipping.

CASING . . . . . A mixture of HYGROSCOPIC AGENTS and/or plasticizing agents and volatile or nonvolatile flavoring agents applied to tobacco to condition it for processing (to reduce breakage, facilitate cutting, etc.). Some commonly known flavoring agents are: cocoa, chocolate, licorice, ginger, cinnamon, vanilla, molasses, rum, brandy, maple syrup, certain esters and oils, honey, and sugar. See also: TOP FLAVORINGS.

CAVITY FILTER . . . . . See: PLUG SPACE PLUG.

CELLULOSE ACETATE . . . . . CA; a white, odorless, tasteless, nontoxic solid used for making cigarette filters. Cellulose acetate, also known as secondary acetate, is a partially acetylated cellulose, having an average degree of substitution of 2.4 acetyl groups per glucose unit.

CHARRED TOBACCO . . . . . Leaf that has been packed at too high a temperature. Such tobacco discolors to a dark

brown or may even go to a sooty powder if the temperature and pressure are extremely high after packing.

CHEESE ..... Highly compacted "cake" of tobacco strips/blends resulting from compression in the cutter feed section of the filler cutting machine.

CIGARETTE BEETLE ..... Also known as the tobacco beetle, *Lasioderma serricorne*, which attacks inside stores of all types of tobacco products. Although the cigarette beetle is attracted especially to stores of tobacco high in sugar content (e.g., FLUE-CURED and ORIENTAL), no type of tobacco is immune. The cigarette beetle is uniquely identified by its posture: the head and prothorax of the adult are retracted. In Europe the cigarette beetle is called TOW BUG. See Figure 8.

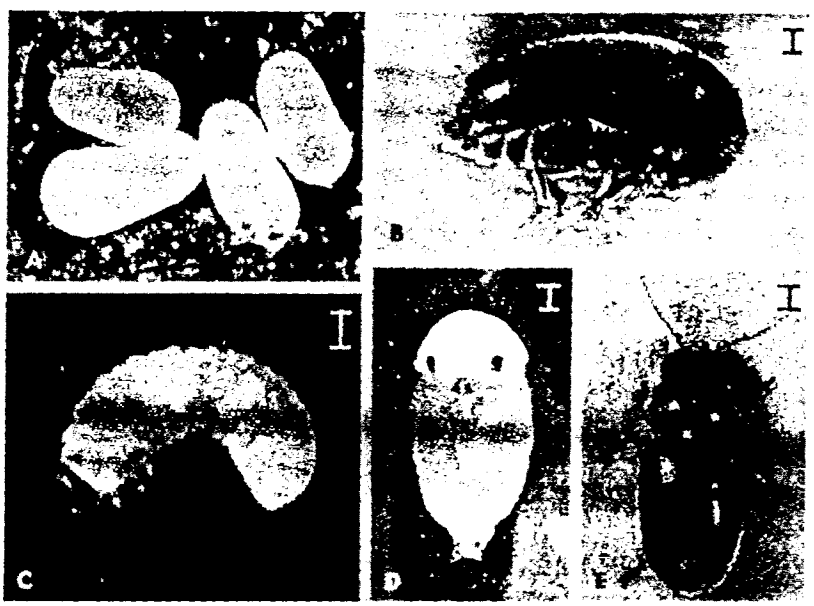


Figure 8.—Stages of the cigarette beetle: *A*, Eggs; *B* and *E*, adults; *C* larva; *C*, pupa.

CIGARETTE BEETLE. Reprinted from *Stored Tobacco Insects: Biology and Control*, Agriculture Handbook No. 233 (U.S. Department of Agriculture, Agricultural Research Service, 1971), p. 5.

Figure 9

CIGARETTE CARD.

CIGARETTE CARD . . . . . A card with a picture inserted in a cigarette pack. The trend began in 1879 when a picture of the Marquis of Lorne, Governor-General of Canada, was inserted in a cigarette package for sale in the United States. The only known copy of this card is in the Metropolitan Museum of Art. Cards continued to be inserted in cigarette packages throughout the world, except for a brief interlude during World War I, until an abrupt cessation with the outbreak of World War II, when they were stopped to conserve paper stocks in September 1939. The collection of these valuable and now obsolete cards is a unique hobby. The cards are masterpieces of printing and artistry and reflect the history of the times in which they were issued. See Figure 9.

CIGARETTE CARTON . . . . . A packaged unit of 10 (generally) CIGARETTE PACKS.

CIGARETTE CLASS . . . . . A designation of cigarette type/size for tax purposes, as defined by the U.S. Department of Treasury (27 CFR 270). Class A cigarettes are those finished cigarettes weighing less than 3 lbs per 1000; they are also called SMALL CIGARETTES. Class B cigarettes are

those finished cigarettes weighing more than 3 lbs per 1000; they are also called LARGE CIGARETTES. Similar classes exist for little, small, and regular cigars.

CIGARETTE FIRMNESS . . . . . A cigarette rod's resistance to compression; the force required to deform cigarettes a preselected amount; the deformation of a cigarette after a predetermined time at a given pressure; sometimes referred to as CIGARETTE HARDNESS. See also: COMPACIMETER.

CIGARETTE HARDNESS . . . . . See: CIGARETTE FIRMNESS.

CIGARETTE MAKING MACHINE . . . . . See: ROD MAKER. See also: BONSACK CIGARETTE MACHINE.

CIGARETTE PACK . . . . . A unitized package of cigarettes, the most common size being 20 Class A cigarettes. Sample packs for promotion and complimentary airline use frequently contain as few as 4 cigarettes.

CIGARETTE PACKER . . . . . A machine that packages cigarettes for retail either in a soft or hard pack. The soft pack packer forms foil and preprinted labels around the cigarettes and places a closure to seal the top of the pack. The hard pack packer forms a prescored preprinted hardboard around the cigarettes.

CIGARETTE PAPER . . . . . The wrapping surrounding the CIGARETTE ROD. Flax and hemp papers are the most common cigarette papers, although kenaf, esparto grass, rice straw, high-quality cellulose, etc. may be used as well. To the paper may be added any number of chemicals; e.g., calcium carbonate will improve (increase) porosity and combustion; magnesium carbonate will improve ash color; titanium oxide will whiten the ash; and potassium nitrate will give the ash greater adherence. The paper which encloses the tobacco column is called the cigarette wrapper. The cigarette wrap-

Cigarette Paper Components

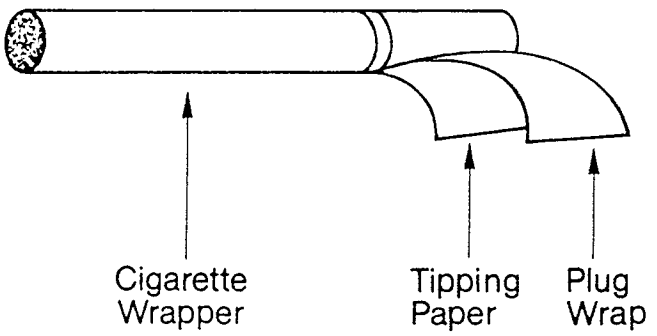


Figure 10

CIGARETTE PAPER. From D. F. Durocher in *Tabak-Journal International*, #3 (1985), p. 188. Reprinted with permission of Tabak-Journal International.

per should have a neutral taste (unless it has been specifically flavored), should have a white ash that does not drop from the cone while burning, and should burn evenly without leaving a black edge. See Figure 10. See also: PLUG WRAP, TIPPING PAPER.

CIGARETTE ROD ..... The combined form of shredded and blended tobacco wrapped in cigarette paper.

CIGARETTE SIZE ..... The dimensions of a finished cigarette. The circumference of most cigarettes is approximately 25 mm. The length, however, varies greatly. A *Regular* cigarette is 70 mm; a *King-Size* one is 85 mm; a *Super King-Size* or *100* is 100 mm; and the *Longs** or *120's* are 120 mm. The first 85 mm brand in the United States was Pall Mall (1939); the first 100 mm was the Pall Mall filter (1965); the first 120 mm was the More filter (1975). (*The "long size" was originally introduced with the Marlboro filter in 1954. It was 80 mm in length.)

CIGARETTE SLITTER/RIPPER ..... A small device for laboratory or factory use that allows a cigarette to be opened

and the tobacco content to be separated from the paper and filter.

CIGARETTE SMOKE AEROSOL . . . . . The condensed and cooled mixture of gases passing down the tobacco rod and issuing through the filter end. The aerosol contains from 10^8 to 10^{10} particles/cm^3, ranging in size from $<0.1\mu$ to approximately 1.0μ in diameter.

CIGARETTE SMOKE CONDENSATE . . . . . CSC; cigarette smoke that is condensed or trapped by a method which attempts to collect all of the smoke. This includes, e.g., IMPACTION TRAP, ELMENHORST COLD TRAP, and ELECTROSTATIC PRECIPITATION, all which see. This does not include the process used to collect TPM. See also: NONVOLATILE CIGARETTE SMOKE CONDENSATE, CRUDE SMOKE CONDENSATE, DRY SMOKE CONDENSATE.

CIGARETTE VENTILATION . . . . . See: AIR DILUTION.

CIGARETTE WRAPPER . . . . . See: CIGARETTE PAPER.

CLASS . . . . . See: CIGARETTE CLASS, TOBACCO CLASS.

CLOSE-GROWN TOBACCO . . . . . Tobacco fields containing high plant populations; primarily FLUE-CURED tobacco fields which have been filled with high plant populations to produce a neutral FILLER or sheet material for cigarettes.

COAL . . . . . The burning cone at the lighted end of a cigarette. See Figure 11. See also: BURNING ZONE TEMPERATURE.

COAL STRENGTH . . . . . The ability of the burning cone of a cigarette to remain firmly attached to the rod throughout vibrations to which it may be subjected; dependent on

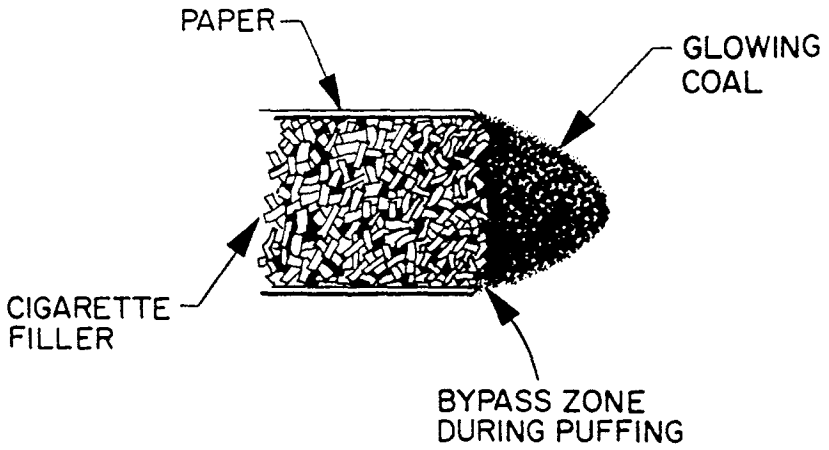


Figure 11

CIGARETTE COAL. From H. Wakeham in I. Schmeltz's *The Chemistry of Tobacco & Tobacco Smoke* (New York: Plenum, 1972), p. 10. Reprinted with permission of Plenum Publishing Corp.

firmness, moisture, size of cut, packing, and paper. Also called FIRE RETENTION, ASH ADHERENCE.

COAL TEMPERATURE ..... See: PEAK COAL TEMPERATURE, BURNING ZONE TEMPERATURE.

COARSE LEAF ..... Tobacco that is thick, boardy, and lacking in natural oils and pliability. See also: COMMON LEAF.

COKER 139 ..... A DISCOUNTED VARIETY of FLUE-CURED tobacco with a low nicotine content and "flat flavor," the development of which was instrumental in formation of the MINIMUM STANDARDS PROGRAM, q.v. Although discounted, Coker 139 is the genetic basis for many of the FLUE-CURED varieties produced today.

COLD WATER SOLUBLES ..... CWS; that portion of tobacco that is soluble in cold distilled water.

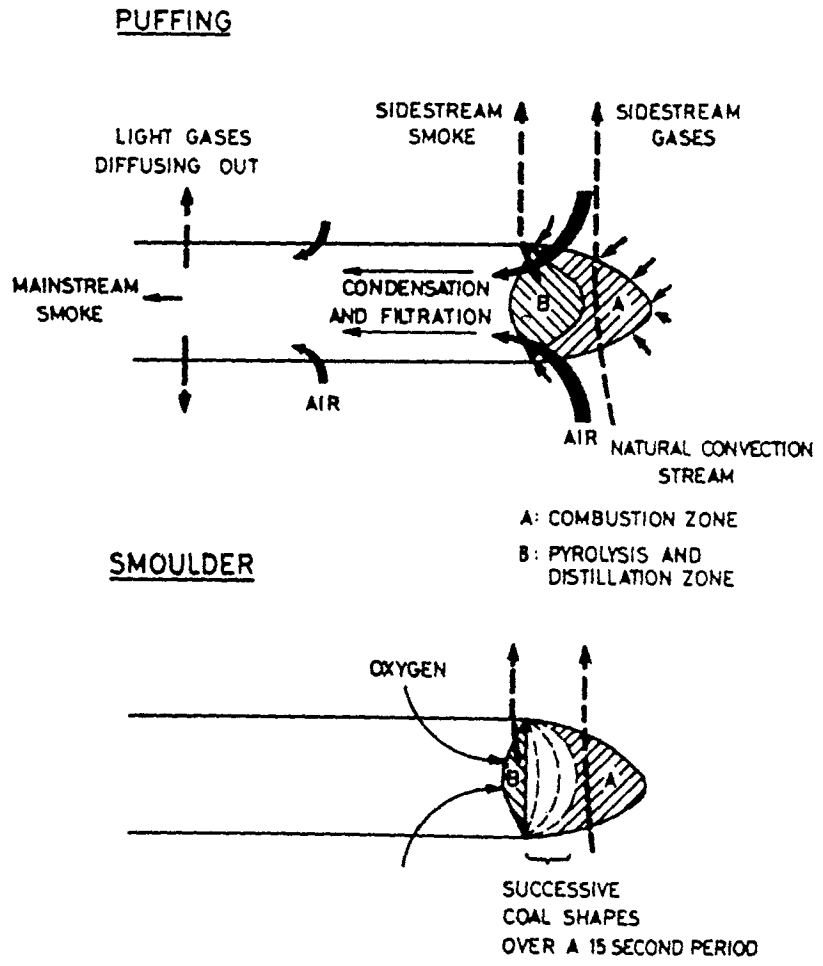


Figure 12

THE BURNING CIGARETTE. From R. R. Baker in *Recent Advances in Tobacco Science*, Vol 6 (1980), 184-224. Reprinted with permission of the author.

COMBINER . . . . . A machine used to manufacture specially designed FILTER PLUGS requiring multiple step operations. See also: PLUG MAKER.

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COMBUSTION ..... The interaction of tobacco with oxygen to produce heat and light. Combustion of tobacco is a flameless, glowing one. Tobacco is oxidized inefficiently, resulting in DISTILLATION PRODUCTS, PYROLYSIS products, and PYROSYNTHESIS products, as well as the expected CO_2, H_2O and other gases. See Figure 12. See also: PYROLYSIS, PYROSYNTHESIS, DISTILLATION PRODUCTS.

COMBUSTION ZONE TEMPERATURE ..... See: BURNING ZONE TEMPERATURE.

COMMON LEAF ..... Tobacco that is similar to COARSE, q.v., except that common leaf is extremely boardy and lacks any desirable orange color characteristics.

COMPACIMETER ..... An instrument used to measure CIGARETTE FIRMNESS by deformation; consists of a plunger, a timer, an amount-of-deformation indicator and the capacity to test 15 cigarettes. See Figure 13. See also: CIGARETTE FIRMNESS.

COMPACT CURING ..... See: BULK CURING.

CONDENSATE ..... See: CIGARETTE SMOKE CONDENSATE.

CONDITIONING ..... See: ORDERING, REORDERING.

COOLER ..... A rotating cylinder that removes heat (through air flow) from processed, dried tobacco. TOP FLAVORINGS usually are added in the cooler.

CORESTA ..... Centre de Cooperation pour les Recherches Scientifiques Relatives au Tabac. See Appendix V. An international organization of representatives from the tobacco industry, sharing scientific/technical information relating to the tobacco plant as well as tobacco products.

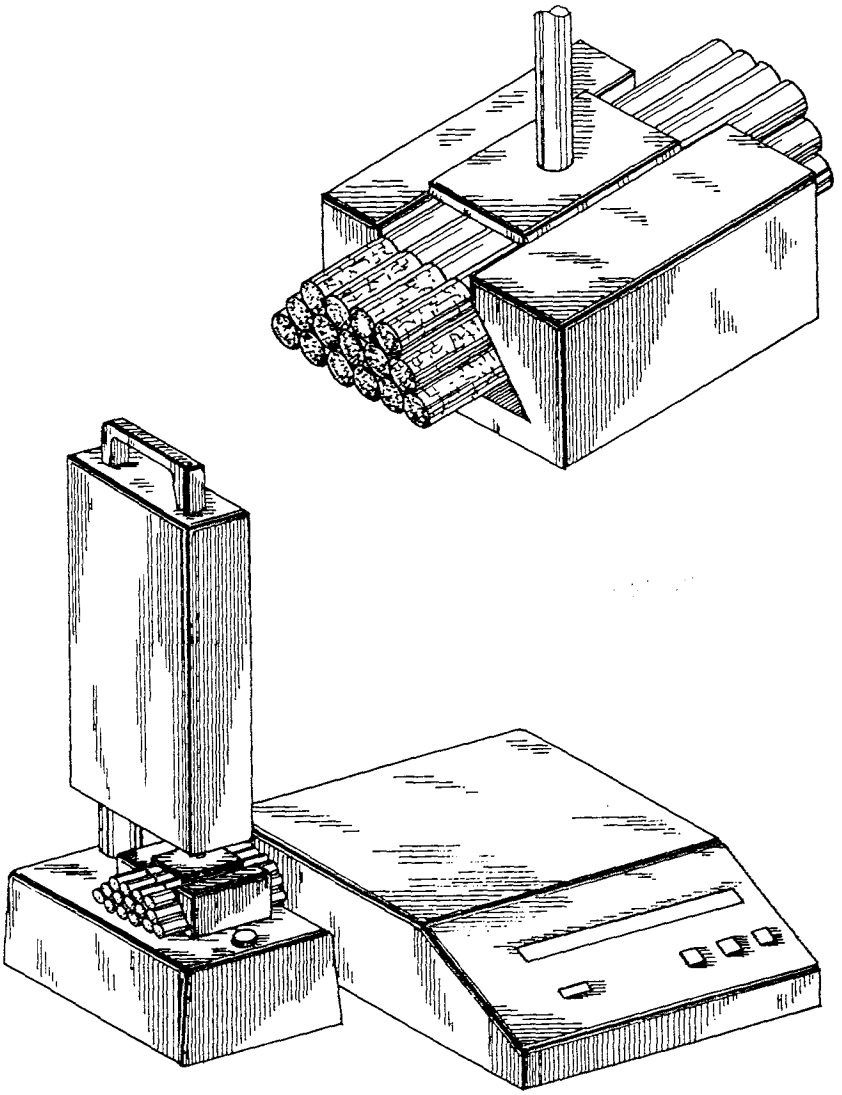


Figure 13

COMPACIMETER.

CORESTA STANDARDS . . . . . An attempt by this international tobacco organization to standardize testing procedures for the industry. After several standards were issued, it was decided that future work should be done under the guide of the International Organization for Standardization, which

created a Tobacco Technical Committee for this purpose. While the ISO is reviewing the standards needed, CORESTA is continuing to publish what they are now calling "recommended methods" for immediate laboratory use. See Appendix IV.

CRAMBIDS . . . . . See: SOD WEBWORM.

CRANE FLY . . . . . *Neolemnophila ultima*; a mosquito-like fly whose larvae feed on the roots of young tobacco plants.

CRITICAL RADIUS OF CURVATURE . . . . . The maximum radius of curvature at which a MIDRIB or STALK will break or fracture. Of matured, uncured tobacco leaves, Suggs et al. [*Tobacco Science*, Vol. 6 (1962), 71-77] found the mean critical radius to be 0.974 inches with a standard error of 0.41 inches.

CROSS-FLOW CURING . . . . . A system of flue curing developed by W. H. Johnson at North Carolina State University (1977). It involves horizontal movement of heated air, allowing the curing to proceed more quickly while using less energy. See also: CURING.

CRUDE SMOKE CONDENSATE . . . . . CORESTA Standard definition: the weight of that portion of the total smoke which is trapped in the smoke trap; reported in mg per cigarette (mg/cig). See also: CIGARETTE SMOKE CONDENSATE.

CUCUMBER MOSAIC VIRUS . . . . . A virus disease with symptoms similar to those of common tobacco MOSAIC; usually introduced in tobacco through wounds, principally those made by aphids. Known as CMV.

CURING . . . . . The drying process for newly harvested tobacco. See Figure 14. AIR CURING is performed in widely ventilated barns under natural atmospheric conditions (from which the name comes) with little or no artificial heat; it

Method of curing	*Type*	*Use*
Air	Virginian, Burley, Amarelo	Pipe, chewing cigarettes, snuff
	Cigar	Cigars
	Local	All uses
Sun	Oriental	Cigarettes, pipe
	Local	All
Fire	Virginian	Pipe, cigarette, chewing
Flue	Virginian Amarelo	Cigarette, pipe

Figure 14

CURING CLASSIFICATIONS. From B. C. Akehurst's *Tobacco* (London: Longman, 1968), p. 29. Reprinted with permission of Longman Inc.

takes 3-12 weeks. Light air-cured tobacco is very thin to medium in body, light tan shaded toward red to reddish brown in color, and mild in flavor. Burley is light air-cured. Dark air-cured is medium to heavy in body, light to medium brown in color. FLUE CURING is performed in small, tightly constructed barns with artificial heat beginning at 90 °F and ending around 170 °F; it takes 5-7 days. The name comes from the metal flues used in the heating apparatus. Flue-cured tobacco is yellow to reddish-orange in color, thin to medium in body, and mild in flavor. FIRE CURING is performed in ventilated barns with open fires (from which the name comes) allowing the smoke to come in contact with the tobacco; it is alternated with air curing. Fire-cured tobacco is light to dark brown in color, medium to heavy in body, and strong in flavor. SUN CURING is performed on racks in the sunshine (from which the name comes) for set daily periods over 4 weeks, depending on the weather. Sun-cured tobacco looks similar to air-cured. See also: BULK CURING, HOMOGENIZED LEAF CURING, CROSS-FLOW CURING.

CURL . . . . . Tobacco leaf (whole or threshed) which has shrunk, turned in, or folded as a result of heat exposure or rubbing against a machine.

CUT FILLER . . . . . See: FILLER.

CUT WIDTH . . . . . The size (width) of shredded tobacco leaf or stem. In the United States, leaf runs approximately 0.85 mm (30 cuts/inch); in Europe, approximately 0.565 mm (45 cuts/inch); in Canada, approximately 0.635 mm (40 cuts/inch). In the United States, shredded stems run 120 cuts/inch. The coarser the cut (the fewer cuts/inch), the stronger and more aromatic will be the smoke and the greater the production of particulate matter.

CUTTER . . . . . A machine for cutting leaf tobacco or stems into filler for cigarette making. The tobacco is chuted into a hopper on a rotary-type cutter where it is compressed into a CHEESE and extruded through a mouthpiece opening.

CUTTERS . . . . . The middle leaves on a BURLEY or FLUE-CURED plant; located above the GRANULATORS or LUGS. Cutters are the largest leaves on the plant in length and width and have high oil and resin contents. The FILLING POWER and DRINKING QUALITY of cutters are very good. See also: BURLEY, FLUE-CURED.

CUTWORM . . . . . Moth larvae, some 20 species of which feed on the tobacco plant.

CYLINDER . . . . . A rotating drum used to BLEND, ORDER, REORDER and/or CASE tobacco.

CYLINDER VOLUME . . . . . CV; the volume that a given weight (for example, 10 g) of shredded tobacco occupies under a definite pressure; the force exerted by a given weight (for example, 10 g) of shredded tobacco in a given volume; expressed as cc/10 g. A sample of tobacco and a piston are placed in a cylinder. The pressure of the piston compresses the tobacco to approximately the density of the tobacco in a finished cigarette; an arbitrary but precisely consistent compression time is used. The piston is dropped and allowed to rest on the tobacco and the volume is measured. A repre-

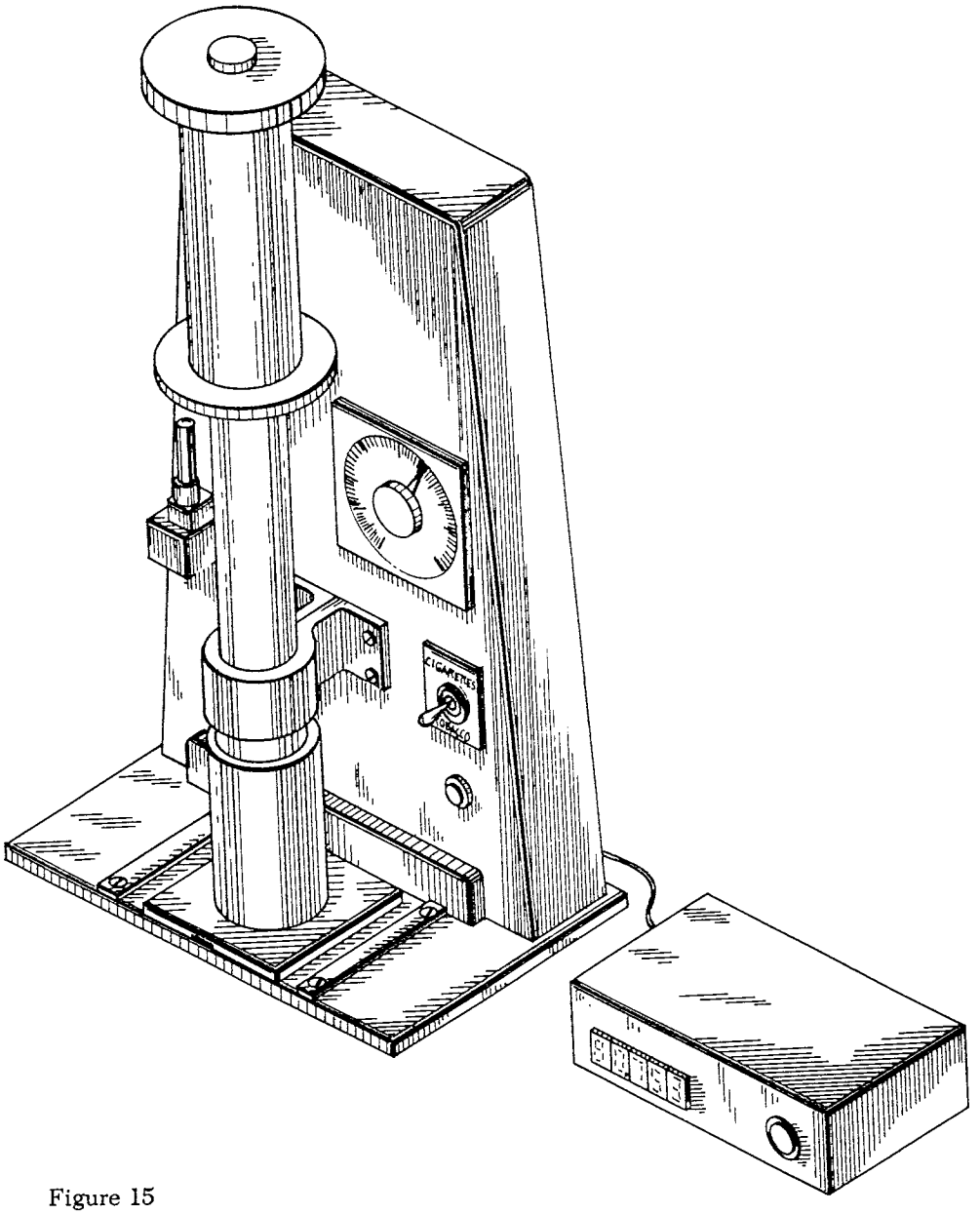


Figure 15

BORGWALDT CYLINDER VOLUME APPARATUS.

sentative example of this type of instrument is the Borgwaldt device shown in Figure 15. See also: FILLING POWER.

CYTREL ..... See: NONTOBACCO SMOKING MATERIAL.

DAMPING OFF ..... *Pythium sp.*; typically a plant bed fungus-caused disease characterized by a brown/black rot on the stem near the soil line.

DARK-FIRED TOBACCO ..... FIRE-CURED tobacco. See: CURING.

DEAD DEAD TOBACCO ..... A term used to describe BROWN LEAF, q.v.

DEGREE OF BLOOM ..... How well fibers are dispersed throughout a FILTER.

DEGREE OF VENTILATION ..... That part of PUFF VOLUME which penetrates the paper and/or the filter wrapper of a cigarette. See also: AIR DILUTION.

DENIER ..... A unit used for measuring the weight per unit length of a synthetic fiber (one filament) or a bundle of fibers, such as CELLULOSE ACETATE TOW. Denier usually is expressed as denier per filament (dpf), which is the weight in grams of a single filament 9000 meters long; TOTAL DENIER is the weight in grams of a bundle of fibers 9000 meters long.

DIELECTRIC CONSTANT ..... The ratio of electric field strength in vacuum to that in a dielectric; permittivity; inductivity. Of green, BRIGHT tobacco (at 1 kilocycle, 15.35% moisture, 77 °F), 23.58; of cured BRIGHT tobacco (same conditions), 28.00.

DIFFUSION ..... The exiting of combustion gases through the CIGARETTE PAPER as air enters. Diffusion is depen-

dent on many things, among them paper POROSITY, gas flow rate, and cigarette circumference and length.

DILUTION . . . . . See: AIR DILUTION.

DISCOUNTED VARIETY . . . . . A leaf variety that is no longer acceptable to the buyers and, therefore, not eligible for PRICE SUPPORTS.

DISTILLATION PRODUCTS . . . . . Leaf components which are transferred into the smoke stream essentially unchanged. See also: COMBUSTION.

DISTRIBUTOR . . . . . That part of the ROD MAKER where tobacco is removed from a holding magazine and classified or processed on its way to the rod-forming operation.

DOWNSTALK TOBACCO . . . . . P and N grades, PRIMINGS, and NONDESCRIPT from the lower stalk position, usually the bottom four leaves. Downstalk tends to be thin-bodied, low in nicotine, and often contains sand or dirt.

DOWNY MILDEW . . . . . See: BLUE MOULD.

DRAFT RESISTANCE . . . . . See: RESISTANCE TO DRAW.

DRAW RESISTANCE . . . . . See: RESISTANCE TO DRAW.

DRAWING . . . . . A process allowing penetration of flavors that have been sprayed on tobacco (after it has been dried and cooled and while it lays packed in boxes for 24 hours). As the flavor penetrates, it is said "to draw."

DRINKING QUALITY . . . . . A measure of the ability of leaf to absorb moisture, flavorings, and casings. See also: OPEN GRAINED.

DRY MATTER . . . . . The residue left after leaf has been subjected to 3 hours heating in an oven at 100 °C (the U. S. standard currently in use); reported as % of total. Should not be confused with "dry weight." See also: OVEN VOLATILES.

DRY SMOKE CONDENSATE . . . . . CORESTA Standard definition: the weight of crude smoke condensate after deduction of its water content; reported in mg per cigarette (mg/cig). See also: CIGARETTE SMOKE CONDENSATE.

DRYER . . . . . Machine used to reduce the moisture content of tobacco. This is effected by exposing the tobacco to moving heated air having a relative humidity low enough to absorb moisture. An apron dryer is a tunnel-type apparatus through which a wire mesh conveyor passes. Tobacco is spread on the conveyor in a thin layer so that air may move through it. A rotary dryer is a cylindrical apparatus which, by the use of steam tubes around the inner perimeter of the cylinder shell, elevates the tobacco in a stirring action. Exposure to the heated tubes and a countercurrent airstream through the length of the cylinder reduces the moisture content of the tobacco. See also: ROASTER.

DUST . . . . . See: TOBACCO DUST.

EARTHY TOBACCO . . . . . Leaf that has been stored in a slightly over-conditioned state and takes on an earthy smell although it is not damaged.

EASI-HARVEST SYSTEM . . . . . See: ONCE-OVER HARVESTING.

ECUSTA EC . . . . . See: NONTOBACCO SMOKING MATERIAL.

ELASTICITY . . . . . The ability of a leaf to be stretched without breaking. Leaf with elasticity has good DRINKING QUALITY and high FILLING POWER.

ELASTICITY DEFORMATION ..... The degree of response of a tobacco shred when it is placed under pressure and then released.

ELECTROSTATIC PERFORATION ..... See: PERFORATION.

ELECTROSTATIC PRECIPITATION ..... The collection of CIGARETTE SMOKE CONDENSATE by inducing a charge on smoke particles and attracting them to surfaces of opposite charge. See also: CIGARETTE SMOKE CONDENSATE.

ELMENHORST COLD TRAP ..... A CIGARETTE SMOKE CONDENSATE method; the condensed residue from total MAINSTREAM smoke collected at −80 °C and subsequently evaporated under reduced pressure (~1-2 torr) at 40 °C until water content is approximately 3% by weight. See also: CIGARETTE SMOKE CONDENSATE.

EQUILIBRIUM MOISTURE CONTENT ..... The amount of moisture tobacco will hold under ambient conditions. See Figure 16.

EQUILIBRIUM OVEN VOLATILES ..... The OVEN VOLATILES as determined after the tobacco has reached EQUILIBRIUM MOISTURE CONTENT. See also: OVEN VOLATILES, EQUILIBRIUM MOISTURE CONTENT.

ETCH ..... A tobacco virus disease, similar to MOSAIC, causing a mild mottling of the upper leaves with alternating light and green color.

ETHREL ..... Trade name for a ripening agent or plant growth regulator, the active ingredient being 2-chloroethylphosphonic acid. See: RIPENING AGENTS.

EXPANDED TOBACCO ..... See: EXPANSION.

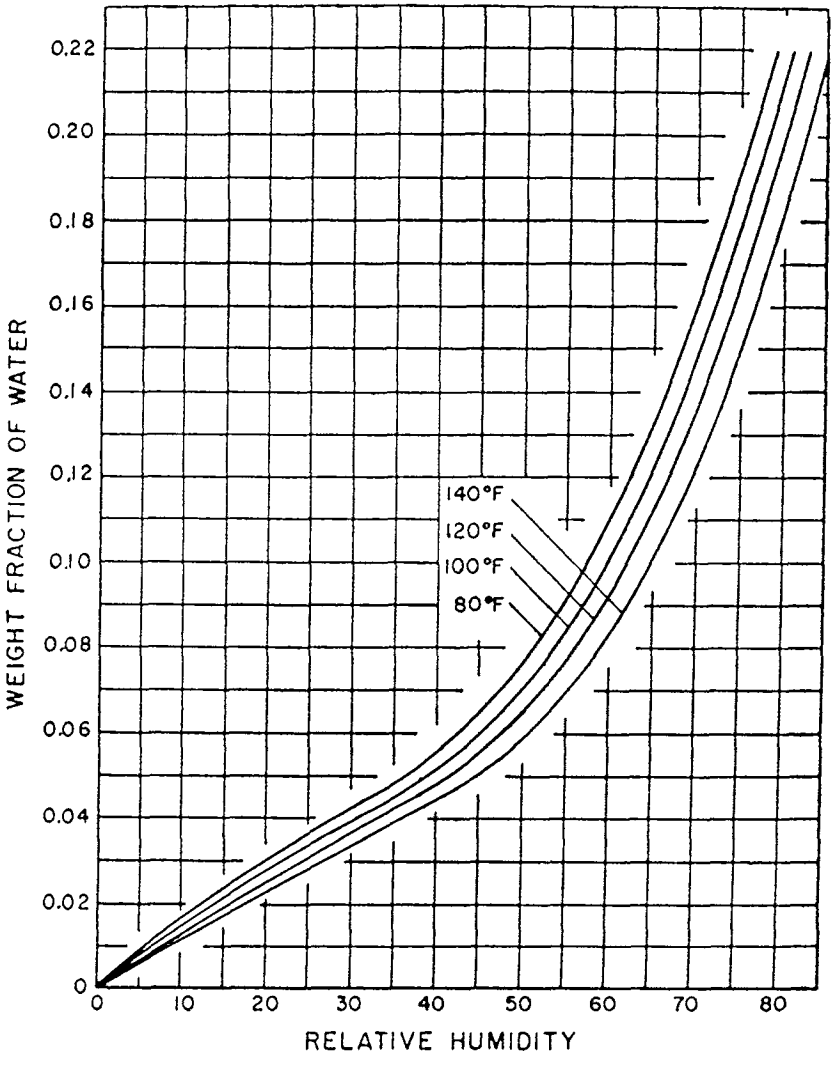


Figure 16

EQUILIBRIUM MOISTURE CONTENT. From M. Samfield in *Tobacco*, Vol. 176, #3 (1 February 1974), p. 21. Reprinted with permission of Lockwood Trade Journal, Inc.

EXPANSION ..... A chemical and/or physical procedure that increases the volume of the cells of tobacco, thus increasing shred dimensions and the FILLING POWER of the shreds; performed on cured, cased or uncased, filler.

Generally the tobacco is saturated with an inert gas in a high-pressure vessel called an IMPREGNATOR. Expansion of the tobacco then takes place in an expansion tower through the introduction of high-temperature air. See also: PUFFED TOBACCO, FREEZE-DRIED TOBACCO.

EXPORTS . . . . . Tobacco and tobacco products intended for distribution and sale to customers outside of the producing country. The United States remains the leading exporter of unmanufactured tobacco in the world. Important outlets are:

Australia	Italy	Spain
Belgium-Luxembourg	Japan	Sweden
Canada	Mexico	Switzerland
Congo	Netherlands	Thailand
Denmark	Norway	United Arab Republic
Egypt	Philippines	United Kingdom
France	Portugal	West Germany

The major manufactured tobacco product exported by the United States is cigarettes. Federal tax is not required on these cigarettes. Major outlets are:

Argentina	Hong Kong	Netherlands Antilles
Australia	Italy	Panama
Belgium-Luxembourg	Japan	Paraguay
Canary Islands	Kuwait	Saudi Arabia
Chile	Libya	Spain
Colombia	Malaysia	Switzerland
France	Netherlands	

EXTRUDED TOBACCO . . . . . Tobacco that is compressed into a BALE, planked on top and bottom with plywood, and wrapped with a synthetic film material. Tobacco is baled in this way for easier transportation.

FTC FILTER . . . . . CAMBRIDGE FILTER (Federal Trade Commission), q.v.

FTC TAR . . . . . See: TAR.

FABRICATION AREA . . . . . See: MAKE-PACK AREA.

FALSE ORDER ..... A condition of tobacco whereby it appears to have a higher moisture content than it actually does because it is at a higher temperature. See: ORDERING.

FANNED LEAF ..... Leaves that have been opened out and laid flat on each other before being tied in bundles for market.

FARM BALE ..... See: BURLEY FARM BALE.

FATTY STEMS ..... Stems of leaf that has not been properly dried during curing; soft and rubbery and apt to mould if stored under pressure.

FEEDER ..... A device, incorporating a storage bin and a conveyor, used to add components into the processing line at a given rate.

FERMENTATION ..... Generally applied only to cigar tobaccos but sometimes to BLACK TOBACCO; characterized by high initial moisture content (up to 50%), heat generation, and 10-20% loss of dry weight. Sometimes called SWEATING. Fermentation is a vigorous, controlled process, as opposed to AGEING.

FILLER ..... Cut, blended, cased, and flavored tobacco ready for cigarette making. Also referred to as CUT FILLER. See also: RAG.

FILLING POWER ..... The ability of tobacco to form a firm cigarette rod at a given moisture content. A high filling power indicates that a lower weight of tobacco is required to produce a cigarette rod than is required with a tobacco of lower filling power. CYLINDER VOLUME is used interchangeably with filling power; a high cylinder volume indicates a high filling power. Filling power is mistakenly referred to as SPECIFIC VOLUME.

FILTER ..... Any air permeable substance (e.g., paper, cotton, cork, silica gel, meerschaum, cellulose acetate, etc.)

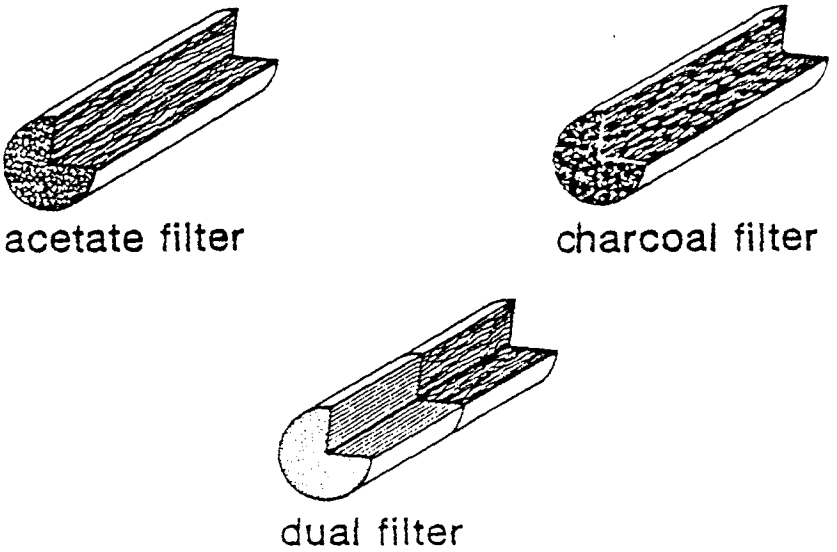


Figure 17A, 17B, 17C

Courtesy Hauni-Werke Korber & Co.

attached to the smoking end of a cigarette. Paper and cellulose acetate are in most common use today, often in conjunction with charcoal. The paper and cellulose acetate help reduce particulate matter; the charcoal adsorbs portions of the gaseous phase of the smoke. Filters are made in varying densities, diameters, and designs. The first commercial cigarette in the United States with a filter mouthpiece was Parliament, manufactured by Philip Morris in 1932. In 1936 Brown & Williamson introduced Viceroy, having a filter comprised of a cylinder of folded paper rather than a hollow tube with cotton. The use of CELLULOSE ACETATE appears to have begun in the early 1950s with the L&M brand. See Figure 17A, 17B, 17C. See also: PLUG SPACE PLUG.

FILTER DILUTION . . . . . See: AIR DILUTION.

FILTER EFFICIENCY . . . . . The percentage of the incoming smoke or smoke component that is removed by a filter.

See also: SMOKE REMOVAL EFFICIENCY, SELECTIVE FILTRATION.

FILTER MAKING MACHINE . . . . . See: PLUG MAKER.

FINISHED GOODS . . . . . Products sealed in cases and ready for shipment or storage.

FIRE CURING . . . . . See: CURING.

FIRE-HOLDING CAPACITY . . . . . The ability of a tobacco leaf to glow without flame when ignited; the duration of glow in seconds. Fire-holding capacity is influenced both by physical (texture, moisture, porosity) and chemical (sulfur, magnesium, nitrogen, chlorine, potassium) factors. It is also known as GLOW DURATION.

FIRE RETENTION . . . . . See: COAL STRENGTH.

FIRMNESS . . . . . See: CIGARETTE FIRMNESS.

FIXING . . . . . 1) The second stage of flue- or fire-curing, following YELLOWING, during which the colors of the leaf become fixed. 2) The setting of a powdery or water soluble coloring material onto paper (tipping or wrapper) to make it rub-off resistant or water stable (insoluble in water).

FLAGS . . . . . 1) STEMS, with some leaf attached, after they have been through the thresher at the stemmery. 2) Small pieces of uncut LAMINA or partially cut lamina which appear in the cut product.

FLAVOR . . . . . Generally refers to the blend of sensations evoked by a substance (tobacco smoke) in the mouth; "a complex sensation comprising taste, odor, roughness or smoothness, hotness or coldness, and pungency or blandness" [From R. W. Moncrieff in *The Chemical Senses*, 2nd ed. (London: Leonard Hill, 1951)]. See also: AROMA.

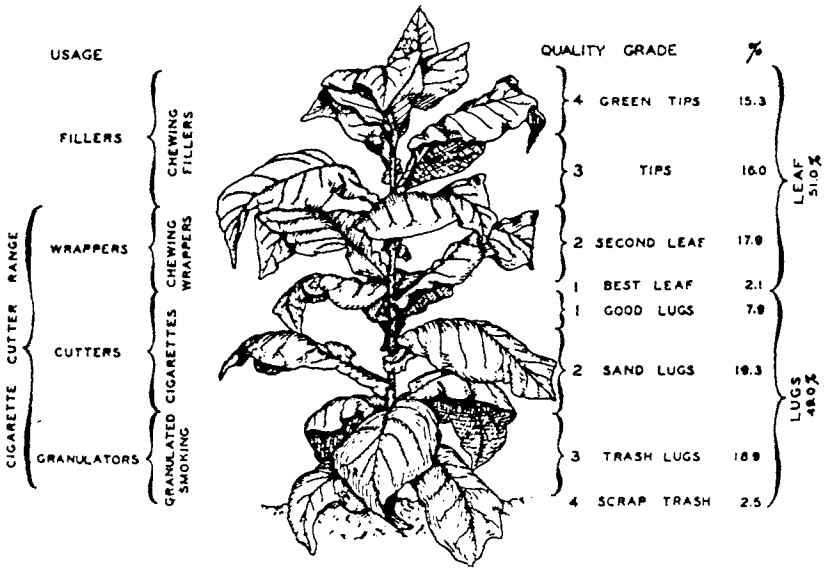


Figure 18

FLUE-CURED TOBACCO. From F. R. Darkis, L. F. Dixon, F. A. Wolf, and P. M. Gross in *Industrial & Engineering Chemistry*, Vol. 28 (1936), 1214-1223. Reprinted with permission of the American Chemical Society.

FLEA BEETLE . . . . . *Epitrix hirtipennis*; an insect which eats small holes in tobacco leaves. May be a serious insect pest of newly transplanted tobacco.

FLIP-TOP BOX . . . . . See: HINGE-LID PACK.

FLOWER . . . . . See: TOBACCO FLOWER.

FLUE-CURED TOBACCO . . . . . Commonly called BRIGHT or VIRGINIA tobacco. There are 4 types: Old Belt Virginia & North Carolina (#11), Eastern North Carolina (#12), South Carolina-North Carolina Border Belt (#13), and Georgia & Florida (#14). Flue-cured tobacco is lemon or orange-yellow in color. See Figure 18. Flue-cured tobacco possesses a sweet aroma and slightly acidic taste. It is high in sugar content and low to average in nitrogenous materials, acids, and nicotine. It blends well with BURLEY and MARY-

LAND tobaccos because its sugar content smooths and neutralizes the smoke. See Appendix II.

FLUE CURING . . . . . See: CURING.

FLYINGS . . . . . The lowest leaves on a BURLEY or FLUE-CURED plant. Flyings are the thinnest textured and mildest smoking leaves on the plant, and they have the highest FILLING POWER and DRINKING QUALITIES of all the plant positions. See also: BURLEY, FLUE-CURED.

FOAMED TOBACCO SHEET . . . . . A tobacco or NONTOBACCO SMOKING MATERIAL sheet that has been foamed (e.g., with Methocel) by the introduction of air or vapor into the slurry during the casting process to give it a lower density; one of the methods of increasing the FILLING POWER of tobacco. An early method of foaming tobacco was announced in 1969 by AMF, Inc.

FOIL . . . . . The inner wrap of a cigarette package, consisting of aluminum foil bonded to paper. The foil is necessary to provide "dead fold" characteristics to the wrap; i.e., when folded, the wrap has little tendency to spring back. See also: TOBACCO FOIL.

FORCED AGEING . . . . . An acceleration of the chemical changes that result from AGEING. Forced ageing is performed under controlled environmental conditions. Sometimes referred to as FORCED SWEATING. See also: AGEING.

FORCED SWEATING . . . . . See: FORCED AGEING.

FRACTION . . . . . See: SIEVE.

FRAGILITY . . . . . See: SHATTER RESISTANCE.

FRIABILITY . . . . . Breakage of tobacco shreds.

FREE AMINO ACIDS . . . . . In tobacco, amino acids that are not tied up in peptides or proteins.

FREE BURNING RATE . . . . . See: STATIC BURNING RATE.

FREEZE-DRIED TOBACCO . . . . . Tobacco that has been wet with water, frozen, and dried in a vacuum chamber, resulting in expansion of the cells. See also: EXPANSION.

FRENCHING . . . . . A disease, frequently confused with MOSAIC, which is believed to be caused by a soil toxin. It causes leaves to be narrow, thick, brittle, and stringy-looking.

FROG EYE . . . . . *Cercospora* species; a fungus disease which may appear on seedlings, on plants in the field, and on harvested tobacco. The spots usually occur on the lower or more mature leaves. Also called BARN SPOT, GREEN SPOT.

FUMIGATION . . . . . 1) The process of FIRE-CURING LATAKIA tobacco. See also: CURING, LATAKIA. 2) The treatment of stored tobacco with any of a variety of agents to inhibit insect infestation. 3) The treatment of seedbeds prior to sowing tobacco seed to produce young tobacco plants for the field.

FUNKY TOBACCO . . . . . Leaf on the verge of going mouldy or leaf that has been mouldy and redried.

FUSARIUM WILT . . . . . *Fusarium oxysporum*; a fungus-caused stalk disease, indicated by slow yellowing of the leaves on one side of the plant and characterized by a darkening of the inner bark of the stalk.

GAS PHASE . . . . . The phase of cigarette smoke which passes through a CAMBRIDGE FILTER under standard smoking conditions; consists of permanent gases and vapors, including oxygen, nitrogen, carbon monoxide, carbon diox-

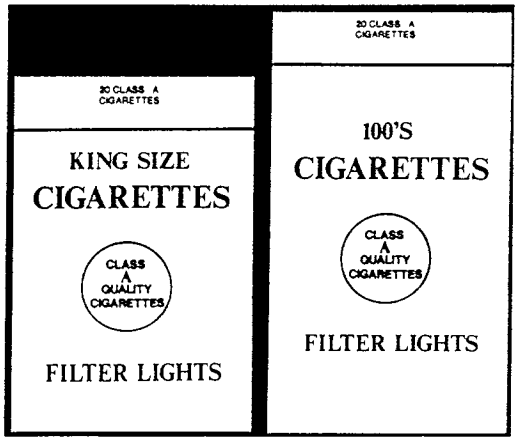


Figure 19

GENERIC CIGARETTE. From *Tobacco International*, Vol. 185, #7 (1983 April 1), p. 71. Reprinted with permission of Lockwood Trade Journal Co., Inc.

ide, methane, ethane, butane, low boiling hydrocarbons, alcohols, esters, carbonyls, etc. Also called VAPOR PHASE.

GENERIC CIGARETTE ..... A non-branded cigarette product first introduced commercially in the United States in 1981 by Gary Tobacco Co., a division of Liggett & Myers. Cigarettes were the first generic products to be advertised, notably when Liggett & Myers placed its "no-frills product" ads in newspapers around the country in January 1983. See Figure 19.

GLOW DURATION ..... See: FIRE-HOLDING CAPACITY.

GRADING ..... The SORTING of cured leaves into uniform lots by stalk position according to BODY, color, and degree of damage or spotting. The United States uses 107 official grades for BURLEY and 154 for FLUE-CURED. By way of comparison, Canada has 56 and Zimbabwe has 220. Also called SORTING. See Appendix VI.

GRAINY ..... See: OPEN GRAINED.

GRANULATORS . . . . . The manufacturers' classification for the lowest leaves on a BURLEY or FLUE-CURED plant. See also: BURLEY, FLUE-CURED.

GRANVILLE WILT . . . . . *Pseudomonas salanacearum*; a leaf disease caused by a bacterium and characterized by a wilting or dwarfing of leaves on one side of the plant. Also called BACTERIAL WILT.

GREEK TOBACCO . . . . . See: ORIENTAL TOBACCO.

GREEN CASTE . . . . . Tobacco that was reasonably ripe when harvested but was cured a little too fast. Such tobacco has the ability to mellow and mature during AGEING.

GREEN JUNE BEETLE . . . . . *Cotinis nitida*; a plant bed insect whose larvae burrow and uproot small tobacco plants.

GREEN LEAF . . . . . 1) Leaf before it has been aged. 2) Leaf that has been harvested before it was ripe. Such leaf is sour, immature, and hay-like.

GREEN LEAF THRESHING . . . . . The separation of STEM from the leaf portion of tobacco at a REDRYING plant. The two products, STEM and LAMINA, are dried and packed separately. See also: THRESHING, GREEN THRESHING.

GREEN-PRIZING . . . . . See: PRIZING.

GREEN SCUM . . . . . A plant-bed disease characterized by an algal growth on the plant bed surface.

GREEN SPOT . . . . . See: FROG EYE.

GREEN THRESHING . . . . . THRESHING before REDRYING and storage. See also: THRESHING, GREEN LEAF THRESHING.

GREEN TIPS ..... The top-most leaves on a FLUE-CURED tobacco plant. See also: FLUE-CURED, TIPS.

GREEN WEIGHT ..... The weight of tobacco prior to REDRYING.

GREY TOBACCO ..... FLUE-CURED tobacco suffering from a color defect; TOADY. The cured leaf, rather than being rich lemon to orange yellow, has a fairly uniform lack of color or is variegated grey. Nutrient toxicity is thought to be the cause. Grey tobacco burns poorly.

GUMMY ..... Leaf that is sticky to the touch; leaf which contains significant amounts of oils and resins on the leaf surface.

HLC ..... HOMOGENIZED LEAF CURING, q.v.

HAMMER MILL ..... An apparatus that effects a reduction in product size. Consists of a circular basket placed under a high-speed rotating shaft. Tobacco is chuted into a mill chamber where it comes into direct contact with the rotating hammers. As the hammers beat against the tobacco, it is reduced in size until it is small enough to pass through the basket openings.

HAND ..... A bunch of cured tobacco, consisting of 5-25 leaves sorted by quality and tied at the butt end.

HARVESTING ..... See: STALK-CUTTING, PRIMING, ONCE-OVER HARVESTING.

HEADSPACE ..... The atmosphere around a sample to be measured. It consists of the ambient gases plus volatiles present in the sample. Headspace may be sampled for analysis by the static (equilibrium condition) method or the dynamic (nonequilibrium condition) method by removing and concentrating the volatiles in a suitable trap.

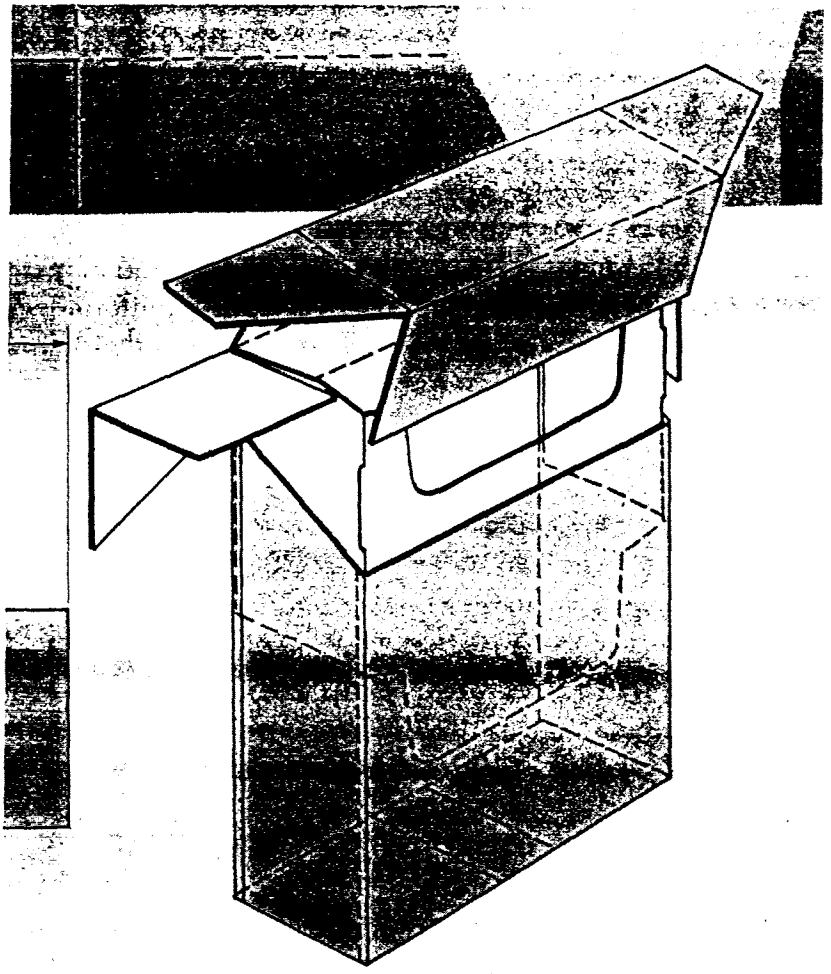


Figure 20

HINGE-LID PACK. From Molins Machine Company Ltd.'s *The Hinge-Lid Pack* (London, 1965). Reprinted with permission of Molins Ltd.

HICKS . . . . . A variety of FLUE-CURED tobacco; NC95.

HINGE-LID PACK . . . . . A cardboard, crush-proof, flip-top box, containing either 3 rows of 7-7-6 cigarettes or 2 rows of 10 cigarettes each; first introduced by Molins Machine Co. Ltd. in 1938 for the Churchmans No. 1 brand, although it is

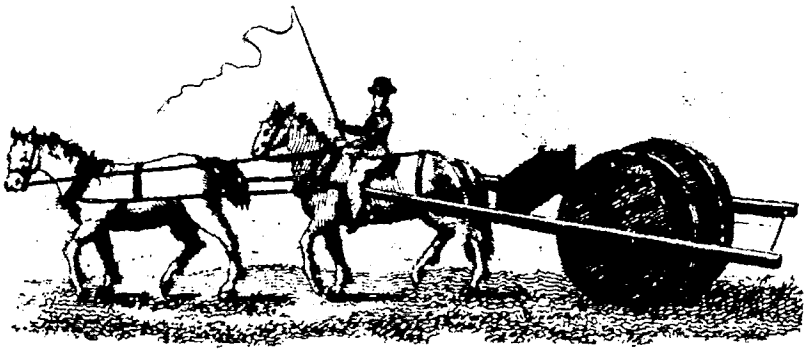


Figure 21

HOGSHEAD. From Lehman Brothers' *About Tobacco* (1955), p.32.

best remembered with the U.S. introduction of the Marlboro filter cigarette by Philip Morris in 1954. See Figure 20. The Molins Hinge-Lid Packer, consisting of a packer, wrapper, and boxer, packs up to 150 packs per minute containing from 4 to 30 cigarettes/pack.

HOGSHEAD . . . . . A large round wooden cask traditionally used for storing and ageing tobacco. The origin of the term is not known. The English standardized it as 63 gallons in 1423, but the capacity varies. A hogshead of tobacco usually measures 48 inches in length and diameter and contains approximately 1000 pounds of leaf. See Figure 21. It appears that hogsheads may become obsolete with the popularity of the BALE. All hogsheads consist of mats (sides) and heads (top and bottom). Most hogsheads are made with wooden slats for the sides and either slats or plywood heads. Disposable hogsheads, which are trashed when opened, are made with the slats wired or banded to form a solid cylinder and nailed to the sides. Patented hogsheads, which can be reused, have specially assembled sides formed into 2 halves with intermeshing fittings that allow pins to be inserted to hold the halves together. The heads are plywood with a nesting ring to permit interlocking with the mats.

HOLLOW STALK ..... *Erwina aroideae*; a bacterium-caused disease attacking the plant after TOPPING or SUCKERING, especially during damp, cloudy weather.

HOMOGENIZED LEAF CURING ..... An accelerated process for curing tobacco which effects the required chemical changes in a homogenized slurry instead of in the intact whole leaf. The slurry is then RECONSTITUTED into sheet form for commercial use. The procedures involved are: homogenization, incubation, and dehydration.

HOMOGENIZED TOBACCO ..... See: RECONSTITUTED TOBACCO.

HORNWORM ..... *Protoparce sexta*; the tobacco hornworm is one of the most destructive insects attacking tobacco in all growing areas; three broods in a year allows the hornworm to feed on all stages of the growing tobacco.

HOT TOBACCO ..... A pile of tobacco that is carrying too much moisture and has started to ferment.

HUMECTANTS ..... See: HYGROSCOPIC AGENTS.

HYGROSCOPIC AGENTS ..... Humectants; ingredients added to tobacco to help it retain moisture and plasticity. The first such agent was glycerin, dating from the 1890s.

IMPACTION TRAP ..... The collection of CIGARETTE SMOKE CONDENSATE by impinging the smoke against a surface. Generally an orifice of small diameter is used in the impaction process. For a more complete description of this method, see H. D. Mathewson, *Tobacco Science*, Vol. 12 (1968), 41-49.

IMPORTS ..... Tobacco and tobacco products brought into the country from a foreign country. The United States is the largest importer of leaf tobacco in the free world, followed closely by the United Kingdom, West Germany, and the

U.S.S.R. The majority of the leaf imported by the U.S. is ORIENTAL.

IMPREGNATOR . . . . . See: EXPANSION.

INTACT CURING . . . . . See: BULK CURING.

KABAT . . . . . See: METHOPRENE.

KEEPING QUALITY . . . . . The determination that tobacco will not go mouldy with its current moisture content.

KENAF . . . . . A hemp-like plant (*Hibiscus cannabinue*) whose fiber has been used as a partial substitute for flax in CIGARETTE PAPER.

KENTUCKY ALKALOID SERIES CIGARETTES . . . . . See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

KENTUCKY NICOTINE SERIES CIGARETTES . . . . . See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

KENTUCKY REFERENCE CIGARETTES . . . . . See: UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES.

KILLING OUT . . . . . A stage in the CURING process which completes the removal of moisture from the stem and leaf.

KNOCK-OUTS . . . . . PULL-OUTS, q.v.

LAMINA . . . . . That area of the tobacco leaf (STRIP) between the VEINS.

LARGE CIGARETTES . . . . . See: CIGARETTE CLASS.

LASER PERFORATION . . . . . See: PERFORATION.

LATAKIA . . . . . A Syrian tobacco known for its very pungent aroma. After being SUN-CURED on the stalk, it is FIRE-CURED (also known as FUMIGATION, in this instance), from whence it obtains its strong, smokey flavor. See also: CURING, FUMIGATION.

LEAF . . . . . 1) The flat portion of a tobacco plant growing out from the STALK and containing STEM, VEINS, and LAMINA. 2) The middle-to-upper leaves of the stalk; thick, firm, with good bouquet and flavor; high alkaloid and TPM delivery. Also known as BODIED LEAF.

LEAF MARKET . . . . . See: AUCTION.

LEMON LEAF . . . . . Bright to brilliant yellow; almost flashy in color. Lemon leaf usually has been cured a little too quickly. It smokes harshly with a displeasing bite.

LESION NEMATODES . . . . . BROWN ROOT ROT, q.v. See also: NEMATODE.

LIVE DEAD TOBACCO . . . . . A term used to describe further BROWN LEAF, q.v.

LONG END . . . . . A long, continuous CIGARETTE ROD that has broken off before entering the CUTTER on the cigarette maker.

LOOSE ENDS . . . . . Qualitatively, a defect in a manufactured cigarette in which tobacco is packed loosely in the end of the rod. See also: VOID ENDS. Quantitative testing comprises subjecting the cigarettes to controlled handling, usually tumbling, where the amount of tobacco that falls out of the cigarette is collected and weighed. An example is the Borgwaldt instrument shown in Figure 22.

LOOSENING . . . . . The manual or mechanical separation of pressed tobacco leaves that have been conditioned or moistened.

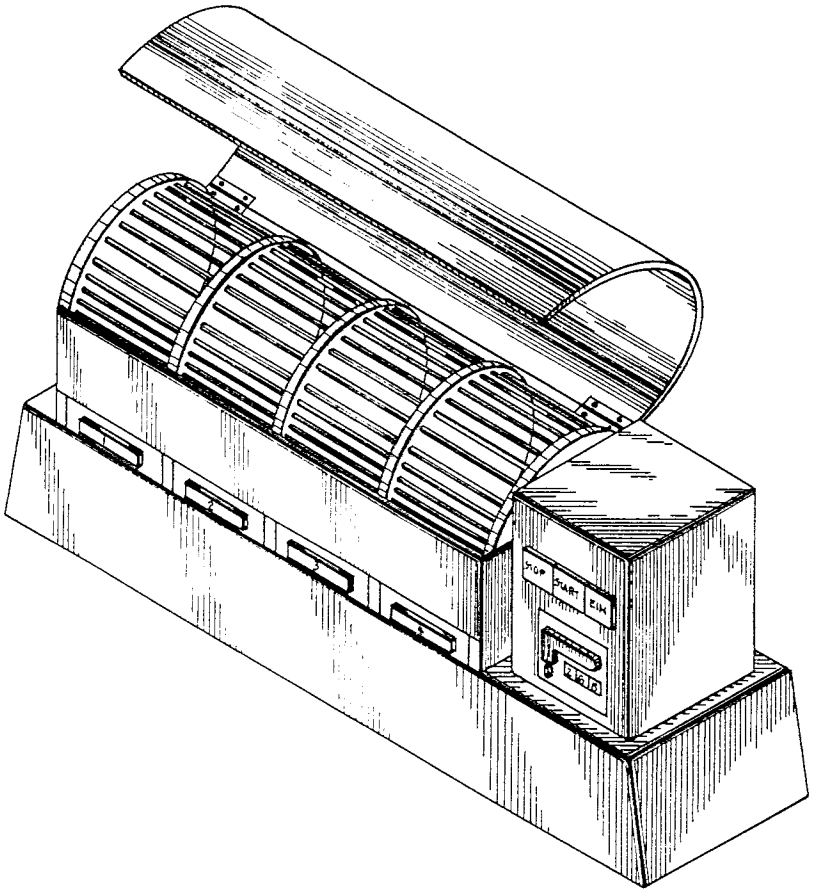


Figure 22

BORGWALDT CIGARETTE LOOSE ENDS TESTER.

LOW-PROFILE TOBACCO . . . . . Tobacco from plants that, at a height of approximately 30 inches, are topped back to 24 inches. The plants are topped early and low in order to produce tobacco uniform in agronomic characteristics and chemical composition. Developed at Clemson University, low-profile tobacco is managed with Long's ONCE-OVER HARVESTING machinery.

LUGS . . . . . The leaves on the bottom-quarter of either a BURLEY or FLUE-CURED plant; the CUTTER leaves of a BURLEY plant. Lugs are fine textured, OPEN GRAINED, with good FILLING POWER and low TPM delivery. See also: BURLEY, FLUE-CURED.

MH . . . . . MALEIC HYDRAZIDE. See: SUCKERS.

MAHOGANY LEAF . . . . . A deep orange-brown leaf indicating ripeness and more smoking strength and impact than ORANGE or LEMON.

MAINSTREAM . . . . . In a closed system (for analytical purposes), mainstream is the smoke issuing from the mouth end of a cigarette. In a free smoking situation, it is the smoke that is drawn from the mouth end of a cigarette during puffing.

MAKE-PACK AREA . . . . . That portion of a cigarette plant where cigarette manufacturing and packaging take place. Sometimes called the FABRICATION area.

MAKING MACHINE . . . . . See: ROD MAKER, PLUG MAKER.

MALEIC HYDRAZIDE . . . . . See: SUCKERS.

MANIPULATION . . . . . A term applied strictly to ORIENTAL leaf to cover the operations of sorting, cleaning, fermentation, and packing.

MARYLAND TOBACCO . . . . . A light AIR-CURED tobacco, named after the state of Maryland. Maryland tobacco is similar to BURLEY but somewhat milder and lighter in taste. It is low in carbohydrates and nicotine and average in nitrogenous materials and nonvolatile acids. See Appendix II.

MAXUL . . . . . A scheduled group of 72 bales of ORIENTAL tobacco, having 9 stacks of SARATOGAS, 4 high with 2 bales per saratoga.

MAXWELL REPORT . . . . . Successor to the WOOTTEN REPORT; an annual statistical report on the domestic cigarette industry prepared by John C. Maxwell, Jr., originally with the Institutional Research Department of W.E. Hutton & Co. His now famous reports have continued over the years as he has changed affiliations. Maxwell's published summaries began in 1964 in *Printers' Ink*. In 1964 as well in *World Tobacco* he published his first annual international survey of the cigarette industry, sometimes referred to as the MAXWELL INTERNATIONAL REPORT.

MEADOW NEMATODES . . . . . BROWN ROOT ROT, q.v. See also: NEMATODE.

MECHANICAL PERFORATION . . . . . See: PERFORATION.

MENTHOL . . . . . $C_{10}H_{20}O$; 3-hydroxymenthane; peppermint camphor. Colorless crystals obtained mainly from oil of *Mentha arvensis* or from other mint oils (e.g., from *Mentha piperita*, see Figure 23), or prepared synthetically from thymol or turpentine derivatives. Both the *dl*- and *l*-menthols may be prepared synthetically; only the *l*-menthol is found in nature. While both forms smell and taste like mint, the *dl*-menthol has more of a camphor-like odor. The *l*-menthol is the most popular flavor additive for cigarettes. The first menthol cigarette on the U.S. market was Spud, introduced in 1927 by the Axton Fisher Tobacco Co.

METHOPRENE . . . . . A biorational (nature-identical) substance used for pest control with a broad base of agricultural commodities, including tobacco; the active ingredient in KABAT (ALTOSID).

Figure 23

PEPPERMINT. From J. E. Landing in *Drug & Cosmetic Industry*, Vol. 94 (January 1964), 34-35, 63. Reprinted with permission of Harcourt Brace Jovanovich.

MIDGE ..... *Hydrogaenus spp.*; a mosquito-like insect attacking the stems of FLUE-CURED seedlings.

MIDRIB ..... The center STEM of a tobacco leaf; does not include the STALK of the plant. Commonly called STEM.

MINIMUM STANDARDS PROGRAM ..... A program to ensure the acceptability of leaf based on agronomic, physical, chemical, and smoke characteristics; begun in 1964. All new varieties are tested against two control varieties: NC2326 and NC95 (HICKS).

MOISTURE CONTENT ..... See: EQUILIBRIUM MOISTURE CONTENT.

MOLE CRICKET ..... *Scapteriscus acletus R. & H.*; also *Gryllotalpa hexadactyla Perty.*; a burrowing insect which

feeds on the roots of tobacco plants in the Coastal Plain region.

MOSAIC . . . . . An infectious virus causing a mottling of the tobacco leaf; tobacco mosaic virus; TMV.

NSM . . . . . New Smoking Material. See: NONTOBACCO SMOKING MATERIAL.

NARROW GUTTED LEAF . . . . . Narrow, thin leaf that has very little LAMINA-to-STEM ratio. Also called RAT TAILS.

NAVY CUT . . . . . Refers to the days when British sailors were allowed to purchase unmanufactured, duty-free tobacco leaf. They formed it into a cigar-like roll and bound it tightly with a thin cord. As tobacco was required, the rope was unwound and the pressed, solid plug cut into slices.

NEMATODE . . . . . An eel-worm afflicting tobacco plants. There are two major types of nematodes: endoparasitic, which enter the root to feed on the inside, and ectoparasitic, which feed mostly on the outside portion of the root and other underground parts of the plant.

NESTING . . . . . 1) Intentionally leaving foreign matter among the tobacco sold at auctions for the purpose of adding weight. 2) The mixing of diverse stalk positions or types of tobacco.

NEUTRAL FRACTION . . . . . The material which is recovered under standard conditions after a solution of CIGARETTE SMOKE CONDENSATE or of tobacco has been extracted with aqueous acid and alkali.

NEW SMOKING MATERIAL . . . . . NSM. See: NONTOBACCO SMOKING MATERIAL.

NICOTIANA . . . . . Genus to which tobacco belongs. There are three subgenera—*petunioides*, *rustica*, and *tabacum*—

Figure 24

Nicotiana tabacum Linnaeus ("Machu Picchu"). Inflorescence, × ¼; entire flower, tubular part, limb, capsule, stamen insertion, × 1; leaf, × ⅜.

and over 100 species and groups, not to mention subgroups and varieties. (See Appendix VII) The most well-known species is *N. tabacum L.*, an amphidiploid which has never been found growing in a truly wild state. See Figure 24.

NICOTINE ..... $C_{10}H_{14}N_2$; 3-(1-methyl-2-pyrrolidinyl)-pyridine. One of the few liquid alkaloids; a colorless to pale yellow liquid, found in tobacco leaves and smoke, which turns brown on exposure to light or air. First isolated from smoke in 1809 by L. Vaqueline, nicotine is the most abundant alkaloid found in tobacco.

NICOTINE SERIES CIGARETTES ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

NONDESCRIPT ..... An official U.S. tobacco grade (See Appendix VI) indicating low-quality leaf but not SCRAP.

NONTOBACCO SMOKING MATERIAL ..... A cigarette filler composed of a material other than natural tobacco. The basic organic plant constituent cellulose is the most common nontobacco filler. However, more complex substances have also been used, as well as some man-made materials. Reference can be found to the following vegetable-based substances: rhubarb, plantain, coltsfoot, self-heal, comfrey, stinging nettle, watercress, groundsel, oxtongue, beet, mallow, poppy leaves, sage, walnut, cherry, red beech, hornbeam, maple, hazlenut, goldenregen, prickly broom, eucalyptus, bagasse, lettuce, peanut, soybean, potato, corn, yam, taro, and cocoa, as well as paper and seaweed. The first nontobacco cigarette was Cubebs, made from Java pepper plant leaves, and marketed in the 1920's. Some recent (1970s) attempts to create a nontobacco smoking material market include:

Manufacturer	Product	Date
British-American Tobacco	Batflake	1976
Celanese	Cytrel	1970
Courtaulds	Tabrelle	1970
Ecusta Paper	Ecusta EC	1975
Imperial Chemical	NSM	1970
Reemtsma/Bayer	RCN	1974
Tamag Basel	Polystrep	1975

See also: SYNTHETIC TOBACCO, TOBACCO EXTENDER.

NONVOLATILE CIGARETTE SMOKE CONDENSATE ..... The nonvolatile residue obtained when an acetone solution of CIGARETTE SMOKE CONDENSATE is evaporated to almost constant weight under standard conditions. See also: CIGARETTE SMOKE CONDENSATE.

NUTRIENTS ..... Elements furnishing nourishment to the growing tobacco plant. The three most important nutrients for tobacco plants are nitrogen, potassium, and phosphorus. Also considered to be major are calcium, sulfur, and magnesium. Of lesser importance are iron, boron, manganese, copper, zinc, and chlorine.

1A1, 1A2, 1A3, 1A4 ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

1R1 ..... See: UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES.

OGP ..... Organic Gas Phase. See: GAS PHASE.

OV ..... OVEN VOLATILES, q.v.

OFF-TYPE TOBACCO ..... Any tobacco that does not have reasonably normal or acceptable characteristics.

OFFSHORE TOBACCO ..... Tobacco that has come from any country other than the one in which one lives. For ORIENTAL tobacco, that which grows any place other than in Turkey, Greece, Bulgaria, Yugoslavia, or another traditionally ORIENTAL country.

OFFAL ..... Losses of tobacco due to manufacturing processes.

OLD CROP ..... Leaf grown in any year previous to the current crop year.

ONCE-OVER HARVESTING ..... A harvesting method developed by Long Mfg. N.C., Inc. in 1974. It allows the

harvesting of an entire crop of tobacco with only one trip through the field and with only two people to operate the machinery. All of the leaves are removed from the plant at this time and then cured together. Also called the "EASI-HARVEST SYSTEM," once-over harvesting works best with LOW-PROFILE TOBACCO.

OPEN GRAINED ..... A characteristic of leaf referring to its ability to absorb large volumes of water, casings, or flavorings. See also: TIGHT FACED, DRINKING QUALITY.

ORANGE LEAF ..... Rich, ripe yellow, FLUE-CURED leaf. Such leaves smoke with a full tobacco flavor, mellow, nutty, and smooth.

ORDERING ..... 1) Raising the moisture content of cut (or uncut) tobacco through the addition of water. Also called CONDITIONING. See also: FALSE ORDER. 2) Used on the farm to denote raising the moisture content of tobacco to facilitate handling.

ORDERING CYLINDER ..... A cylinder used to increase the moisture content of tobacco. As tobacco slowly passes through the rotating cylinder, saturated steam is sprayed into each end of the cylinder, keeping the interior of the cylinder at a constant moisture and temperature.

ORIENTAL TOBACCO ..... A class of tobaccos grown in Turkey, Greece, and neighboring areas. It is mostly SUN CURED. Also known as TURKISH, AROMATIC, or GREEK tobacco. See Figure 25. Oriental tobacco has a strong characteristic flavor. It is low in nicotine, average in structural carbohydrates and nitrogenous materials, and high in reducing sugars, nonvolatile acids, and volatile flavor oils. See Appendix II.

OVEN VOLATILES ..... OV; those volatiles in tobacco that are evolved by treatment in a forced draft oven at a

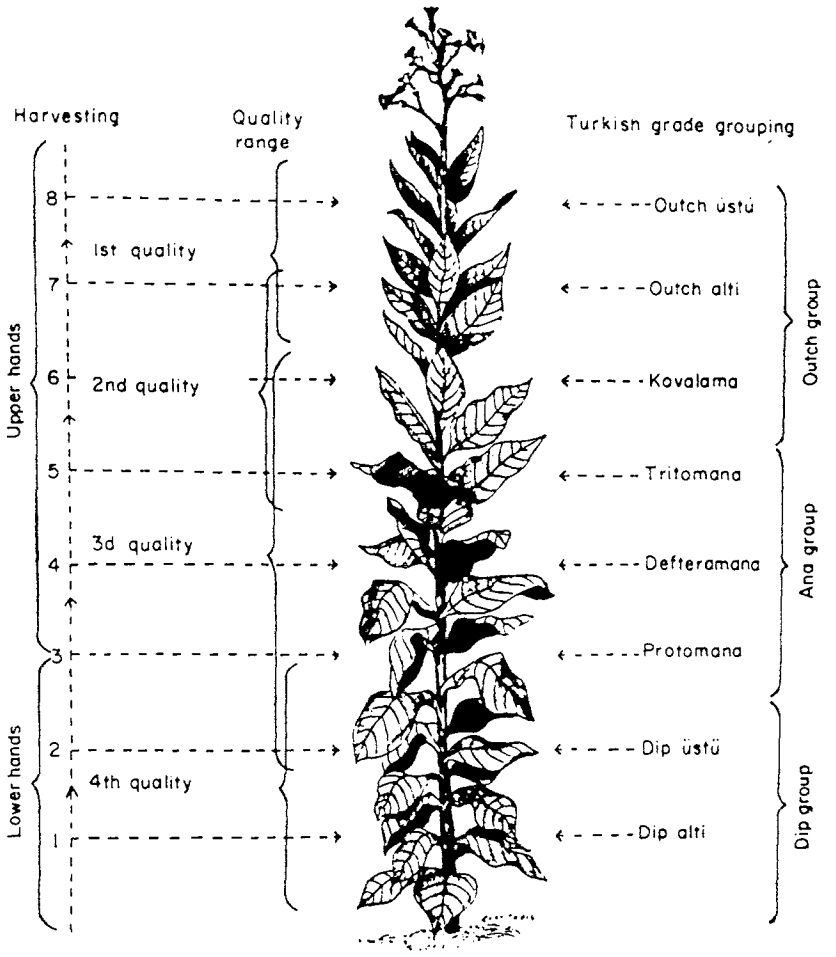


Figure 25

ORIENTAL TOBACCO. From E.L. Wynder & D. Hoffmann's *Tobacco and Tobacco Smoke* (New York: Academic, 1967), p. 10. Reprinted with permission of Academic Press, Inc.

predescribed temperature for a standard period of time. See also: EQUILIBRIUM OVEN VOLATILES, DRY MATTER.

OVERGROWN TOBACCO . . . . . Leaf that has had too much fertilizer, mainly nitrogen, and has grown big and rank in the field.

OVER-PROCESSED TOBACCO . . . . . Tobacco that has been baled or prized in cases or hogsheads under too much pressure.

OVERTIPPING . . . . . A covering of the brand name printing on the cigarette with TIPPING PAPER.

OZONE INJURY . . . . . See: WEATHER FLECK.

PSP . . . . . PLUG SPACE PLUG, q.v.

PACK . . . . . See: CIGARETTE PACK.

PACKER . . . . . See: CIGARETTE PACKER, CASE PACKER.

PAD . . . . . Tobacco leaves stuck together in a clump during the ageing process in a HOGSHEAD.

PALE LEAF . . . . . Leaf that is tending to the white side. Such tobacco is sharp, tangy, sour, and insipid. See also: TWO-FACED TOBACCO, WHITE TOBACCO.

PAPER . . . . . See: CIGARETTE PAPER.

PAPIROSSI . . . . . A "cigarette" which allows the smoke to pass through a hollow cardboard tube before being drawn in by the smoker. See Figure 26. The tobacco is so densely packed that often the papirossi will not stay lit without the action of puffing. Papirossi are favored by Russia and other Slavic countries. Also PAPIROSSY.

PARTICULATE PHASE . . . . . The phase of cigarette smoke retained on a CAMBRIDGE FILTER pad during standard smoking conditions; consists of solids and condensed droplets in suspension ranging mostly in size from 0.2–0.4 micron, having a maximum size of 1.0–1.5 micron.

PEAK COAL TEMPERATURE . . . . . The maximum temperature measured during a single puff at any location in the

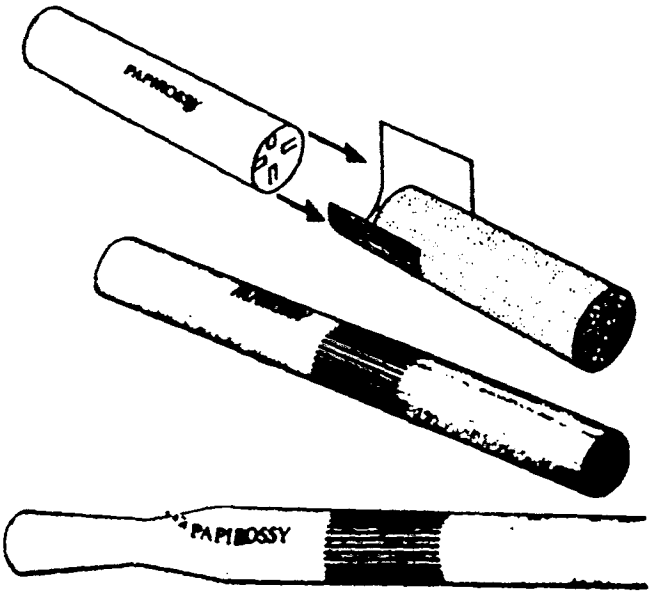


Figure 26

PAPIROSSI. From *Tobacco Reporter*, Vol. 102, #8 (August 1975), p. 47. Reprinted with permission of Harcourt Brace Jovanovich.

burning zone. See also: BURNING ZONE TEMPERATURE.

PERFORATION ..... Of cigarette or tipping paper, increases both the AIR PERMEABILITY of the paper and the AIR DILUTION of the cigarette. MECHANICAL PERFORATION: the paper is mechanically perforated in the form of round holes, slits, or embossing. ELECTROSTATIC PERFORATION: the paper is perforated by electrical discharges bringing about irregular holes. LASER PERFORATION: the paper is perforated by a laser beam causing teardrop shaped holes.

PERIQUE ..... A tobacco (Type #72) grown only in St. James Parish, Louisiana. It is noted for its pleasing aroma and is used especially in fancy pipe tobacco blends. Perique is produced by a unique process of packing the dried leaves in casks under great pressure for about 9 months. Annual

Figure 27

MEDALLION OF THE PHILIP MORRIS AWARD FOR DISTINGUISHED ACHIEVEMENT IN TOBACCO SCIENCE.

production averages 250 thousand pounds, a large portion of which is exported.

PHILIP MORRIS INC. AWARD FOR DISTINGUISHED ACHIEVEMENT IN TOBACCO SCIENCE . . . . . An annual award, consisting of a medallion (See Figure 27) and an honorarium, presented at the Tobacco Chemists' Research Conference by Philip Morris Incorporated. The award recognizes the young (under 45 years of age) U.S. scientist for an outstanding early career in basic or applied tobacco science. Recipients to date:

R.H. Cundiff	1967	R. J. Reynolds
C.H. Keith	1968	Celanese Fibers

C.B. McCants	1969	North Carolina State University
A.W. Spears	1970	Lorillard
D.F. Matzinger	1971	North Carolina State University
G.L. Steffens	1972	U.S. Department of Agriculture
W.H. Johnson	1973	North Carolina State University
J.C. Leffingwell	1974	R. J. Reynolds
R.W. Jenkins	1975	Philip Morris
G.P. Morie	1976	Tennessee Eastman
P.D. Legg	1977	U.S. Department of Agriculture
D.L. Davis	1978	University of Kentucky
S.-D. Kung	1979	University of Maryland Baltimore County
G.B. Collins	1980	University of Kentucky
	1981	No award given
L.P. Bush	1982	University of Kentucky
J.I. Seeman	1983	Philip Morris
C.R. Green	1984	R. J. Reynolds
R.F. Severson	1985	U.S. Department of Agriculture
G.H. Bokelman	1986	Philip Morris

PHILIP MORRIS INTERNATIONAL AWARD FOR DISTINGUISHED ACHIEVEMENT IN TOBACCO SCIENCE ..... A biennial award of a medallion, a certificate, and an honorarium, presented at the CORESTA Congresses, 1972–1976, by Philip Morris Incorporated. The award recognized the under-50 scientist for achievement in one of the areas of basic or applied tobacco science. Recipients:

P. Schiltz	1972	S.E.I.T.A.
H. Elmenhorst	1974	Martin Brinkmann
M. Oka	1976	Japan Tobacco & Salt Public Corporation

Replaced in 1977 with an award administered by CORESTA itself.

PHYSICAL PROPERTIES ..... Mechanical properties which remain unchanged as long as molecular composition remains constant. Of FLUE-CURED leaf, the following characteristics have been reported:

Length of leaf ..... 20.36 in (mean)
Width of leaf ..... 12.13 in (mean)
Weight of leaf ..... 52.76 g (mean)
Center of gravity..... 8.29 in from stem butt (mean)

Force to break midrib	1.48 lbs downward, 2.28 lbs horizontally (mean)
Lamina weight/in^2	0.1467 g (mean)
Node spacing	1.90 in (mean)
Leaf angle	52.23° at 2 in from stalk, 78.48° at 6 in from stalk (mean)

See also specific test or measurement.

PHYSIOLOGICAL LEAF SPOT ..... See: WEATHER FLECK.

PICKER ROLL ..... A toothed device that meshes with the teeth on the carding drum to separate and untangle FILLER. See: CARDING.

PICKING ..... The manual removal of unwanted objects, e.g., large STEMS, PADS, etc., from strips, blended leaf, cut filler, or smoking tobacco.

PIEBALD TOBACCO ..... Tobacco that has cured too quickly because of excessive dryness in the atmosphere; generally applied to BURLEY tobacco.

PLANT BED ..... A small, specially prepared area on which TOBACCO SEED is sown to produce a plant of sufficient vigor to withstand transplanting to the field.

PLASTICIZER ..... 1) For CELLULOSE ACETATE, a softening agent added in small quantities to the TOW to tack the fibers together at points where the filaments cross each other; usually TRIACETIN or TRIETHYLENE GLYCOL DIACETATE. 2) For tobacco, see HYGROSCOPIC AGENTS.

PLUG ..... A segment of FILTER material. Also called a PLUG ROD.

PLUG MAKER ..... A FILTER making machine. Filters are manufactured in continuous lengths sufficient for 4 or 6

Figure 28

PLUG SPACE PLUG FILTER. From *Fumée et Rétention/Smoke and Retention* (Crissier-Lausanne, Switzerland: Baumgartner Papiers SA, 1980), p. 1–7. Reprinted with permission of Baumgartner Papiers.

cigarettes. Added filter materials or recessed filter tips are handled in subsequent steps on COMBINERS. The plug rods are transported to the cigarette ROD MAKER in trays or by pneumatic conveyor.

PLUG ROD ..... See: PLUG.

PLUG SPACE PLUG ..... A FILTER consisting of two plugs of filter material separated by a cavity which may be left empty or into which may be placed any of the substances capable of contributing to FILTRATION EFFICIENCY. Also called a CAVITY FILTER. See Figure 28.

PLUG WRAP ..... The wrapper in which the FILTER material, e.g., CELLULOSE ACETATE, is contained. See also: CIGARETTE PAPER.

POLYSTREP ..... The name derives from the company Polystrep AG, set up by Tamag Basel AG to develop and market both nontobacco and reconstituted tobacco processes/products. 1) A RECONSTITUTED TOBACCO process developed by Paul Buchmann and Monique Beringer of Tamag Basel AG, in cooperation with Hauni-

Werke Koerber & Co. K.G.; announced in 1974. Formerly the TAMAG PROCESS, then the STRAND TOBACCO process, the reconstituted sheet material now is known as a product of the POLYSTREP process. It involves the reconstitution of tobacco waste and scrap both simply and inexpensively. The product is flakes which resemble processed tobacco leaves. Of special note is a high FILLING CAPACITY and significant reduction in tar and nicotine. This process alternately is called the Tamag READY FLAKE System. 2) See: NONTOBACCO SMOKING MATERIAL.

PORE VOLUME ..... 1) Of ACTIVATED CARBON, the difference in the volumetric displacement by granular activated carbon in mercury and in helium at standard conditions. 2) Of TOBACCO, that percentage of the total volume of tobacco in a cigarette which is not occupied by solid particles; in this latter definition, pore volume is known also as AIR SPACE.

POROSITY ..... 1) Of CIGARETTE PAPER, a measure of air permeability expressed as the time taken for a given volume of air to pass through a given area of paper; the number of cc of air which under a constant or variable suction will pass through a certain surface area of paper in a given time. Porosity measurements are usually reported in Greiner numbers which refer to the time in seconds required for 50 cc of air to pass through 0.786 square inches of paper. The higher the Greiner number, the lower the porosity of the paper. 2) Of LEAF, its ability to absorb moisture, casings, and flavors. Porous tobacco has an OPEN GRAINED surface.

POUNDAGE QUOTA ..... See: QUOTA.

PREFABRICATION AREA ..... See: PRIMARY PROCESSING.

PRESSURE DROP ..... See: RESISTANCE TO DRAW.

PRICE SUPPORT ..... A production control system where farmers agree to limit production in return for guaranteed

price supports. Specific grades are supported at certain dollar levels based on market demand. Tobacco which does not receive a bid or offer in excess of the established price support for that particular grade is purchased by the respective farmer stabilization cooperative.

PRIMARY PROCESSING . . . . . That portion of a cigarette plant that deals with the preparation, blending, and flavoring of tobacco prior to cigarette making. Sometimes called the PREFABRICATION area.

PRIMING . . . . . Removing ripened leaves from the plant by hand.

PRIMINGS . . . . . The first leaves to ripen on the lower half of the stalk.

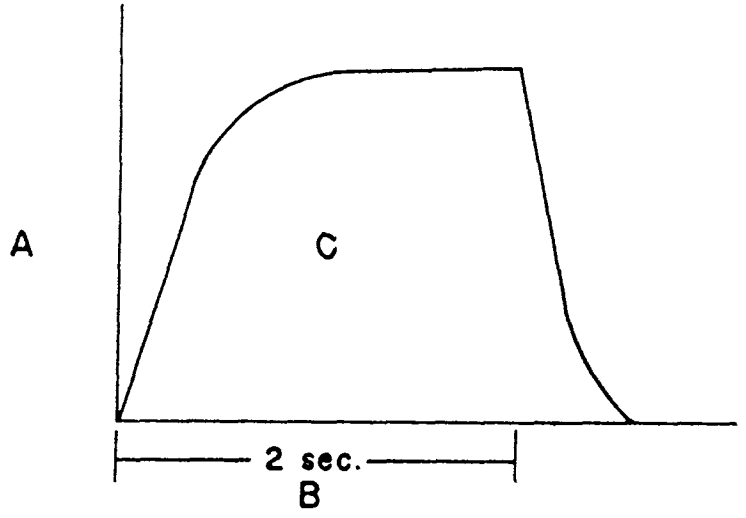
PRIZING . . . . . Packing of tobacco into HOGSHEADS. By use of a hydraulic press, some 750–1000 pounds of leaf can be packed into a hogshead. GREEN-PRIZING: the prizing of cured tobacco during the busiest part of the marketing season to allow the purchasing companies to catch up in their processing operations.

PROTEIN . . . . . Naturally occurring complex combination of amino acids essential to all living cells. Estimated yield using a process developed by Leaf Protein Inc. is 2250 pounds/acre of tobacco. Of this, 400 pounds is Fraction I (100% protein) and 200 pounds is Fraction II (100% protein).

PUFF COUNT . . . . . The number of puffs taken on a cigarette smoked to a prescribed butt length under standard smoking conditions.

PUFF DURATION . . . . . The fixed time lapse for a 35 cc draw on a cigarette. The puff duration is standardized at 2.0 ± 0.2 sec.

PUFF FLOW RATE . . . . . See: PUFF VELOCITY.



A—flowmeter response
B—time (seconds)—lag = 0.54 sec.
C—volume—35 ml

Figure 29

PUFF PROFILE. From F. A. Morrell & C. Varsel in *Tobacco Science*, Vol. 10 (1966), p. 47. Reprinted with permission of Lockwood Trade Journal, Inc.

PUFF FREQUENCY . . . . . The number of puffs per unit of time on a smoking machine. The puff frequency is standardized at 1 puff per 60 ± 1 sec.

PUFF NUMBER . . . . . A whole number which describes a given puff on a cigarette in terms of the total number of puffs taken on that cigarette. Puff number is sometimes incorrectly used as a synonym for PUFF COUNT.

PUFF PROFILE . . . . . A graphic representation of the volume rate of flow of a 35 cc puff over a 2 sec duration on a SMOKING MACHINE. See Figure 29. The puff profile is a velocity/time curve and will vary as functions of the cigarette's RESISTANCE TO DRAW and the applied drawing force. PUFF-BY-PUFF PROFILE: a graphic representation

(over the entire cigarette) of any smoke component on a per puff basis.

PUFF RESISTANCE . . . . . See: RESISTANCE TO DRAW.

PUFF VELOCITY . . . . . The velocity of a 35 cc puff in a 2 sec duration on a SMOKING MACHINE. The puff velocity is standardized at 1050 cc/min air flow. Also called PUFF FLOW RATE, which is standardized at 35 cc/2 sec = 17.5 cc/sec.

PUFF VOLUME . . . . . The volume of smoke taken from the end of a cigarette during one puff by a SMOKING MACHINE. The puff volume is standardized at 35 ± 0.3 cc (CORESTA = 20 °C and 760 torr).

PUFFABILITY . . . . . See: RESISTANCE TO DRAW.

PUFFED TOBACCO . . . . . Expanded tobacco; tobacco whose particle size has been increased by a combination of heat, high pressure differential processing, and a puffing agent; a means of expanding tobacco. See also: EXPANSION.

PULL-OUTS . . . . . Pieces of partially cut STEM that are larger than the required CUT WIDTH. Sometimes called KNOCK-OUTS. Comes from the process in cigarette making which separates larger stem fragments from LAMINA. See also: WINNOWERS.

PYRIKI QUALITY INDEX . . . . . As devised by C. Pyriki in 1958 [*Proceedings of the 2nd International Scientific Tobacco Congress* (1958), 460–495]:

$$\frac{(\text{TOTAL REDUCING SUBSTANCES} + \text{RESINS} + \text{WAXES}) \times 400}{\text{ASH} + \text{NICOTINE} + \text{PROTEIN} + \text{AMMONIA} + \text{RESIDUAL N}}$$

PYROLYSIS . . . . . The thermal degradation of chemical species, usually to smaller fragments. See also: COMBUSTION.

PYROLYSIS ZONE . . . . . The area behind the BURNING ZONE where thermal decomposition, rather than "burning," takes place as indicated by a high concentration of carbon monoxide and a low concentration of oxygen.

PYROSYNTHESIS . . . . . The recombination of fragments, resulting from PYROLYSIS, to form new smoke components. See also: PYROLYSIS, COMBUSTION.

QUALITY . . . . . Of tobacco as a raw material, there are two considerations: it must be pleasant to smoke and to look at, and it must possess characteristics favoring high manufacturing capacity. Tobacco quality is composed of three major components:

1) PHYSICAL CRITERIA: stalk position, ripeness and maturity, uniformity, foreign matter, strip yield and size, filling power,

2) CHEMICAL CRITERIA: nicotine, sugar, petroleum ether extracts, mineral components, alkalinity of water-soluble ash, total N, protein N, α-amino N, starch, nonvolatile acids, total volatile bases,

3) SMOKE FLAVOR CRITERIA: strength, aroma, mildness, and sharpness of smoking taste and odor.

See also: BRUCKNER QUALITY INDEX, PYRIKI QUALITY INDEX, SHMUK QUALITY INDEX, TRIFU NUMBER.

QUOTA . . . . . A modernization (1960s) of the TOBACCO ALLOTMENT system in the U.S. While the latter controlled production by restricting the number of acres planted, the former effected the same result by setting a maximum number of pounds that could be harvested for market. Farm quotas can be leased and/or transferred, a practice which has caused considerable controversy. See also: TOBACCO ALLOTMENT.

1R1 ..... See: UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES.

2R1 ..... See: UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES.

RCN ..... Reduction of Condensate and Nicotine. See: NONTOBACCO SMOKING MATERIAL.

RTD ..... RESISTANCE TO DRAW, q.v.

RAG ..... Blended, cased (usually), and cut tobacco prior to ROASTING. Rag normally contains about 20% moisture. See also: FILLER.

RAT TAILS ..... See: NARROW GUTTED LEAF.

RATE OF BURN ..... See: STATIC BURNING RATE.

READY FLAKE ..... See: POLYSTREP.

RECONDITIONING ..... See: REORDERING.

RECONSTITUTED TOBACCO ..... Tobacco dust, stems, by-products, etc. that are finely ground, that may be mixed with a cohesive agent, and that are rolled or cast into a flat sheet of uniform thickness and quality. The sheet may be cut into any size shreds. The five basic sheet processes are: dust-impingement process, tobacco slurry process, impregnation-of-web process, paper process, and extrusion process. Reconstituted leaf is not a new idea, having been suggested as early as 1857. It is alternately known as HOMOGENIZED TOBACCO.

RED LEAF ..... The next-to-the-top leaves on a BURLEY plant, below the TIPS. See also: BURLEY. Red leaf has a toasted smell. It can be high in nitrogen and alkaloids and TPM delivery.

REDRYING ..... The process of preparing tobacco for storage. Redrying involves the complete removal from tobacco of moisture below a critical level, followed by an application of a uniform moisture content throughout all the leaf.

REDUCING SUGARS ..... Those sugars that have either an aldo or keto group that reduces copper oxide.

REDUCTION OF CONDENSATE AND NICOTINE ..... RCN. See: NONTOBACCO SMOKING MATERIAL.

REGENERATED TOBACCO ..... See: RECONSTITUTED TOBACCO.

REJECT DUST ..... The sand and foreign matter removed from tobacco at the stemmery.

REORDERING ..... ORDERING again. Also called RECONDITIONING. See: ORDERING.

RESISTANCE TO DRAW ..... RTD; the pressure required to force air through the full length of a cigarette at the rate of 17.5 ml/sec (20 °C, 760 torr); this value is expressed as inches or mm of water. Resistance to draw often is referred to as PRESSURE DROP, DRAFT RESISTANCE, DRAW RESISTANCE, PUFFABILITY, and PUFF RESISTANCE. See Figure 30.

RESTRICTED SMOKING MACHINE ..... See: SMOKING MACHINE.

RING SPOT ..... A tobacco virus disease prevalent in Virginia and North Carolina; recognizable by the concentric line patterns of chlorotic and necrotic tissue on the leaves.

RIPENING AGENTS ..... A chemical which promotes yellowing of tobacco leaves after maximum dry weight has been reached. Generally achieved with ethylene gas, either

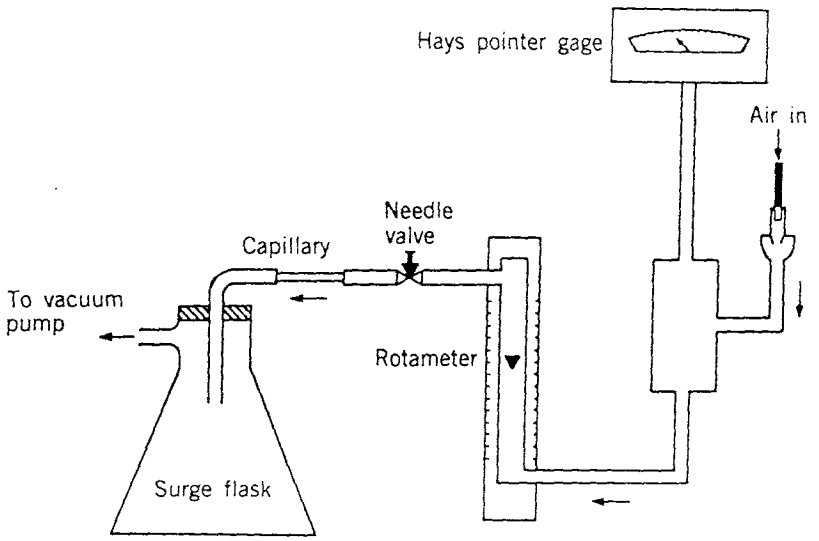


Figure 30

RESISTANCE TO DRAW. From E. L. Wynder & D. Hoffmann's *Tobacco and Tobacco Smoke* (New York: Academic, 1967), p. 563. Reprinted with permission of Academic Press, Inc.

released in the barn after harvesting or in the field through application of an agent such as ETHREL.

ROASTER . . . . . A rotating steam-heated cylinder used to remove moisture primarily from cut and blended tobacco. See also: DRYER.

ROASTING . . . . . Drying; removing moisture from cut tobacco.

ROD . . . . . See: CIGARETTE ROD.

ROD MAKER . . . . . A cigarette making machine. See also: BONSACK CIGARETTE MACHINE. The cut FILLER is air-formed into a continuous rod of tobacco on a travelling belt. The tobacco is then encircled by a continuous ribbon of CIGARETTE PAPER which is glued and heat-sealed. The rod is weighed and cut to a defined length. The rated

capacity of a cigarette maker (cpm) is based upon the rod speed, in meters per minute, that the cigarette rod passes into the cutterhead.

ROLL-YOUR-OWN . . . . . A homemade cigarette prepared by wrapping loose tobacco in a piece of specially purchased cigarette paper and moistening the longitudinal side to seal it during smoking. See also: TUBING.

ROOT-KNOT NEMATODE . . . . . An endoparasitic NEMATODE causing a knot on the roots of the plant. See also: NEMATODE.

RUN-BACK . . . . . A brown or dark discoloration of the main STEM and veins, spreading out into the LAMINA as well. Caused during curing by a drop in temperature for a period of two hours or more.

SBT . . . . . Static Burn Time. See: STATIC BURNING RATE.

SALTY . . . . . See: WET DOG.

SAND DROWN . . . . . Magnesium-deficient FLUE-CURED tobacco; originating from the fact that such tobacco frequently occurred in sandy soils during periods of excessive rainfall.

SAND LUGS . . . . . See: LUGS.

SARATOGA . . . . . A wooden storage box holding approximately 100 pounds of tobacco FILLER.

SAUCE . . . . . Flavoring; CASING.

SCAB . . . . . *Fusarium affine*; a fungus-caused disease of the seedbed very similar to FROG EYE. Lesions appear only under extremely wet conditions.

SCALDING . . . . . See: BROWNING.

SCORCHING . . . . . A discoloration (reddish-brown) of the tobacco leaf caused by too high temperatures during the FLUE CURING process.

SCRAP TOBACCO . . . . . Tobacco pieces less than four inches in length; considered to have little value.

SEED . . . . . See: TOBACCO SEED.

SELECTIVE FILTRATION . . . . . The removal by filtration of a specific smoke component or class of components. See also: FILTER EFFICIENCY, SMOKE REMOVAL EFFICIENCY.

SEMIVOLATILES . . . . . Liquids or solids of high vapor pressure in the PARTICULATE PHASE of tobacco smoke that are relatively volatile by gas chromatography; may include STEAM VOLATILES. Semivolatiles are a large class of materials that can be subject to SELECTIVE FILTRATION.

SENESCENCE . . . . . A phase of plant growth that extends from full maturity to actual death; characterized by an accumulation of metabolic products, an increase in respiratory rate, a loss in dry matter, yellowing or decrease in chlorophyll, a decline in proteins, carbohydrates, RNA, and DNA, and an increase in activity of hydrolytic enzymes. Senescence actually is also the early stage of leaf curing, with an increased rate of dehydration.

SEPARATOR . . . . . A machine which, by differential air velocities, separates strips of tobacco from each other and removes sand, STEMS, and PADS.

SEWING MACHINE . . . . . See: TYING MACHINE.

SHAKER . . . . . A machine which shakes tobacco to remove undesirable pieces or to increase its bulk volume by fluffing it.

SHATTER RESISTANCE . . . . . The resistance of a tobacco leaf to shattering under such mechanical impact and stress as it receives during shaking for redrying, during mechanical stemming, cutting, drying, cooling, and cigarette manufacture. Using a specially-designed machine to collect and classify the leaf particles, Coulson* has identified the following typical values for the Shatter Resistance Index: over 2.0 for high resistance, 1.0–2.0 for moderate resistance (U.S. FLUE-CURED tobacco), and under 1.0 for poor resistance. Also known as the FRAGILITY of tobacco. *[Tso, T. C. *Physiology and Biochemistry of Tobacco Plants.* Stroudsburg, PA: Dowden, Hutchinson & Ross, Inc., 1972, p. 317]

SHAVING BRUSH . . . . . Tied tobacco of extremely short length (less than 6 inches); common in China, Korea, Taiwan, and Indonesia.

SHEETING . . . . . The process of preparing loose-leaf tobacco for the auction floor.

SHMUK QUALITY INDEX . . . . . As devised by A.A. Shmuk in 1953 [*The Chemistry and Technology of Tobacco.* III. (USSR: Gavrilov edition, 1953)], a simple ratio of soluble carbohydrates to proteins.

SHOOKY . . . . . Leaf that is dry and shatters easily; often described as leaf that rattles when you shake it.

SIDESTREAM . . . . . In a closed smoking system (for analytical purposes), sidestream is the smoke that does not issue from the mouth end of a cigarette but rather from the burning end, through the paper, etc. In a free smoking situation, it is all of the smoke issuing from any part of a cigarette except that which is drawn through the mouth end during puffing. In free smoking, sidestream may issue from the mouth end during static burning.

SIEVE . . . . . A series of tiered screens, each with a different opening dimension, that are vibrated to separate cut tobacco

by particle size. The material remaining on each screen is called a FRACTION.

SILO ..... A large holding unit in which different strip components are placed in layers. The silo serves as both a bulking and blending unit.

SIZE ..... See: CIGARETTE SIZE.

SLICK LEAF ..... Leaf that is extremely smooth and slippery to the touch, indicating that it lacks DRINKING QUALITY, natural oils, and OPEN GRAIN. It is also related to certain FLUE-CURED varieties (such as COKER 139) and to tobacco that has been harvested while too immature.

SMALL CIGARETTES ..... See: CIGARETTE CLASS.

SMOKE CONDENSATE ..... See: CIGARETTE SMOKE CONDENSATE.

SMOKE REMOVAL EFFICIENCY ..... The weighable material captured by the FILTER divided by the total weighable material entering the FILTER under a standard smoking routine. Removal efficiency for standard CELLULOSE ACETATE filters can be affected by filter length, pressure drop, circumference, and fiber DENIER. See empirical equation below, which relates some of these variables. See also: FILTER EFFICIENCY, SELECTIVE FILTRATION.

$$\log_e\left(1 - \frac{E}{100}\right) = A \cdot L + B \cdot \Delta P \cdot C^4 + D \cdot L/\delta$$

where:

E = removal efficiency (smoke, nicotine, or tar)
L = filter length in mm
ΔP = filter PRESSURE DROP in mm H_2O at 17.5 ml/sec flow
C = filter circumference in mm
δ = fiber DENIER per filament in g

A,B,D = constants from table below:

	A	*B*	*D*
Smoke	-1.542×10^{-2}	-9.602×10^{-9}	-2.102×10^{-2}
Nicotine	-3.822×10^{-3}	-1.048×10^{-8}	-1.824×10^{-2}
Tar	-9.957×10^{-3}	-8.517×10^{-9}	-2.587×10^{-2}

[From C. Keith in I. Schmeltz's *The Chemistry of Tobacco & Tobacco Smoke* (New York: Plenum, 1972), p. 157]

SMOKE YIELD ..... MAINSTREAM smoke; the quantity of particulate matter per gram of tobacco consumed.

SMOKING MACHINE ..... A mechanical device allowing reproducible cigarette smoking under standard conditions in a manner designed to approximate human smoking behavior. See Figure 31. AUTOMATIC SMOKING MACHINE: any type of RESTRICTED SMOKING MACHINE capable of taking a 2-second 35 cc puff once per minute on each channel independently. RESTRICTED means that the unlit ends of the cigarettes are not open to the atmosphere between puffs.

SOD WEBWORM ..... *Crambus spp.*; a small caterpillar which burrows and feeds on the stems of tobacco. Also called CRAMBIDS.

SOFT LEAF ..... Tobacco that is carrying more than normal moisture content.

SOFTENING ..... The decrease in volume of a selected segment of a burning cigarette rod after a given pressure has been applied for a specific length of time. The SOFTENING INDEX as described by Harris and Fredrickson [*Tobacco*, Vol. 177, #17 (22 August 1975), p. 45] is:

$$\text{Softening Index} = \frac{\Delta V(n) - \Delta V(\text{unlit})}{\Delta V(\text{unlit})} \times 100,$$

where:

$\Delta V(\text{unlit})$ = the decrease in volume of the unlit tobacco rod

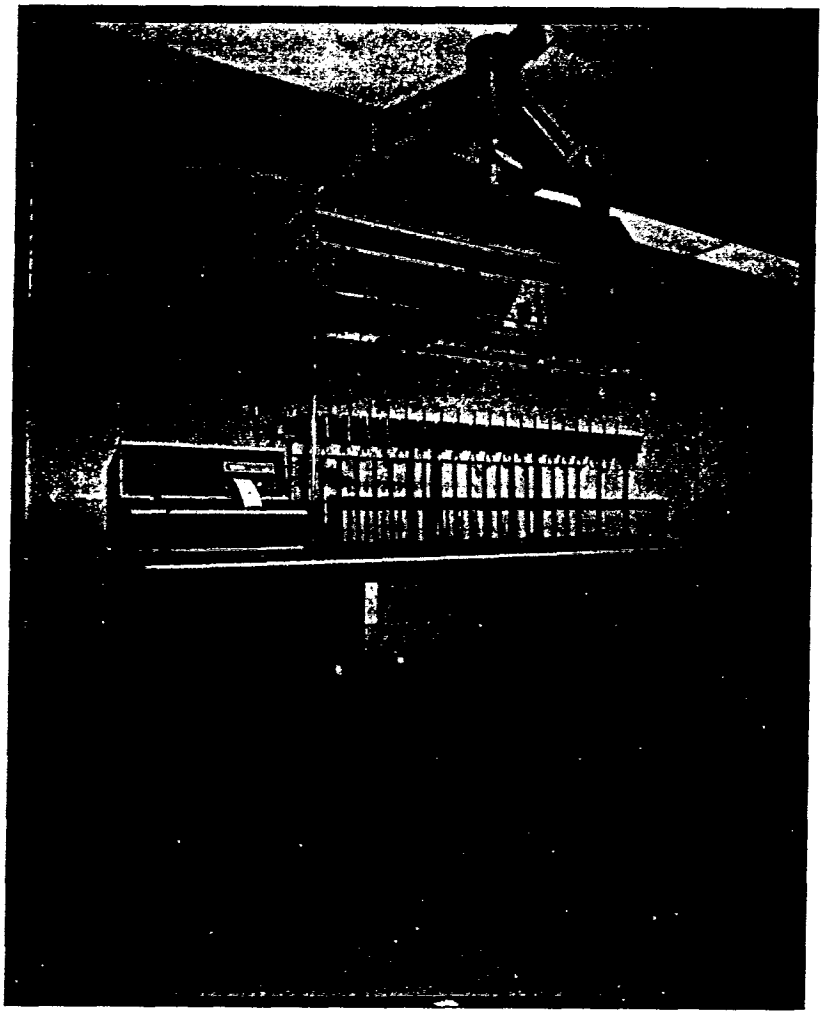


Figure 31

SMOKING MACHINE CAPABLE OF SMOKING 20 CIGARETTES SIMULTANEOUSLY (20-PORT).

$\Delta V(n)$	=	the decrease in volume of the tobacco rod as measured 15 seconds following the puff necessary to consume n mm of the tobacco rod
n	=	the segment of the rod consumed in mm (usually 40 for the purposes of this test).

SOLANACEAE . . . . . The botanical family to which tobacco belongs.

SORE SHIN . . . . . *Rhizoctonia solani*; a disease caused by a soil fungus, resulting in lesions and subsequent breaking of the STEM.

SORTING . . . . . See: GRADING.

SOUTHERN STEM & ROOT ROT . . . . . *Sclerotium rolfsii*; a fungus-caused disease attacking maturing plants at the soil line, causing a brown, depressed lesion.

SPECIFIC HEAT . . . . . The number of calories required to raise the temperature of 1 g of material by 1 °C. Of cured tobacco, Porcsalmy reported a value of 0.51, using a calorimetric method at 100 °C. The following equation allows one to calculate the value if moisture is present:

$$c = \frac{0.50 \times a}{100} + \frac{b}{100},$$

where a = dry matter
b = humidity (%)
c = specific heat

SPECIFIC VOLUME . . . . . The envelope volume of a predetermined amount of tobacco divided by the weight of the tobacco; cc/g. Reported to be 0.8–0.9 cc/g for FLUE-CURED and BURLEY FILLER. A one-gram sample of tobacco is placed in a tea ball which is then weighed, submerged in acetone, and reweighed. Specific volume differs, therefore, from BULK DENSITY in that only the volume of the tobacco itself is measured. It differs from CYLINDER VOLUME in that the tobacco is not compressed. As specific volume increases, FILLING POWER also increases. See also: BULK DENSITY, CYLINDER VOLUME, FILLING POWER.

SPONGE . . . . . A graying of leaf that results from extending the YELLOWING period too long; not to be confused with BROWNING.

SPOTTING . . . . . A discoloration of the cigarette wrapper, i.e., brown spots, as a result of cigarette exposure to high humidity and temperature. Generally occurs with STAINING, q.v.

STAINING . . . . . Overall browning of a cigarette wrapper caused by the cigarette's exposure to high humidity and temperature. Usually occurs with SPOTTING, q.v.

STALK . . . . . The main STEM that supports the tobacco plant, from which the leaves grow.

STALK-CUTTING . . . . . Harvesting by cutting the entire plant or STALK, as opposed to PRIMING; used primarily for AIR- and FLUE-CURED tobaccos.

STATIC BURNING RATE . . . . . The relationship of a unit of length and/or weight of tobacco burned statically per unit of time; the amount of time required for a CIGARETTE ROD to burn 40 mm under static conditions; the rate at which a cigarette smoulders in the absence of drafts or puffing action. The static burning rate affects the production of SIDESTREAM smoke. It is expressed as sec/cm^2 or as mg of tobacco burned/min.

STAVE . . . . . A flat piece of wood, approximately 5″ × 4′, used in making mats for HOGSHEADS.

STEAM VOLATILES . . . . . Liquids or solids in the PARTICULATE PHASE of tobacco smoke (or in tobacco) that distill over in the presence of steam; may be SEMIVOLATILES.

STEM . . . . . The MIDRIB (center vein) of a tobacco leaf; does not include the STALK of the plant. Large stem is >7/64 inch in diameter.

STEM HOLE . . . . . A quality defect in a cigarette which is a puncture of the CIGARETTE PAPER usually caused by a STEM particle.

STEMMING . . . . . See: THRESHING.

STEWING . . . . . Holding a barn of very unripe tobacco at a YELLOWING temperature for a long period of time in an effort to induce coloring.

STIFFENING . . . . . A process for increasing the FILLING POWER or CYLINDER VOLUME of cut and/or expanded tobacco; a procedure resulting in the loss of a certain degree of elasticity of the cell wall, brought about by the addition of chemicals or by treatment to modify the softening effect of water.

STRAND LENGTH . . . . . The length in mm of a given piece of cut FILLER. A normal cigarette will have a distribution of strand lengths throughout the rod.

STRAND TOBACCO . . . . . See: POLYSTREP.

STRIP . . . . . Leaf with the MIDRIB removed.

STRIPPING . . . . . 1) Removing leaf from the stalks; performed on the farm during the GRADING of AIR-CURED tobaccos. 2) Removing the mats and top head from a HOGSHEAD, leaving the tobacco mass to rest on the bottom head.

SUCKERS . . . . . Lateral growths in the leaf axils on tobacco plants. Removing these growths, or SUCKERING, allows the main leaves to draw additional nutrients and become larger, thicker, and heavier. Suckers can be removed by hand, which is labor intensive, or by the use of chemical agents such as maleic hydrazide (MH) and fatty alcohols.

SUN CURING . . . . . See: CURING.

SWEATING . . . . . See: FERMENTATION.

SYNTHETIC TOBACCO . . . . . Oftentimes used synonymously with NONTOBACCO SMOKING MATERIAL, syn-

thetic tobacco more strictly implies a nontobacco filler composed of a man-made material. See also: NONTOBACCO SMOKING MATERIAL, TOBACCO EXTENDER.

2A1 . . . . . See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

2R1 . . . . . See: UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES.

TCRC . . . . . TOBACCO CHEMISTS' RESEARCH CONFERENCE, q.v.

TEGDA . . . . . TRIETHYLENE GLYCOL DIACETATE, q.v.

TMV . . . . . Tobacco Mosaic Virus. See: MOSAIC.

TPM . . . . . TOTAL PARTICULATE MATTER, q.v.

TRTD . . . . . Total Resistance To Draw. See: RESISTANCE TO DRAW.

TVB . . . . . Total Volatile Bases.

TABRELLE . . . . . See: NONTOBACCO SMOKING MATERIAL.

TAMAG PROCESS . . . . . See: POLYSTREP.

TAR . . . . . FTC tar is TOTAL PARTICULATE MATTER minus the nicotine and water content.

TEARTAPE . . . . . A 1 mm to 3 mm strip of cellulose film attached to a film cigarette package wrapper to allow for quick and easy opening of the package; first used by Brown & Williamson Tobacco Corp.

THIEF . . . . . To remove a sample core from a BALE, pile, or HOGSHEAD of tobacco by means of a manually driven or motorized tube.

THRESHER SEPARATOR . . . . . A machine that separates leaf from STEM.

THRESHING . . . . . 1) Removing the STEM or MIDRIB from the tobacco leaf at the stemmery. 2) A form of cutting RECONSTITUTED TOBACCO sheet into small, irregular-sized pieces. See also: GREEN THRESHING, GREEN LEAF THRESHING.

TIGHT FACED . . . . . A leaf characteristic opposite to OPEN GRAINED, q.v. See also: DRINKING QUALITY.

TIP LEAVES . . . . . The top-most leaves on the STALK.

TIPPER . . . . . A machine connected to the cigarette ROD MAKER which receives the CIGARETTE ROD and attaches the filter PLUG. The PLUG rods are cut by a series of drum rolls and knives and introduced to align between 2 cigarette rods, after which TIPPING PAPER is wrapped around the filter segment and glue is applied. The 2 cigarettes are then cut and oriented into a single row.

TIPPING . . . . . Removing the top portion of the tobacco leaf that does not contain objectionable STEM; the remaining portion of the leaf is threshed. FLUE-CURED tobacco often is not tipped.

TIPPING PAPER . . . . . Paper (usually cork-like or opaque white in appearance) that is wrapped around the FILTER, joining it to the end of the CIGARETTE ROD.

TIPS . . . . . The top-most leaves on a BURLEY plant; the next-to-the-top leaves on a FLUE-CURED plant. Tips have the highest TPM delivery and the lowest FILLING POWER and DRINKING QUALITY of all plant positions. See also: BURLEY, FLUE-CURED, GREEN TIPS.

TOADY ..... Leaf that is grey, drab, dead-looking, and cardboard-like in appearance. See also: GREY TOBACCO.

TOASTING ..... 1) A heating process at temperatures up to 320 °F that seals the CASING in the BURLEY leaf and caramelizes the added sugars. Burley is REORDERED after toasting. 2) A process used by tobacco growers to cure tobacco that has been picked before it is fully ripe. A high temperature during final curing will scorch the leaf and give it a darker color. The resulting scorched smell is not unpleasant.

TOBACCO ALLOTMENT ..... Begun in the U.S. in the 1930s, a method of production control restricting to particular farms a specific number of acres to be planted in tobacco. Replaced forty years later by a poundage QUOTA system. See also: QUOTA.

TOBACCO BEETLE ..... See: CIGARETTE BEETLE.

TOBACCO CHEMISTS' RESEARCH CONFERENCE ..... TCRC; an annual meeting where papers on progress in the scientific and technical aspects of the tobacco industry are presented. The meeting is held in the autumn at a non-profit-making institution, e.g., a university, and co-sponsored by one of the cigarette manufacturers.

TOBACCO CLASS ..... One of the major divisions of tobacco leaf. See also: CIGARETTE CLASS.

Class 1	Flue-cured tobacco
Class 2	Fire-cured tobacco
Class 3	Air-cured tobacco
Class 4	Cigar filler tobacco
Class 5	Cigar binder tobacco
Class 6	Cigar wrapper tobacco
Class 7	Miscellaneous tobaccos
Class 8	Foreign tobaccos

TOBACCO DUST . . . . . Minute tobacco particles created by tobacco breakage during the many manufacturing processes; the amount of dust in a factory approximates 3–4% of the tobacco turnover.

TOBACCO EXTENDER . . . . . A nontobacco material, natural or synthetic, that is blended with tobacco in the making of smoking products to produce any of a number of desired effects, e.g., cost savings, alteration of smoke constituents, reduction of tar delivery, improvement of physical characteristics of the products, etc. Also referred to as a TOBACCO SUPPLEMENT. See also: NONTOBACCO SMOKING MATERIAL, SYNTHETIC TOBACCO.

TOBACCO FLOWER . . . . . A self-fertilized and easily cross-pollinated reproductive organ of the tobacco plant. The flower of *N. tabacum* is about 2 inches long and pinkish in color; that of *N. rustica* is less than 2 inches in length and yellow to green in color. See Figure 32.

TOBACCO FOIL . . . . . A sheet of RECONSTITUTED TOBACCO.

TOBACCO MASS . . . . . The bulk of tobacco product resting on the bottom head after the mats and top head of the HOGSHEAD have been removed.

TOBACCO MOSAIC VIRUS . . . . . See: MOSAIC.

TOBACCO MOTH . . . . . *Ephestia elutella*; an insect attacking unmanufactured stores of tobacco of high sugar content (e.g., FLUE-CURED and ORIENTAL cigarette tobaccos). Known as the WAREHOUSE MOTH in Europe. See Figure 33.

TOBACCO PROTEIN . . . . . See: PROTEIN.

TOBACCO QUOTA . . . . . See: QUOTA.

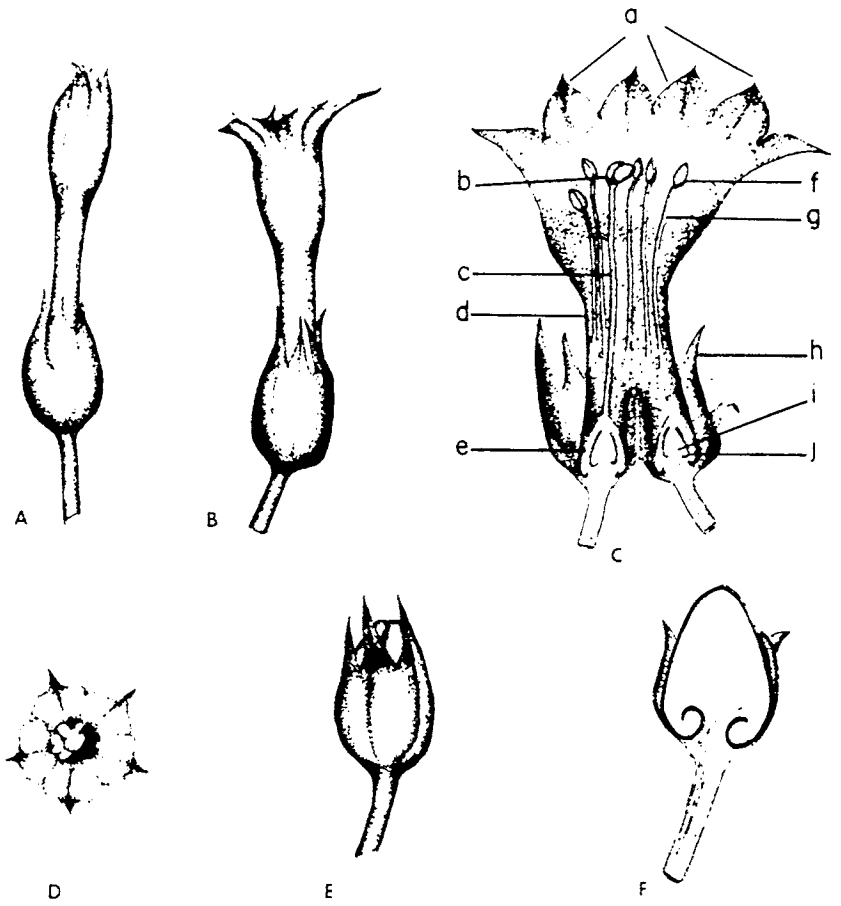


Figure 32

TOBACCO FLOWER. From T. C. Tso's *Physiology and Biochemistry of Tobacco Plants* (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1972), p. 5. Reprinted with permission of Dowden, Hutchinson & Ross, Inc. Parts of tobacco flower and seed pod (magnified about 1½ times): A, unopened flower; B, open flower, longitudinal view; C, flower cut open longitudinally to show essential parts—(a) corolla lobes, (b) stigma, (c) style, (d) corolla tube, (e) ovary, (f) anther, (g) filament, (h) calyx lobe, (i) placenta, and (j) ovules; D, open flower, vertical view; E, seed pod, longitudinal view; and F, seed pod cut open longitudinally to show essential parts. (Drawings by M. O. Neas, after McMurtrey, 1961.)

TOBACCO SEED ..... Tiny seeds from which tobacco plants are grown; 300,000 to 400,000 seeds equal one ounce; one tablespoon can sow 100 square yards. Seed is sown, protected with a cover during germination, and transplanted when the plants are 5–6 inches high.

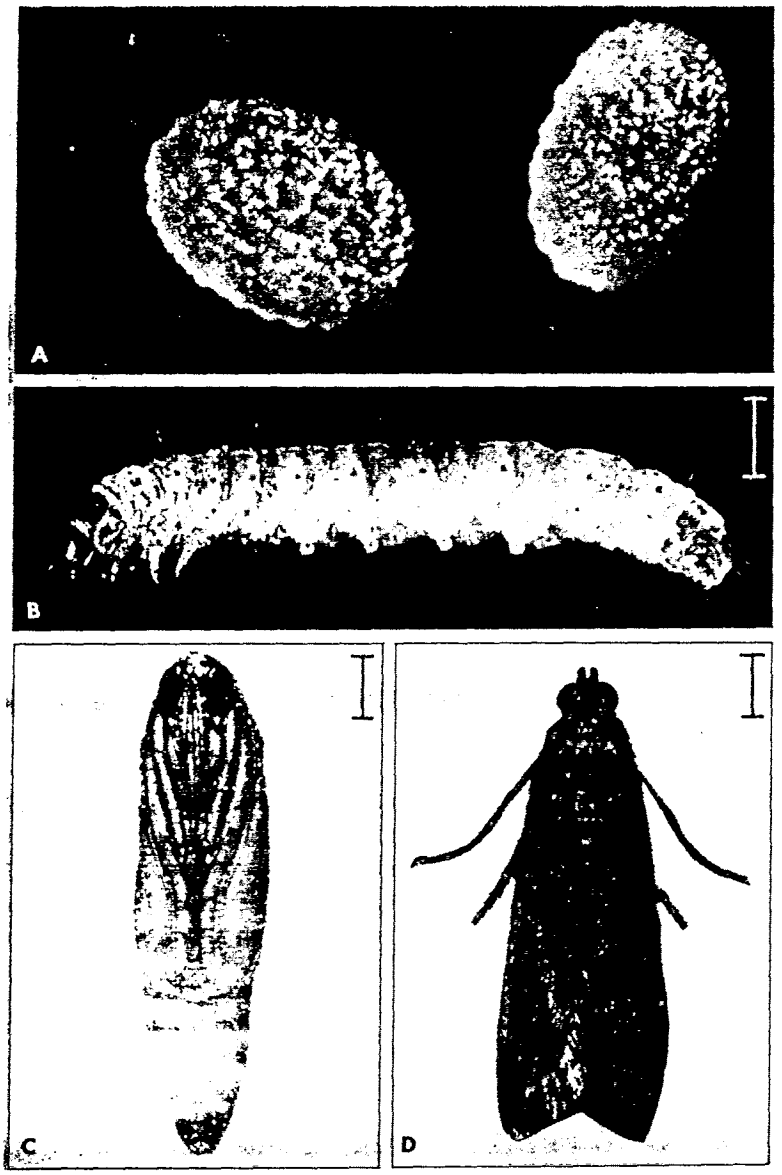


Figure 33

Stages of the tobacco moth: *A*, Eggs; *B*, larva; *C*, pupa; *D*, adult.

TOBACCO SHEET ..... 1) RECONSTITUTED TOBACCO, q.v. 2) A burlap sheet used on the warehouse floor during marketing.

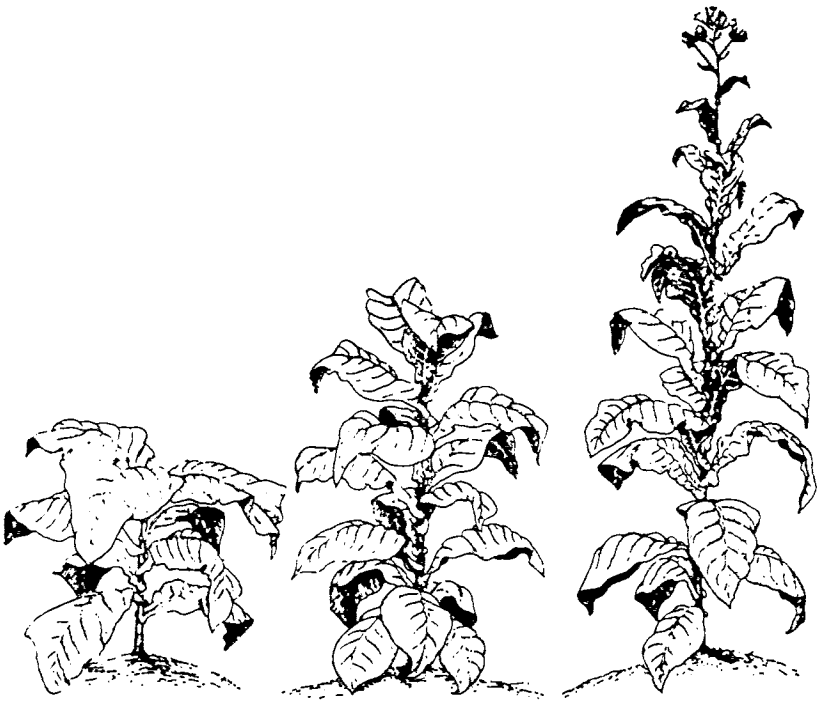


Figure 34

TOPPING. From E. L. Wynder & D. Hoffmann's *Tobacco and Tobacco Smoke* (New York: Academic, 1967), p. 15. Reprinted with permission of Academic Press, Inc.

TOBACCO SUBSTITUTE ..... See: NONTOBACCO SMOKING MATERIAL.

TOBACCO SUPPLEMENT ..... See: TOBACCO EXTENDER.

TOP FLAVORINGS ..... Volatile aromatic flavors applied to cut tobacco after final drying; usually applied in the COOLER. See also: CASING.

TOPPING ..... Removing blossoms and sometimes top leaves of tobacco plants; tends to increase size, thickness, body, and nicotine content of the leaves. See Figure 34.

TOTAL DENIER . . . . . See: DENIER.

TOTAL PARTICULATE MATTER . . . . . TPM; that portion of smoke which is collected on a CAMBRIDGE FILTER. Tso et al. have suggested the following formula as a means of predicting the TPM content of smoke (based on certain leaf characteristics of FLUE-CURED tobacco):

TPM (mg/cig) = 170.16504 (constant)
+ 17.62296 × total polyphenols (%)
− 17.00079 × total phytosterols (mg/g)
+ 50.87225 × pH value
− 5.22681 × sugar (%)
− 0.22681 × trichome (within 3 mm diameter)
+ 16.50523 × leaf thickness (mm)
+ 92.31470 × total nitrogen (%)
− 55.31998 × potassium (%)
− 8.09804 × lipid residue (%)
− 0.18060 × oxalate (meq/g)
− 81.77171 × malate (meq/g)
− 2.64672 × cellulose (%)

[From T. C. Tso's *Physiology and Biochemistry of Tobacco Plants* (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1972), p. 337.] Reprinted with permission of Dowden, Hutchinson & Ross, Inc.

TOW . . . . . CELLULOSE ACETATE processed into bundle form for use in FILTER making.

TOW BUG . . . . . European name for the CIGARETTE BEETLE, q.v.

TRANSFER EFFICIENCY . . . . . The degree to which chemical constituents of tobacco are driven from tobacco into tobacco smoke by volatilization, sublimation, or entrapment. Figure 35 indicates some typical transfer efficiencies for both natural tobacco components and for tobacco additives. The data are based on the amount of component delivered to MAINSTREAM smoke as a function of the amount present in the tobacco consumed during the puff. Also called TRANSFER RATE, TRANSFERENCE RATE.

TRANSFER RATE . . . . . See: TRANSFER EFFICIENCY.

COMPOUND	BP	% TRANSFER (APPROX.)*
Menthol	212° C	39
Nicotine	245° C	24
Glycerol	d. 290° C	22
Neophytadiene	284°C	20
Nornicotine	270°C	8
Dotriacontane	467°C	30
Solanesol	(M.P.) 41.5°C	3

*BASED ON CONTENT IN TOBACCO CONSUMED

Figure 35

TRANSFER PERCENTAGES. From H. Wakeham in I. Schmeltz's *The Chemistry of Tobacco & Tobacco Smoke* (New York: Plenum, 1972), p. 4. Reprinted with permission of Plenum Publishing Corp.

TRANSPARENT LEAF ..... Tobacco that has been so over-conditioned that the cell structure loses its normal characteristics and one can almost see through it.

TRASH ..... The leaves below the LUGS on a BURLEY plant. See also: BURLEY.

TRASHY ..... Leaf of a dry nature that lacks natural oil.

TRIACETIN ..... Glycerol triacetate; PLASTICIZER for CELLULOSE ACETATE fibers in cigarette filters.

TRICHOMES ..... The glandular hairs on a tobacco leaf that give the leaf a sticky surface. See Figure 36.

TRIETHYLENE GLYCOL DIACETATE ..... TEGDA; PLASTICIZER for CELLULOSE ACETATE fibers in cigarette filters.

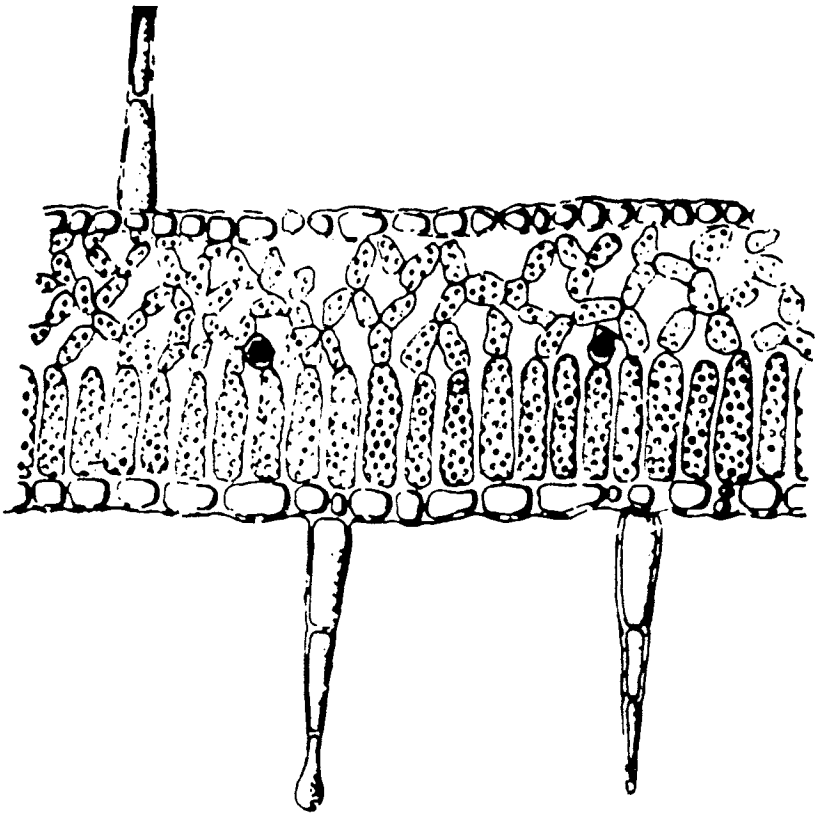


Figure 36

TRICHOMES. From T. C. Tso's *Physiology and Biochemistry of Tobacco Plants* (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1972), p. 4. Reprinted with permission of Dowden, Hutchinson & Ross, Inc.

TRIFU NUMBER . . . . . A determination of tobacco quality made by comparing the ratio between the total reducing substances (reducing sugars) of smoke and the total nitrogen of smoke. The lower the number, the less the quality.

TUBING . . . . . A roll-your-own concept in which the smoker buys empty tubes of paper and makes his own cigarettes by filling them with tobacco himself using a special gadget. See also: ROLL-YOUR-OWN.

TURKISH TOBACCO . . . . . See: ORIENTAL TOBACCO.

TURNING THE TICKET . . . . . The action during auction of a tobacco farmer exercising his right to refuse a sale because he thinks the price is too low.

TWO-FACED TOBACCO . . . . . Leaf that is fairly rich in color on the front side and pale or white on the back. See also: PALE LEAF.

TYING MACHINE . . . . . A labor-saving device during harvesting which stitches tobacco leaves to sticks for curing. Also called a SEWING MACHINE.

UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES . . . . . Research sample cigarettes having different levels of nicotine. Nicotine variability was achieved through the use of special strains of very low nicotine tobacco. No ORIENTAL or MARYLAND types are included in the blend. These cigarettes were developed by, and are for sale to laboratories by, the University of Kentucky. There have been 4 types available: 1A1, 1A2, 1A3, and 1A4. [See below.] However, due to shortages of these cigarettes, a 2A1 type has begun a new series. The 2A1 is similar to the 1A1 except that its nicotine content is slightly higher. A 2A1 cigarette smoked to a butt length of 23 mm delivers approximately 41.3 mg TPM and 0.48 mg nicotine.

	BURLEY		FLUE-CURED		
Sample Code	Low Nicotine	High Nicotine	Low Nicotine	High Nicotine	% Nic. in Cig.
1A1	X		X		0.29
1A2		X		X	1.79
1A3	X			X*	1.25
1A4	X			X*	2.35

* Reference flue-cured used

ALKALOID SERIES CIGARETTES. From *Proceedings of the Tobacco and Health Conference*, Conference Report #2, University of Kentucky (February 1970), p. 29.

UNIVERSITY OF KENTUCKY NICOTINE SERIES CIGARETTES ..... See: UNIVERSITY OF KENTUCKY ALKALOID SERIES CIGARETTES.

UNIVERSITY OF KENTUCKY REFERENCE CIGARETTES ..... Standard reference cigarettes used for biological testing and smoke chemistry studies. Coded 1R1 (first run) and 2R1 (current run), they were developed by the University of Kentucky and are for sale to laboratories by them. At 12% moisture the reference cigarette contains:

Flue-cured lamina	40.1%
Flue-cured stem	14.2%
Burley lamina	24.9%
Turkish (whole leaf)	11.6%
Maryland lamina	1.1%
Glycerin	2.8%
Invert sucrose	5.3%

All physical characteristics were determined in consultation with various cigarette manufacturers.

UPSTALK TOBACCO ..... Leaves above the bottom lower priming leaves or DOWNSTALK, q.v.

VAPOR PHASE ..... See: GAS PHASE.

VEGETABLE WEEVIL ..... *Listroderes costirostris obliquus*; an insect feeding on both the leaves and the stems of young tobacco plants.

VEINS ..... Small stems, radiating from the MIDRIB, that give structural support to the tobacco leaf.

VENTILATION ..... See: AIR DILUTION. See also: DEGREE OF VENTILATION.

VIRGINIA TOBACCO ..... A general reference to FLUE-CURED tobacco grown anywhere in the world; BRIGHT tobacco.

VOID ENDS . . . . . A defect in a manufactured cigarette in which tobacco is missing from the end of the rod. See also: LOOSE ENDS.

WSC . . . . . Whole Smoke Condensate. See: CIGARETTE SMOKE CONDENSATE.

WALNUT LEAF . . . . . A deep dark MAHOGANY leaf of a BURLEY plant indicating strength of smoking characteristics. Better suited for pipe tobacco.

WAREHOUSE MOTH . . . . . European name for the TOBACCO MOTH, q.v.

WEATHER FLECK . . . . . A disease characterized by black, then brown, then white spots, caused by high concentrations of ozone in the air. Also called BLIGHT, PHYSIOLOGICAL LEAF SPOT, OZONE INJURY, and AIR POLLUTION DAMAGE.

WET DOG . . . . . High-chlorine leaf tobacco; also called SALTY.

WET TAILS . . . . . Tobacco that is carrying too much moisture in the tips of the leaves.

WHITE-FRINGED BEETLE . . . . . *Graphognathus spp.*; a beetle which feeds on tobacco roots.

WHITE TOBACCO . . . . . Tobacco that has been grown in unsuitable soil or may have suffered from total lack of nitrogen; the extreme of PALE LEAF, q.v.

WHOLE SMOKE CONDENSATE . . . . . See: CIGARETTE SMOKE CONDENSATE.

WILDFIRE . . . . . *Pseudomonas tabaci*; an infectious bacterium-caused disease characterized by the destruction of chlorophyll, resulting in a yellow halo around the diseased area of the leaf.

WINNOWERS . . . . . Clumps in FILLER that are ejected by the cigarette making machine; includes STEM that has been cut too large. See also: PULL-OUTS.

WIREWORM . . . . . *Conoderus vespertinus*; the tobacco wireworm feeds and tunnels in the roots and stems typically of newly transplanted tobacco.

WOOTTEN REPORT . . . . . An annual statistical report on the domestic cigarette industry prepared by Harry M. Wootten, originally with the Investment Advisory Division of Reynolds & Co. Wootten's published reports began in 1941 in *Printer's Ink* and ended with his death in 1962. See also: MAXWELL REPORT.

WRAPPER . . . . . 1) A film vapor barrier on CIGARETTE PACKS. The wrapping machine receives packs from the CIGARETTE PACKER, attaches TEARTAPE to the wrapper film, and then wraps the package in film. 2) See also: CIGARETTE PAPER.

YELLOWING . . . . . The first stage of flue- or fire-curing. See also: SENESCENCE.

YIELD . . . . . 1) The weight of cured tobacco produced per unit of land; in the U.S., commonly lbs/acre. 2) The weight of tobacco after the REDRYING and GREEN LEAF THRESHING processes. The ratio of STRIP to STEM, and the percentage of loss by way of dust, sand, lint, etc., are both of prime consideration.

APPENDIXES

APPENDIX I: *Tobacco Processing*

The following operations are performed in the order listed. Each term is defined explicitly in the preceding pages.

PREPARING SEEDBEDS
SOWING SEEDBEDS
TRANSPLANTING
TOPPING & SUCKERING
HARVESTING
CURING
GRADING
MARKETING
*STEMMING/THRESHING
REDRYING
PRIZING
AGEING
ORDERING
*STEMMING/THRESHING
BLENDING
FLAVORING: CASING
TOASTING (Burley only)
REORDERING
CUTTING
REORDERING
FLAVORING: TOP FLAVORING
BULKING
MAKING

*The process of STEMMING may be done either before or after storage.

APPENDIX II: *Composition of Cigarette Tobaccos*

Table 6. Representative Analyses of Cigarette Tobaccos (Leaf Web after Aging, Moisturefree Basis) (II)

Component, %[a]	Flue-cured, type 13	Burley, type 31	Maryland, type 32	Turkish[b]
total volatile bases as ammonia	0.282	0.621	0.366	0.289
nicotine	1.93	2.91	1.27	1.05
ammonia	0.019	0.159	0.130	0.105
glutamine as ammonia	0.033	0.035	0.041	0.020
asparagine as ammonia	0.025	0.111	0.016	0.058
α-amino nitrogen as ammonia	0.065	0.203	0.075	0.118
protein nitrogen as ammonia	0.91	1.77	1.61	1.19
nitrate nitrogen as NO_3	trace	1.70	0.087	trace
total nitrogen as ammonia	1.97	3.96	2.80	2.65
pH	5.45	5.80	6.60	4.90
total volatile acids as acetic acid	0.153	0.103	0.090	0.194
formic acid	0.059	0.027	0.022	0.079
malic acid	2.83	6.75	2.43	3.87
citric acid	0.78	8.22	2.98	1.03
oxalic acid	0.81	3.04	2.79	3.16
volatile oils	0.148	0.141	0.140	0.248
alcohol-soluble resins	9.08	9.27	8.94	11.28
reducing sugars as dextrose	22.09	0.21	0.21	12.39
pectin as calcium pectate	6.91	9.91	12.41	6.77
crude fiber	7.88	9.29	21.79	6.63
ash	10.81	24.53	21.98	14.78
calcium as CaO	2.22	8.01	4.79	4.22
potassium as K_2O	2.47	5.22	4.40	2.33
magnesium as MgO	0.36	1.29	1.03	0.69
chlorine as Cl	0.84	0.71	0.26	0.69
phosphorus as P_2O_5	0.51	0.57	0.53	0.47
sulfur as SO_4	1.23	1.98	3.34	1.40
alkalinity of water-soluble ash[c]	15.9	36.2	36.9	22.5

[a] In % except for pH and alkalinity.
[b] Blend of Macedonia, Smyrna, and Samsun types.
[c] Milliliters of 1*N* acid per 100 g tobacco.

Figure 37

From W. R. Harlan and J. M. Moseley in *Kirk-Othmer Encyclopedia of Chemical Technology* (New York: John Wiley & Sons, 1955). Reprinted with permission of John Wiley & Sons, Inc.

APPENDIX III: *Composition of Cigarette Smoke*

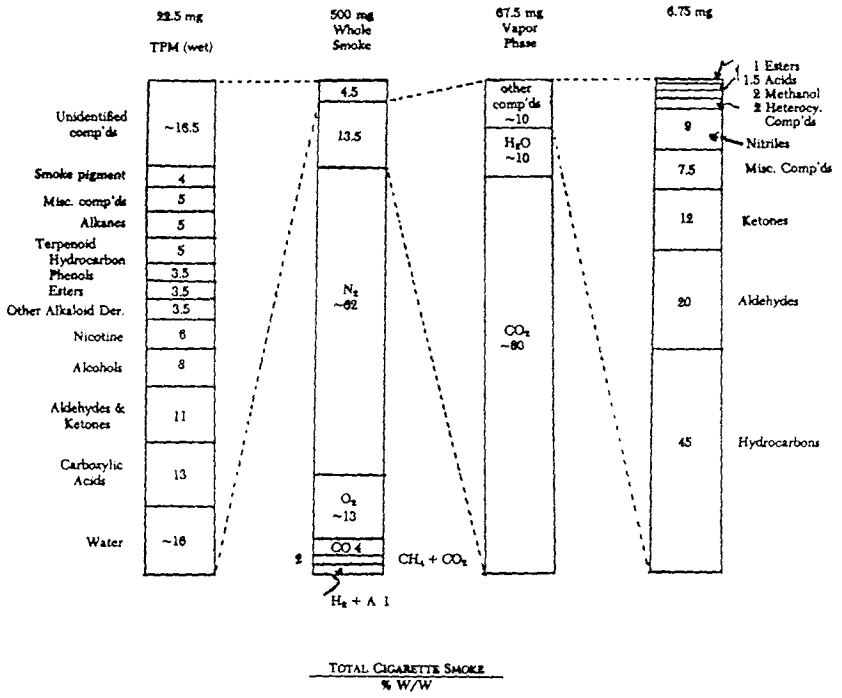


Figure 38

From A. Rodgman's presentation, American Chemical Society, Central North Carolina Section (1969). Reprinted with permission of the author.

APPENDIX IV: *CORESTA Standard and Recommended Methods*

Standard: The Specific Efficiency of Filter Tips for Cigarette Definitions and Measuring Principles (1960)

Standard: The Smoke Yield of a Tobacco Product, Cigarette Definitions and Measuring Principles (1962)

Standard: The Specific Efficiency of Filter Tips for Cigarettes (1963)

Standard Method No. 10: Machine Smoking of Cigarettes, Determination of Crude and Dry Smoke Condensate (1969)

Standard Method No. 12: Determination of Alkaloids in Cigarette Smoke Condensates (1969)

Standard Method No. 13: Determination of Alkaloid Retention by Cigarette Filters (1969)

Standard Method No. 20: Determination of Alkaloids in Manufactured Tobacco (1969)

Recommended Method No. 1: Determination of Dithiocarbamate Residues in Tobacco (1973)

Recommended Method No. 1-bis: Revised Method for the Determination of Dithiocarbamates in Tobacco (1974)

Recommended Method No. 2: Determination of Organochlorine Pesticide Residues in Tobacco (1974)

Recommended Method No. 3: Determination of the Air Permeability of Cigarette Paper (1975)

Recommended Method No. 4: Determination of Maleic Hydrazide Residues in Tobacco (1976)

Recommended Method No. 5: Determination of Carbon Monoxide in the Mainstream Smoke of Cigarettes by Non-Dispersive Infrared Analysis (1982)

Recommended Method No. 6: Measurement of Ventilation: Definitions and Principle of Measurement (1983)

APPENDIX V: *Tobacco Associations*

AMERICAN FARM BUREAU FEDERATION
225 Touhy Avenue
Park Ridge, Illinois 60068

ASSOCIATED TOBACCO MANUFACTURERS
Defunct

ASSOCIATION OF DARK LEAF TOBACCO DEALERS & EXPORTERS
100 North Sixth Street
Springfield, Tennessee 40202

ASSOCIATION SUISSE DES FABRICANTS DE CIGARETTES
Case Postale 212
CH-1700 Fribourg
Switzerland

BAKERY, CONFECTIONERY & TOBACCO WORKERS INTERNATIONAL UNION
10401 Connecticut Avenue
Kensington, Maryland 20895

BRIGHT BELT WAREHOUSE ASSOCIATION
P. O. Box 12004
Raleigh, North Carolina 27605

BURLEY & DARK LEAF TOBACCO EXPORT ASSOCIATION
1100 17th Street NW
Suite 306
Washington, DC 20036

BURLEY AUCTION WAREHOUSE ASSOCIATION
P. O. Box 670
Mount Sterling, Kentucky 40353

BURLEY LEAF TOBACCO DEALERS ASSOCIATION
P. O. Box 428
Maysville, Kentucky 41056

BURLEY STABILIZATION CORPORATION
4320 McCalla Avenue
Knoxville, Tennessee 37914

BURLEY TOBACCO GROWERS COOPERATIVE ASSOCIATION
620 South Broadway
Lexington, Kentucky 40508

CANADIAN TOBACCO MANUFACTURERS' COUNCIL
1808 Sherbrooke Street West
Montreal, Quebec H3H 1E5
Canada

CENTRE DE COOPERATION POUR LES RECHERCHES SCIENTIFIQUES RELATIVES AU TABAC
53 Quai d'Orsay
F-75340 Paris-Cedex 07
France

CIGAR ASSOCIATION OF AMERICA, INC.
1100 17th Street NW
Suite 1201
Washington, DC 20036

CIGAR SMOKERS OF AMERICA
Defunct

COORDINATING BOARD OF TOBACCO TRADE ASSOCIATIONS
Absorbed by NATIONAL ASSOCIATION OF TOBACCO DISTRIBUTORS

COUNCIL FOR TOBACCO RESEARCH-U.S.A.
110 East 59th Street
New York, New York 10022

EASTERN DARK-FIRED TOBACCO GROWERS ASSOCIATION
P. O. Box 517
Springfield, Tennessee 37172

FEDETAB
Ave. de Tervuren 270-272
B-1150 Brussels
Belgium

FLUE-CURED TOBACCO COOPERATIVE STABILIZATION CORPORATION
P. O. Box 12300
Raleigh, North Carolina 27605

INDEPENDENT RETAIL TOBACCONISTS ASSOCIATION OF AMERICA
Defunct

INFOTAB
Fue Montoyer 10, Bte. 2
B-1040 Brussels
Belgium

INTERNATIONAL ASSOCIATION OF PIPE SMOKERS CLUBS
c/o Paul T. Spaniola
647 South Saginaw
Flint, Michigan 48502

LEAF TOBACCO EXPORTERS ASSOCIATION
3716 National Drive
Suite 114
Raleigh, North Carolina 27612

NATIONAL ASSOCIATION OF TOBACCO DISTRIBUTORS
630 Third Avenue
17th Floor
New York, New York 10017

NATIONAL CIGAR LEAF TOBACCO ASSOCIATION
1100 17th Street NW
Washington, DC 20036

NATIONAL TOBACCO TAX ASSOCIATION
Absorbed by NATIONAL ASSOCIATION OF TAX ADMINISTRATORS

NORTH CAROLINA TOBACCO FOUNDATION
North Carolina State University
Office of Foundations & Development
Raleigh, North Carolina 27607

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APPENDIX VI: *Key to Standard Grademarks for Tobacco*

GRADEMARKS	BURLEY	FLUE-CURED
Groups	X-Flyings C-Lugs or Cutters B-Leaf T-Tips M-Mixed N-Nondescript S-Scrap	A-Wrappers B-Leaf H-Smoking Leaf C-Cutters X-Lugs P-Primings M-Mixed Group N-Nondescript S-Scrap
Qualities	1-Choice 2-Fine 3-Good 4-Fair 5-Low	1-Choice 2-Fine 3-Good 4-Fair 5-Low 6-Poor
Colors	L-Buff F-Tan FR-Tannish Red R-Red D-Dark Red K-Variegated M-Mixed V-Greenish VF-Greenish Tan VR-Greenish Red G-Green GF-Green Tan GR-Green Red	L-Lemon LL-Whitish Lemon F-Orange FR-Orange Red R-Red K-Variegated KR-Variegated Scorched G-Green V-Greenish GR-Green Red GK-Green Variegated GG-Grey Green KL-Variegated Lemon KF-Variegated Orange KV-Variegated Greenish KM-Variegated Mixed KD-Variegated Dark Red
Combination Symbols		XL-Lug Side PO-Oxidized Primings XO-Oxidized Lugs or Cutters BO-Oxidized Leaf or Smoking Leaf GL-Thin Bodied Non-descript GF-Medium Bodied Non-descript LP-Lemon (Primings Side) FP-Orange (Primings Side)
Special Symbol		S-Slick

APPENDIX VII: *Species of Nicotiana*

(N. _ _ _)

acaulis	alba	arborea
acuminata	alpina	arentsii
acuta	ameghinoi	asiatica
acutiflora	andicola	attenuata
affinis	angustifolia	aruiculata
alata	anisandra	australiasiae
benavidesii	bonariensis	breviloba
benthamiana	brachyantha	buccinana
berteriana	brachysolen	
bigelovii	breviflora	
caesis	cerinthoides	copiapina
capensis	chilensis	coquimbana
cardiophylla	chinensis	cordifolia
caudata	cirrhoides	corymbosa
caudigera	clevelandii	crispa
cavanillesii	collae	cymaeflora
debneyi	deserticola	dilatata
decurrens	digluta	doniana
exasperata	excelsior	exigua
fastigiata	florida	frigida
fatuhivensis	forgetiana	fruticosa
flexuosa	fragrans	
floribunda	friesii	
gigantea	glutinosa	graciliflora
glandulosa	goodspeedii	greeneana
glauca	gossei	guatemalensis
herzogii	heterophylla	humilis
ingulba	ipomopsiflora	irregularis
knightiana		
lancifolia	linearis	lychnoides
langsdorfii	longibracteata	lyrata
lanuginosa	longiflora	
latissimum	loxensis	

macgillivrayi
macrantha
macrocalyx
maritima
megalosiphon

neesii
nesophila

obtusifolia
occidentalis

pallida
palmeri
pampasana
pandurata
paniculata
parviflora
pauciflora

quadrivalvis

raimondii
repanda
repens

sanderae
scapigera
setchellii
solanifolia

tabacum
tenella
thyrsiflora

undulata

velutina
vincaeflora

wigandioides

ybarrensis

mendocina
mexicana
miersii
minima
minor

noctiflora
nudicaulis

odorata
oligantha

pavonii
persica
petiolaris
petiolata
petuniaeflora
petunioides
philippii

roemeriama
rosulata
rotundifolia

sordida
spegazzinii
stenocarpa
stocktonii

tomentosa
tomentosiformis
torreyana

uspallatensis

virginica
viridiflora

modesta
monticola
multiflora
multivalvis

otophora
oulophylla

pilosa
plantaginea
plumbaginifolia
pulmonarioides
pusilla

ruralis
rusbyi
rustica

suaveolens
sylvestris

trigonophylla
tristis
tuberculata

viscosa

APPENDIX VIII: *Diseases of Tobacco*

NAME	TYPE
Alfalfa mosaic	Virus
Angular leaf spot [*Pseudomonas*]	Fungus
Anthracnose [*Colletotrichum*]	Fungus
Ascochyta leaf spot [*Ascochyta nicotianae*]	Fungus
Aster yellow	Mycoplasma
Bacterial wilt [*Pseudomonas solanacearum*]	Fungus
Barn rot	Fungus
Barn spot [*Cercospora nicotianae*]	Fungus
Bassara	Physiologic disorder
Beet curly top	Virus
Big bud	Mycoplasma
Black fire [*Pseudomonas*]	Fungus
Black leg [*Erwinia caratovora*]	Fungus
Black root rot [*Thielaviopsis basicola*]	Fungus
Black shank [*Phytophthora parasitica*]	Fungus
Blotch [*Fusarium affine*]	Fungus
Blue mould [*Peronospora tabacina*]	Fungus
Broomrape [*Orobanche*]	Parasitic plant
Brown root rot [*Pratylenchus*]	Nematode
Brown spot [*Alternaria alternata*]	Fungus
Bushy top	Virus
Charcoal rot [*Marcrophomina phaseoli*]	Fungus
Club root	Virus
Crown gall [*Agrobacterium tumefaciens*]	Fungus
Cucumber mosaic	Virus
Dagger nematode [*Xiphinema*]	Nematode
Damping-off [*Pythium*]	Fungus
Dead blossom leaf spot [*Sclerotinia sclerotiorum/Botrytis cinerea*]	Fungus
Dodder [*Cuscuta*]	Parasitic plant
Drought spot	Physiologic disorder
Drowning	Physiologic disorder
Etch	Virus
False broomrape	Physiologic disorder
Fasciation [*Corynebacterium fascians*]	Fungus
Frenching	N metabolism

Frog-eye [*Cercospora nicotianae*]	Fungus
Fusarium wilt [*Fusarium oxysporum*]	Fungus
Granville wilt [*Pseudomonas solanacearum*]	Fungus
Green scum	Algae
Guinea-fowl spot	Physiologic disorder
Hollow stalk [*Erwinia caratovora*]	Fungus
House burn	Curing
Leaf curl	Virus
Leaf drop	Physiologic disorder
Leaf scald	Physiologic disorder
Leafy gall [*Corynebacterium fascians*]	Fungus
Necrosis	Virus
Olpidium seedling blight [*Olpidium brassicae*]	Fungus
Peanut stunt	Virus
Philippine bacterial leaf spot [*Pseudomonas aeruginosa*]	Fungus
Phyllosticta leaf spot [*Phyllosticta nicotianae*]	Fungus
Pink mould [*Pyronema*]	Fungus
Pole burn	Curing
Pole sweat	Curing
Rattle	Virus
Ring nematode [*Criconemoides*]	Nematode
Ringspot	Virus
Root-knot nematode [*Meloidogyne*]	Nematode
Rosette	Virus
Rust [*Uredo nicotianae*]	Fungus
Scab [*Fusarium affine*]	Fungus
Shed burn	Curing
Sooty mould [*Fumago vagens*]	Fungus
Sore shin [*Rhizoctonia solani*]	Fungus
Southern stem & root rot [*Sclerotium rolfsii*]	Fungus
Spiral nematode [*Helicotylenchus/Rotylenchus*]	Nematode
Stem-break [*Ditylenchus dipsaci*]	Nematode
Stubby root nematode [*Trichodorus*]	Nematode
Stolbur	Mycoplasma
Stunt	Virus
Stunt nematode [*Tylenchorhyncus*]	Nematode
Streak	Virus
Tobacco cyst nematode [*Heterodora tabacum*]	Nematode
Tobacco etch	Virus

Tobacco mosaic	Virus
Tobacco ringspot	Virus
Tobacco vein mottle	Virus
Tobacco witchweed [*Striga gesneroides*]	Parasitic plant
Tomato spotted wilt	Virus
Vein banding	Virus
Verticillium wilt [*Verticillium albo-atrum*]	Fungus
Weather fleck	Physiologic disorder
White mould [*Erysiphe cichoracearum*]	Fungus
Wildfire [*Pseudomonas*]	Fungus
Wisconsin bacterial leaf spot [*Bacterium melleum*]	Fungus
Wound tumor	Virus
Yellow dwarf	Mycoplasma

APPENDIX IX: *Insects that Plague Tobacco*

NAME	TYPE
Aphid, green peach [*Myzus persicae*]	Above-ground
Beetle, cigarette [*Lasioderma serricorne*]	Storage
Beetle, green June [*Cotinis nitida*]	Soil
Beetle, white-fringed [*Graphognathus spp.*]	Soil
Budworm, tobacco [*Heliothis virescens*]	Above-ground
Corn maggot, seed [*Delia platura; Delia floralis*]	Soil
Cricket, tobacco [*Brachytrupes membranaceus*]	Soil
Cutworm, black [*Agrotis ipsilon*]	Soil
Cutworm, dark-sided [*Euxoa messoria*]	Soil
Cutworm, granulate [*Feltia subterranea*]	Soil
Cutworm, variegated [*Peridroma saucia*]	Soil
Flea beetle, potato [*Epitrix cucumeris*]	Above-ground
Flea beetle, tobacco [*Epitrix hertipennis*]	Above-ground
Fly, crane [*Neolemnophila ultima*]	Soil
Grasshopper	Above-ground
Hornworm, tobacco [*Manduca sexta*]	Above-ground
Looper, cabbage [*Trichoplusia ni*]	Above-ground
Midge [*Hydrogaenus spp.*]	Above-ground
Mite, mold [*Tyrophagus putrescentiae*]	Storage
Mole cricket, Changa [*Scapteriscus vicinus*]	Soil
Mole cricket, Southern [*Scapteriscus acletus*]	Soil
Moth, tobacco [*Ephestia elutella*]	Storage
Slug	Above-ground
Snail	Above-ground
Sod webworm [*Crambus caliginosellus*]	Soil
Stem borer [*Scrobipalpa heliopa*]	Above-ground
Stink bug, brown [*Euschistus servus*]	Above-ground
Stink bug, Southern green [*Nezara viridula*]	Above-ground
Thrips, tobacco [*Frankliniella fusca*]	Above-ground
Tuberworm, potato [*Phthorimaea operculella*]	Above-ground
Weevil, vegetable [*Listroderes costirostris obliquus*]	Above-ground
Whitegrug	Soil
Whitefly	Above-ground
Wireworm, Southern potato [*Conoderus falli*]	Soil
Wireworm, tobacco [*Conoderus vespertinus*]	Soil

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