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KILLIAN RESEARCH LABORATORIES, INC.

1949-1955

This segment of research headed by Dr. John A. Killian of Killian Research Laboratories, Inc. began under the sponsorship of Geyer, Newell and Ganger, Inc. of New York. Geyer, Newell and Ganger was an advertising agency that provided services for P. Lorillard Company. Apparently the work was done for Lorillard through this ad agency. A letter dated July 11, 1950 from Dr. Harris B. Parmele of P. Lorillard Company to Mr. Robert M. Ganger, Executive Vice President of P. Lorillard, discussed composing a formal contract with Dr. Killian. (04362090) As per a letter from Dr. Killian to Mr. Ganger dated July 10, 1950, Killian Laboratories would give "their exclusive services on tobacco and all forms of smoking tobacco," and that Lorillard "will have the right to refer any problems pertaining to smoking tobacco within the domains of these sciences to the Killian Laboratories for investigation." (04375077/5081)

The first studies began on March 1, 1949. These studies involved the investigation of certain physical and chemical characteristics of various regular-size (70 mm.) and king-size (85 mm.) commercial brands of cigarettes as compared to Embassy cigarettes, a P. Lorillard king-size brand. The characteristics of the smoke studied were the temperature at the time of inspiration into the smoker's mouth, the relative contents of

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nicotine and resinous compounds, and the balance between acids and bases (acidity). The moisture content and sugar content of the tobacco were also studied, as well as the length of the cigarette and butt length after smoking.

As of the first report dated August 4, 1949 (work done March 1 through July 1), the smoke characteristics listed above were considered to be a function of the cigarette length and butt length. (04354302/4357) Another report related specifically that the temperature of the smoke of the cigarettes was dependent upon the relative lengths, or weights, of smoked portions and of the lengths of the butts. (04354420/4483)

The summary and conclusion in the report dated August 4 indicated, as was the case with future studies, that all of the characteristics were considered with reference to their effect on the acidity of the smoke. Dr. Killian concluded that either some or all of the compounds which he classified as resinous were contributors to the acidity of cigarette smoke. (Dr. Killian referred to tar as "resinous compounds.") Killian also concluded that the smoke of Embassy cigarettes was less acidic (18-44%) than the smoke of the regular, and other king-size, cigarettes. He attributed this to the finding that Embassy cigarettes contained 23 percent less total resinous compounds (64 percent less acideous fraction) than the regular-size cigarettes. The smoke of Old Golds was also found to be less acidic than the smoke from other regular-size cigarettes. (04354302/4357, 04364195/4197)

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Dr. Parmele of P. Lorillard felt that Dr. Killian had confirmed the "well-known" fact that temperature of smoke, as well as nicotine and tar, was a function of butt length and that he had demonstrated that acidity is also a function of butt length. (04364195/4197)

At this point, there was discussion regarding the "physiological advantages" of Killian's findings and mention that if they were to be pursued, "animal experiments should be conducted to prove the point one way or the other; although it may be just as advisable to let matters stand as they are, with the individual involved permitted to draw his own conclusions." (04364195/4197) This statement seemed to be made in the context of advertising claims which appeared to be a major focus in the work performed by Killian Laboratories.

P. Lorillard Company was interested in determining why the smoke from Embassys and Old Golds displayed less acidity than the other popular brands of their size. Dr. Parmele stated, in a letter dated October 7, 1949, that "We are now prepared to state that evidence acquired to date indicated that acidity of smoke and sugar content of tobacco are related." (04364193) More sugar in tobacco was believed to correlate with more acid in smoke and Embassy and Old Gold tobacco contained less sugar than competitive brands.

Other studies involving the comparative acidity of Embassy were performed periodically at least through April 1953

by Dr. Killian. Lorillard also ran tests that duplicated Killian's results. As mentioned in reference to a previous report, Embassy cigarettes were found to have reduced amounts of nicotine, total resinous compounds, and acid tars drawn into the smoker's mouth as compared to popular regular-size cigarettes. Killian stated, "Of these three results, reductions in acid tars are the most important from the standpoint of minimizing irritant actions of cigarette smoke on mucous membranes." (04354368/4401)

The final known "report" of comparative tests on Embassy cigarettes is in the form of a letter from Dr. Parmele to Mr. Ganger dated April 22, 1953. The focus of these studies was to prove a relationship between sugar in tobacco and the acidity of smoke. This involved the analysis of the total sugar in the tobacco and a measure of the acidity of the smoke from various brands of cigarettes, regular- and king-size, including Old Gold and Embassy. As with all other testing, all cigarettes were smoked through 55 mm. Lorillard repeated the total sugar determination and also determined the amount of aldehydes in the smoke. They believed that aldehydes were the "reducing substances" known to exist in cigarette smoke and that they were more irritating to mucous membranes than the weak organic acids in tars. Analyses showed that the more sugar in the original tobacco, the more aldehydes in the smoke. (01143620/3622)

Interest in all previously mentioned findings, as well as other related findings, began to move towards the

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"physiological significance." A letter from Dr. Parmele to Mr. Ganger dated July 19, 1950 mentions some testing to be done by Dr. Killian. Testing was to involve the determination of carbon monoxide in the blood of humans before and after smoking Embassy cigarettes and before and after smoking regular-size cigarettes. In addition, the measurement of finger-tip skin temperature and blood flow, under the same conditions had apparently already begun. It was presumed that these tests were a measurement of nicotine and its removal by the passage of smoke through long and short butt lengths. It was also mentioned in this same letter that Dr. Killian would "attempt to develop ways and means of proving the physiological significance of acid tars, using animals or humans." (04362087/2088)

Around this same time, Dr. Killian began using rabbit eye tests for comparing the irritant actions of smoke from Embassy, Old Gold and various regular-size cigarettes.

Dr. Killian set up physiological studies by "outside" corroborators in order to confirm his results. Dr. Irving Glass carried out skin temperature and blood flow experiments, Dr. A. Wilbur Duryee provided consultations and analyses of data on these studies, and Dr. Martin Cohen performed rabbit eye tests. At this point, no results could be found within the documents on Killian's studies or those performed by "outside" corroborators. One document dated January 29, 1951 does mention "new information brought to light by Dr. Killian, wherein he definitely shows that

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Old Gold smoke is less toxic and less irritating than smoke from other brands." (01143673/3674)

Dr. Killian eventually began comparative analytical and "physiological" studies involving Kent cigarettes with the micronite filter. Killian began tests with Kent in which Kent was compared to Viceroy and Parliament in relation to the removal of tar and nicotine by the micronite filter. A letter from Dr. Parmele to Dr. Ganger, dated January 25, 1952, discusses the results of one such study. Smoking 53 millimeters of the cigarettes showed that 10.7 milligrams of tar were retained by the micronite filter, while the Parliament and Viceroy filters retained only 0.4 and 0.9 of a milligram, respectively. A removal of 60 percent of the nicotine was obtained by the micronite filter, whereas the filters of Viceroy and Parliament showed no removal for nicotine. (01143657/3658)

In June 1952, Dr. Killian and P. Lorillard proceeded towards "physiological" testing involving a comparison between Kent and other brands such as Parliament and Viceroy. Tests were performed for the determinations of the effects upon the peripheral vascular system (blood flow and skin temperature) of Kent cigarettes and this was compared to the effects of Parliament and Viceroy. An initial test on one individual involving finger-tip skin temperature showed no drop in temperature when smoking Kent, but a drop of 3.5°F. when smoking Parliament. (01143656)

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Dr. Killian found in a skin temperature test that "when sensitive individuals smoked Kent cigarettes, there was no drop in finger-tip skin temperatures, whereas, when these same people smoked either Parliament or Viceroy cigarettes, their skin temperatures dropped on the average six (6) or or seven (7) degrees Fahrenheit." (01143651/3654) Dr. J. Murray Steele of New York University Medical Division was contracted by P. Lorillard to run confirmatory tests. In thirteen out of seventeen cases, the subjects showed less finger-tip skin temperature drop when smoking Kents than when smoking Parliament or Viceroy. Contrary to Dr. Killian's results, Dr. Steele found some skin temperature drop in eleven out of seventeen subjects when smoking Kent. The conclusion was that "the skin temperature drop induced by smoking Parliaments or Viceroy is twice that encountered when the same subjects smoked Kents." (01143651/3654)

Dr. Killian also began measuring the smoke irritability of Kent smoke, as well as that of Parliament and Viceroy, using the rabbit eye test while continuing to conduct skin temperature tests as well. He found "practically no irritation with the smoke of either Parliaments or Viceroy." (01143650) Unfiltered smoke from Kent, Parliament and Viceroy was also tested for irritation. In the rabbit eye test, the degree of irritation was equal. In light of the work with the filtered version of these cigarettes, it was concluded that the "micronite filter effectively removes the irritating principals." (01143647/3648)



Dr. Killian began testing Kent cigarettes with various filter efficiencies for their effect on skin temperature and irritability. The "original" filtering efficiency of Kent was said to be 60 percent, skin temperature tests showed no evidence of skin temperature (finger-tip) drop with Kents with an efficiency of 50 percent. (01143650) Special Kent cigarettes with a filtration efficiency in the low thirties gave indications of being slightly irritable in the rabbit eye test and slightly toxic to sensitive human subjects by the skin temperature test; while those with an efficiency in the high thirties "gave no indication of irritation or toxicity by the rabbit eye and skin temperature tests, respectively." (01143644/3645)

Further studies were conducted on Kent cigarettes with the micronite filter in relation to skin temperature. Dr. Killian found that the micronite filter removes sufficient nicotine from the smoke to eliminate any decrease in skin temperature of sensitive people, but when the filter is removed from the cigarettes, the skin temperature drop increases proportionately to the amount of cigarette smoked. As Dr. Parmele stated in a letter to Mr. Ganger dated December 9, 1952, "the Micronite filter currently used is efficient enough to obscure vasoconstriction as evidenced by skin temperature measurements." (01143639/3640) It was also determined that 40 percent nicotine removal was "sufficient" to produce a completely negative skin temperature reaction in sensitive smokers.

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Work continued along the line of comparing Kent with other commercial brands in relation to smoke analysis and effects on the peripheral vascular system at least through December 1954, but the information is "sketchy." Indications were such that much of this work, as well as that previously mentioned with Embassy cigarettes, was for the purpose of monitoring/comparing the brands and having a basis for advertising claims.

Dr. Killian began a project in January 1954 involving the treatment of tobacco for Old Gold cigarettes. A progress report in the form of a letter to Mr. Philip Lennen of Lennen and Newell dated March 17, 1954 gives some information on the project. This project involving the treatment of tobacco with nitrates was set up through Lennen and Newell Advertising Agency and was to be a collaboration between P. Lorillard and Killian Research Laboratories.

Old Gold cigarettes made from tobacco treated with potassium nitrate showed no reduction in tars and about 15 percent reduction in nicotine compared to regular Old Golds. Cigarettes made of tobacco treated with 10 percent diethylene-dinitrate showed a 50 percent decrease in tars and a 25 percent decrease in nicotine in the smoke as compared to untreated cigarettes.

Tests were planned in which they would decrease the amount of diethylene nitrate used for treatment to 5 percent and

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then 2.5 percent if substantial reductions were obtained. No results were found for these tests. (01141276/1278)

The contract, and therefore the research, with Killian Research Laboratories was terminated on December 31, 1954; however, with the agreement of an advance notice of ninety (90) days, Dr. Killian considered the date to be March 11, 1955.

Most of the research performed by Dr. John Killian at Killian Research Laboratories was not considered responsive; however, some documents were produced. Without other documents within the same file to provide additional information, these documents would have appeared responsive. Such documents were those that mentioned "physiological significance" or testing in general terms rather than in terms of specific irritation or circulatory tests that other documents mentioned. Other produced documents involved the small distinct projects carried out by Killian which appeared to be smoke modification and therefore were responsive.

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