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CIGARETTE SMOKE AS A HEALTH HAZARD

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It has been said frequently, and with some justification, that the medical profession broke faith with the public in failing to inveigh vigorously against smoking as a menace to health. But it can never be held against our profession that it permitted itself, even by implication, to be involved in the endorsement of a tobacco product.

The cigarette industry is not a commodity business; by this I mean that the individual manufacturer makes no honest, wholehearted effort to claim a commodity better than his competitors. Each makes a cigarette that he feels will satisfy the public taste; he proceeds to exploit it by a type of advertising that concerns itself not at all with the inherent qualities of the commodity. In its truest sense the manufacturer's real commodity must never be discussed; it is taboo. A little reflection reveals the real commodity to be smoke—the dry, destructive distillation of wood (leaves); and what this smoke contains must be sung *sotto voce*. And so, carbon monoxide, ammonia, prussic acid, acetic acid, aldehydes including acrolein, the alkaloid nicotine and pyrrol, pyridine and other heterocyclic nitrogenous bases (generically grouped under the term "tars"), all products of the distillation and contained in the smoke, had best be forgotten for the greater happiness, perhaps, of the consuming public.

The manufacturer who sets out to make a more healthful cigarette must be prepared, however, to face these facts and to square his claims with them, at least when making these claims directly to our profession. The smoker knows, from practical experience, that old cigarettes produce a less agreeable smoke than fresh ones. The difference between the stale and fresh cigarette is simply one of water content of the tobacco. The cigarette stales by giving up original water content. To help maintain this original water content against the inevitable drying out, the manufacturer incorporates a hygroscopic agent in the tobacco mixture. The agent generally used is glycerine. Since the late Thomas Edison lent his name to the assertion that the most harmful product of cigarette combustion was acrolein, glycerine as one probable source of this compound became widely objectionable. But decades of smoking glycerinated tobacco has proven the human organism fairly tolerant to the mixture containing it. Recently a manufacturer has substituted diethylene glycol for glycerine as a hygroscopic agent. The maker of a tobacco mixture containing a new combustible is at once on the defensive, at least from the point of view of public health, in that he has yet to know—if ever—that the new mixture is no more harmful than the old and tried mixture. And it is to the credit of that manufacturer that he set about to establish[1,2] the harmlessness of this innovation. With the aid of the scientific ingenuity of a medical school laboratory, the demonstration was offered that not only did the new hygroscopic agent in the tobacco mixture produce a smoke less irritating than a similar mixture containing glycerine, but even less irritating than one containing no hygroscopic agent at all. This was all "proven" by judging the degree of edema of the conjunctivae of rabbits resulting from instilling into the eyes of these rabbits a water extract of the smoke from these different tobacco mixtures.

Without going into the character of the laboratory procedures for securing comparable smoke mixtures, these tests in the last analysis, were based on the judgment of an observer as to the amount of conjunctival edema induced in each experiment. All this, when there is at hand to every smoker, without benefit of medical school or laboratory, a test, fairer and more delicate; fairer, because it does not limit the test to the water soluble ingredients of the smoke, and more delicate, because the olfactory nerve ends in the mucous membrane of the nose are far more efficient than the eye for detecting irritating smoke. Indeed, that is precisely part of the job of these nerve

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ends. When cigarettes made with diethylene glycol were so tested by the writer and several others (smoke quickly drawn up through the posterior pharynx and exhaled through the nose), they were found, unfortunately, to be quite as irritating as other cigarettes. Strangely enough, this simple test is as scientific* as that published in behalf of the diethylene glycol cigarettes. We do not wish to stress the reliability of these judgments, but simply to call attention to the fact that where elaborate laboratory procedures merely eventuate in a judgment based on an elemental sensation, these findings may be adequately checked in simple ways.

It may fairly be asked if, in the nature of things and viewed from the vantage ground of strict business, cigarette manufacturers can offer anything better or more certain to effect improvement in quality than changes of the nature we have been discussing. The answer is decidedly in the affirmative.

The writer has been interested in tobacco smoke chemistry for about ten years, during which time consultations with many executives in the industry have afforded occasional opportunities to penetrate the veil of secrecy generally assumed before outsiders, particularly physicians. The following is presented as a physician's analysis of the cigarette industry, viewed as a public health problem.

The tobacco industry, like all others, concerns itself with making money. It is an industry centuries old, steeped in an art that defies the amateurish dabblings of intruders and hypnotized into a belief in the sacredness of the leaves that are cured and blended. This latter spirit it has successfully striven to instill in the consuming public, with the result that there has been achieved for the industry a false public psychology, from which the industry, unmolested, or if you will, unassisted, will never dare retreat. The belief that cigarettes contain only pure, unadulterated tobacco is almost universal among smokers, and while vaguely aware of flavorings in tobacco mixtures, they are blissfully ignorant of the ungodly messes of which they are composed. Having once taken the position that smoke quality is merely a matter of the quality and purity of tobacco, there is no place for publicity on the adulterants used in making the cigarette as good and as acceptable as it is.

What cannot be achieved by the art is attempted by suggestion through the printed word. Tobacco smoke is a mucous membrane irritant, if nothing else; and even the most confirmed smoker realizes that on occasion. And so each cigarette maker, after the manner of his copy writer, cries "It's mild." In seeking mildness the industry is endeavoring to meet a universal demand; irritating smoke drives the smoker to try another brand, with little or no relief, however, and so the industry is prepared to make any change in manufacturing that will give the requisite mildness, provided: (1) It does not at the same time produce a flatness of taste and odor which robs smoking of its "kick;" (2) it does not rob the smoke of such tasteless ingredients as some tobacconists hold responsible for maintaining and cultivating the smoking habit (nicotine?);† (3) and provided the added treatment is of such a nature as to permit of publicity in keeping with the consumer's psychology of "the purer the tobacco, the better the cigarette!" Above all else, it must supply this advertising copy which is the life blood of the business.

Without entering into the bases for his belief the writer is satisfied that a tobacco smoke less harmful physiologically yet acceptable to the average smoker's taste will not result from a change in the combustion mixture, either through a change in the curing or blending of the tobacco leaf or the introduction of some new combustible into the tobacco mixture. This is exactly the approach to the general problem of tobacco production through the decades that has brought the cigarette to its present state of excellence, or the lack of it. There remains a simpler yet perfect approach to a solution—filtration of the smoke.

* Says the *Popular Science Monthly* of March 1935, concerning the professional taster of soap mixtures: "Despite its apparent crudity, this test is said to show the amount of free alkalinity in the soap with high precision, revealing in a moment what would otherwise require three to four hours of laboratory work."

† This, however, is a mistaken notion; there is never a physiologic craving for tobacco.

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Removal of combustion products from the smoke stream may be effected by purely physical methods, or by the operation of physicochemical principles (absorbents). The former is merely a matter of supplying condensation surface to the smoke before it reaches the mouth. This may be accomplished by the use of cigarette holders or hollow tipped cigarettes containing small cotton plugs, but their use practically limits the removal of deleterious substances to the smoke tars. However, the consumer has evinced little interest in the use of any contrivance that produces a more physiologically tolerable smoke if by so doing it adds an atmosphere of artificiality to a habit which has become second nature. This has confirmed the tobacconist in his conviction that a smoker does not smoke for his health, and that unnecessary fuss detracts from his enjoyment of a "good smoke."

Patent grants relative to the tobacco industry liberally cover the matter of adding absorbent materials to tobacco mixtures. In the main these materials are clays or claylike substances. It would lead us too far astray to enter into the reasons why most of these offered additions to the art cannot practically serve the purposes for which they are offered. They all represent a proper approach from the medical standpoint in the effort toward producing a less harmful smoke.

It is apparent that filtered smoke can only be insidiously thrust upon the public. This requires the filter to be dispersed through the tobacco by way of one of these physicochemical absorbents. The writer has spent much time in the study of tobacco smoke absorbents and feels certain that there is at least one substance available for addition to tobacco that meets all the requirements. It is noncombustible and therefore takes no part in the formation of the combustion products. It effects recognizable changes in the smoke when added to tobacco, to an extent of less than 1 part in 500; in even this small concentration it reduces the tar and acid content of the smoke, effecting mildness without flatness. Since the amount of filtration is a function of the concentration of the filtering material in the tobacco mixture, such a treatment of tobacco permits of effects upon smoke ranging from imperceptible influences on its original chemistry to one so thorough as to leave the smoke completely tasteless.

The medical profession, if it is to concern itself in the matter at all, should take the following position regarding cigarettes: Tobacco smoke cannot be considered harmless. The manufacturers of tobacco products are to be encouraged in their efforts to modify the art in behalf of a more harmless smoke, but, however good the achievement, the introduction of a filtering material into the smoke stream will effect a still safer smoke. The profession should assist in the production of consumers' psychology sympathetic to the introduction of filters into cigarettes.

The physicians of the United States never have endorsed a tobacco product and probably never will, but they should be prepared to endorse and encourage the use of principles in the practice of the art where it is evident that such practices lead to the production of a less harmful smoke.

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2. *Laryngoscope*, 45:149, 1935.

DrFarrell.com

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