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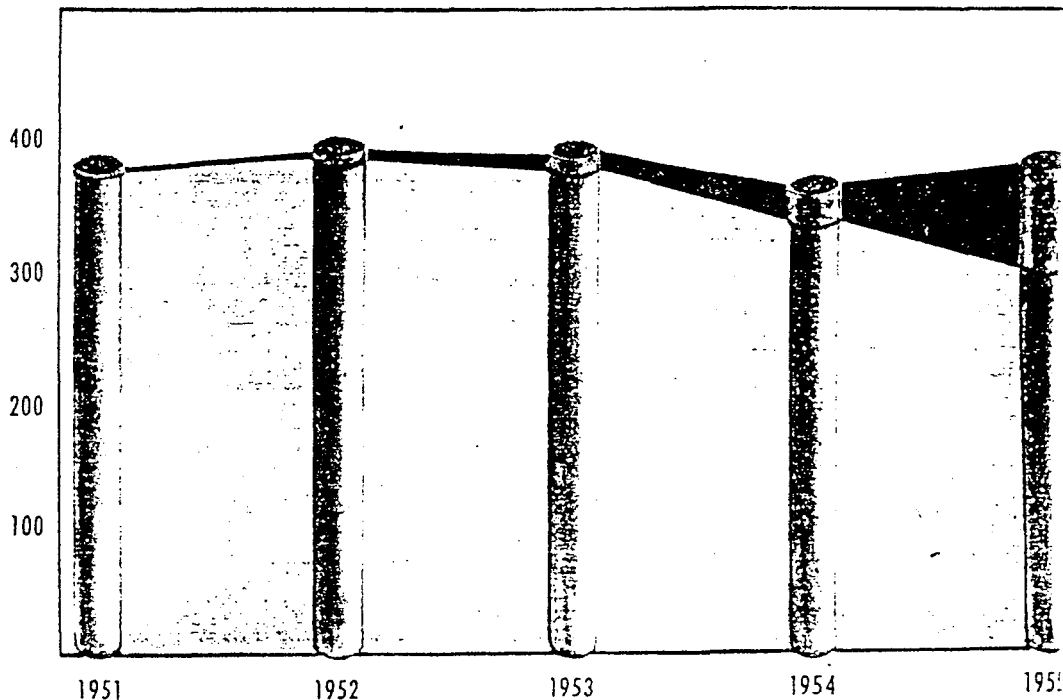
DOCUMENT DESCRIPTION: Trade Journal Article - Growth in Cigarette Filter Consumption - Chemical and Engineering News

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Cigarette Production, Billions

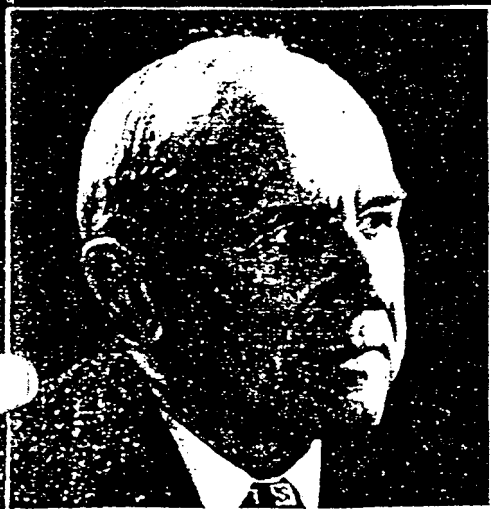


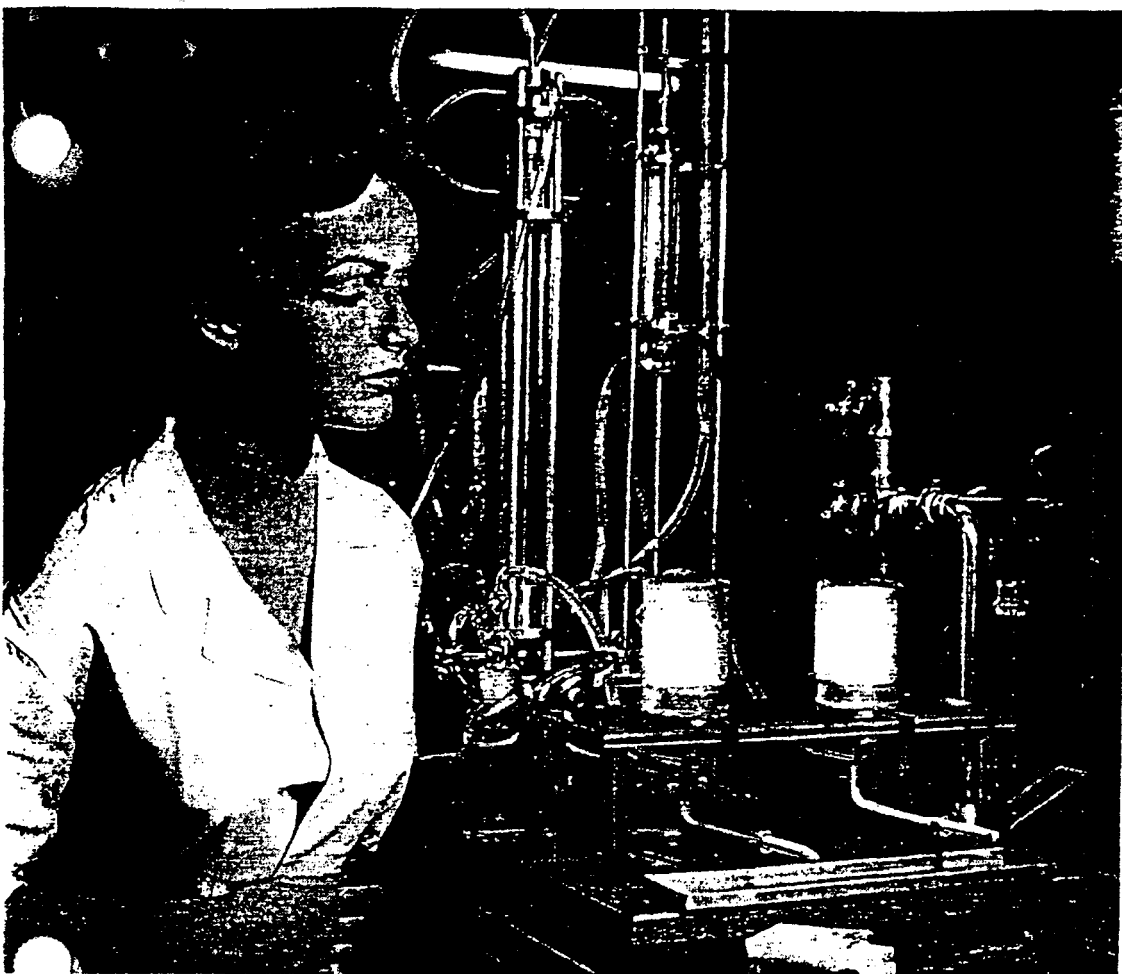
**Growth in Filter-Cigarette Consumption
—to 20% of Market—Opens Chemical
Vistas 1846**

**A New Corporate Pattern to Fit
Stauffer's Growth 1864**

**American Research:
Money to Back Bright Ideas 1916**

**Tailoring Organic Coatings for
Corrosion Control 1922**





Technician at P. Lorillard's Jersey City labs measures amount of tar and nicotine in Kent filter-tip cigarettes

Round, Firm, and Filtered

A fast expanding market for the chemical industry, filter cigarettes last year required more than \$10 million worth of filter materials

BIGGEST NEWS IN CIGARETTES is filters. A look at any cigarette counter tells the story. Now more than a dozen different filter brands await the smoker's choice.

Demand is soaring. In 1951, filter cigarettes accounted for less than 1% of the nation's total tax-paid cigarette output. By 1954, the figure had climbed to 10% and last year reached 20%. This figure may rise to 35% and go even higher. (In Switzerland, some 65% of all cigarettes sold today are filter-tipped.) Once poohpoohed as refinements intended for dilettantes and eccentric millionaires, filter cigarettes have by now gained acceptance among the public.

For the chemical industry, cigarette filter materials have become an increasingly important market, now valued at over \$10 million a year. Last year, for example, some 22 million pounds of cellulose acetate (in the form of a ropelike material consisting of thousands of parallel filaments) were used in filter cigarettes, compared to about 3 million pounds in 1953. Manufactured for the cigarette industry by Tennessee Eastman and Celanese, cellulose acetate is today the most widely used cigarette filter.

Customarily, cellulose acetate filters are treated with so-called plasticizers, which are actually sizing agents. These materials, which stiffen the filaments so

they do not lose their shape when the cigarette is smoked, are another market for the chemical industry. In addition to cellulose acetate, numerous other materials are used in filters.

Over the years, cigarette manufacturers have tested hundreds of possible filter agents. In the words of one cigarette manufacturer: "We have been approached by suppliers of every conceivable type of filter material short of steel and concrete." Cigarette chemists have explored the use of treated paper, diatomaceous earth, activated alumina, silica gel, bentonite, and various mineral fibers. There has also been talk of a plastic filter, possibly made from polyurethane foam.

Millions of smokers (smokers include about 60% of the men in the U. S. and about 30% of the women) use filter cigarettes. On the average, the smoke of filter cigarettes contains about 30% less tar and about 20% less nicotine. Specifically, the smoke of the average unfiltered king-size cigarette contains 23 mg. of tar and 3.3 mg. of nicotine, compared to the smoke of the average king-size cigarette with filter which contains 16 mg. of tar and 2.7 mg. of nicotine.

Early Developments

Despite all the advertising hoopla of the past few years, filters are nothing new. Handmade filter cigarettes were available in Europe by 1900. Later, various filter brands with exotic names like Obak and Imperiale began trickling into the U. S. market. As the first major U. S. development in this field, Benson & Hedges brought out filter-tip Parliament in 1931. Five years later, Brown & Williamson introduced Viceroy.

Throughout these early years, filter brands (then known as mouthpiece cigarettes) continued to be marketed in a relatively sedate, unobtrusive fashion, with an eye on the carriage trade. Then came Lorillard's introduction of Kent in 1952. Amid a splurge of full-

Who Uses What	
Du Maurier Kent L&M Marlboro Viceroy Vogue Winston	Cellulose acetate
Herbert Tareyton	Purified cellulose paper and activated charcoal
Parliament	Absorbent cotton
L&M (with cellulose acetate)	Cellulose powder
Kent (with cellulose acetate and cotton)	Crocidolite (asbestoslike material)
Hale	Cotton impregnated with chlorophyll

page ads, Lorillard announced the unique virtues of Kent's Micronite filter ("developed by researchers in atomic energy plants"). This filter, used during World War II in gas masks and later in the removal of airborne radioactive materials in AEC installations, was reported to be seven times more effective than any other leading cigarette filter. In fact, the original Micronite filter was so effective that it had to be modified; some people felt they were smoking nothing but hot air.

Improvements were continually being made in cigarette filters. Brown & Williamson, which up until 1952 had been using treated crepe paper in its Viceroy, switched to cellulose acetate. As the first cigarette company to use cellulose acetate filters, B&W made a point of promoting the "20,000 individual filters in every Viceroy tip."

Filter cigarettes began catching on fast. In 1953, close to 14 billion were sold in the U. S.—mainly Viceroy, Kent, and Parliament. Although this was still only about 3.5% of the nation's total tax-paid cigarette output, the cigarette industry's Big Three sensed a trend. Liggett & Meyers (Chesterfield) introduced L&M in October 1953; R. J. Reynolds (Camel) launched Winston in March 1954; and five months later American Tobacco (Lucky Strike) brought out filter-tip Herbert Tareyton.

single factor was what the tobacco industry has come to call the Cancer Scare.

Since 1953, widespread newspaper, magazine, radio, and TV coverage has been given to reports that cigarette smoking is a factor in lung cancer, a disease which in the U. S. causes about 25,000 deaths annually. A study of 684 cases of lung cancer indicated that only 1.3% were nonsmokers, while 68% smoked more than one pack a day and over 80% had smoked more than 30 years. In a later study, the American Cancer Society reported that men who smoke cigarettes regularly have seven times the lung cancer death rate of those who never smoke.

Blow to Sales

The public obviously did not take all this with a "tut-tut, so what" attitude. Millions of people suddenly began smoking fewer cigarettes or cut out smoking entirely. Amid all the excitement, cigarette sales, which normally increase about 4 to 6% a year, dropped 2% in 1953 and 4.5% in 1954. As one observer put it: "What quickly helped to pull the cigarette industry out of a tailspin was the immediate public acceptance of filters." In fact last year, to a considerable extent because of filters, cigarette consumption, reversing its two-year downtrend, increased 3.4% over 1954, but was still below the 1952 peak.

With the increasing attention being paid to filter cigarettes, the tobacco industry, as never before, intensified its research on the central problem: the nature of cigarette smoke. As has long



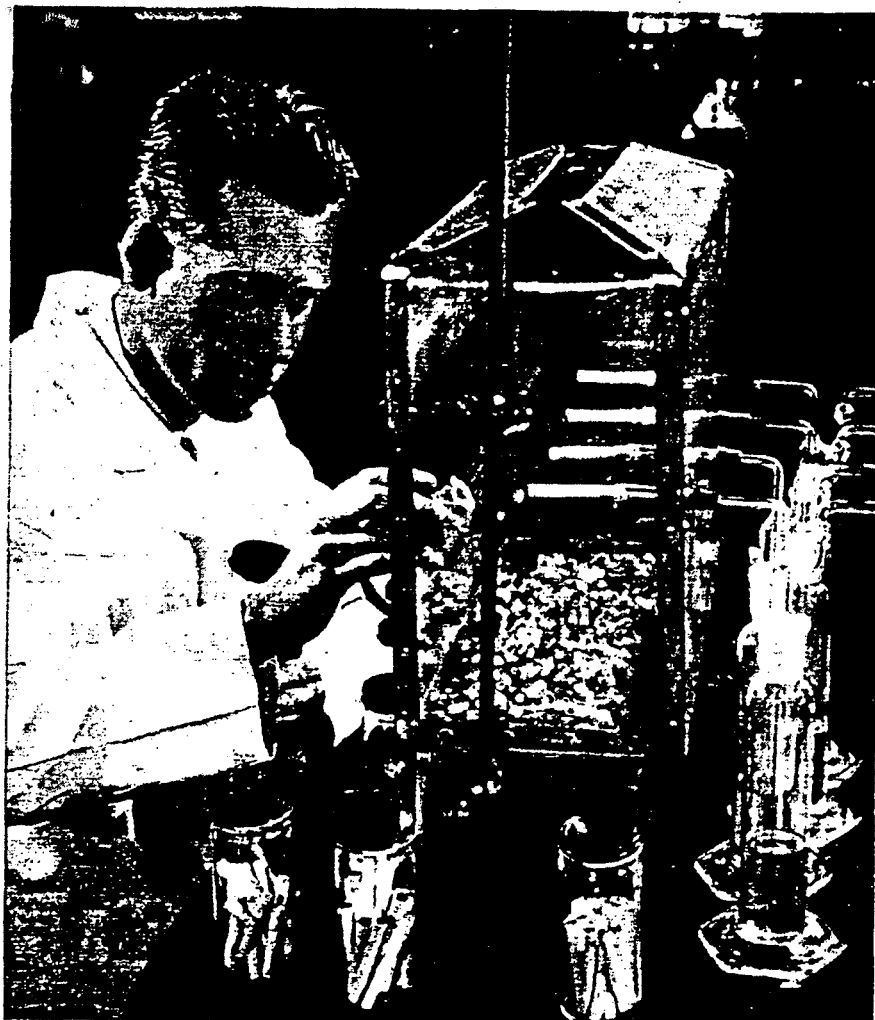
Frank Adams

Hall Syndicate

"Smoking hasn't hurt him physically, but mentally he's a wreck. He's tortured with the fear that his cigarette doesn't have as many filter traps as any other brand. . . ."

Prime Factor: Cancer Scare

Behind all this was not merely the razzle-dazzle of multimillion-dollar advertising campaigns or the capriciousness of public taste. By far the biggest



One of the nation's heaviest cigarette smokers, this smoking machine in the labs of P. Lorillard has tested thousand of cigarettes for smoking qualities and nicotine and tar content as part of the research on Kent cigarettes. Basic material in Kent's filter is Micronite, which filters out particles as small as 0.2μ

been known, this smoke is a complex mixture of gases, liquids, and solids. (A single puff may contain as many as 25 billion smoke particles.) Included among the gases are carbon dioxide, carbon monoxide, carbonyl sulfide, acetylene, methane, ethane, propane, butane, and other compounds. In the liquid and solid phases are the nicotine and tars. (The tars alone contain at least 45 different compounds and many more are suspected.) In the solid and liquid phases are virtually all of the ingredients that give tobacco its characteristic flavor and aroma.

In almost all cases, cigarette filters today are mechanical in action. They trap a portion of the solid and liquid particles, but essentially none of the gases. An exception to this is the Herbert Tareyton filter, which contains activated charcoal to adsorb part of the gases, while a portion of the solids and liquids is trapped by purified cellulose paper.

In cigarette filtration, the manufacturer is not too sure about what he is actually trying to remove. He probably wants to reduce the concentration of the toxic material, nicotine, and of the tar ingredients known to be irritants. And, if one or more compounds are found to be factors in lung cancer, he certainly wants to eliminate these also. But which specific compounds are involved in lung cancer—no one knows for sure. Of course, it does not take a laboratory wizard to develop a filter that will remove massive portions of the smoke. But will the resulting cigarette be so stripped of flavor and aroma that it will not really be worth smoking?

In their continuing search for filters, manufacturers are looking for materials that:

- Will selectively remove from the smoke the unwanted substances, while eliminating a minimum of those that

are not only harmless but contribute to smoking satisfaction

- Are entirely safe materials themselves
- Are tasteless and have an attractive appearance and feel
- Do not interfere appreciably with the flow of cigarette smoke
- Are inexpensive and simple to manufacture and incorporate into cigarettes

Of course, cigarette manufacturers can try entirely different approaches that do not involve filters. One method is the use of special varieties of tobacco. The John Alden brand, for example, is made from tobacco containing a naturally low nicotine content.

As another technique, unwanted ingredients can be greatly reduced during the processing of the tobacco itself. An extraction process is the basis for the low nicotine content of King Sano cigarettes. However, many manufacturers who have experimented with such treatment find it generally unsatisfactory because it can cause downgrading in tobacco quality.

A Chemical Approach

As a different approach, some companies have been experimenting with the impregnation of the filter or cigarette paper with compounds that eliminate unwanted ingredients from tobacco smoke by reacting with them chemically. An example is the recent research of Rand Development Corp., on the addition of ammonium sulfamate to cigarette paper. When subjected to the heat of the burning cigarette, ammonium sulfamate gives off ammonia, which reacts with the reportedly carcinogenic compound, 3,4-benzopyrene, found in low concentration in the smoke of tobacco and cigarette paper.

Obviously, in the competitive cigarette industry, research directors do not make a practice of sounding off about latest research projects. Yet even now there are indications that the chemical approach to the treatment of cigarette smoke is gaining ground. Says the research director of one company: "The cigarette filter of the future will involve selectivity based on chemical reactions. By impregnation of the filter with the proper chemical, the objectionable elements in the smoke can be removed without affecting the other elements that give aroma and satisfaction. . . . We are positive that cigarette filters are here to stay, and we are equally confident that the filter of the future will involve chemicals in the broad sense."