

23rd April, 1963.

HISTORY OF THE DEVELOPMENT OF THE KEY
IDEAS IN PROJECT ARIEL.

1. I had naturally been pondering this idea for some considerable time but the first definite description of the concept is contained in a note dated 1st June, 1961, sent to Mr. Hobson. [Ref. MAD HATTER III, File 2, encl.30.] The opening paragraph is :-

"The thought behind this research is that there may be an alternative and better way of obtaining the benefits of smoking than by using a cigarette and, in particular, a way which will avoid the inconveniences of the smoke and ash. Thus we envisage something which will have the psychological and social attributes of the present cigarette and which, although not being lit, can be "smoked" so as to give a vapour of suitable taste and smell carrying with it nicotine in the amount smokers are accustomed to."

Then later, on page 6 -

"We should then want to devise some way of making the aerosol available in a form which would also satisfy the psychological aspects of smoking. This does not seem to be impossible, and this point may be illustrated by referring to a possible device although this would only be at the very best a first step towards a solution.

My present ideas are to have a tube of the dimensions and appearance of a cigarette which would be airtight and filled with a mixture of tobacco and some material X, or with X and some non-inflammable support on which nicotine had been deposited. Both ends of this device would be closed. To use this "cigarette" the ends would be pierced, and it would be puffed like an ordinary cigarette. The first puff would take in a quantity of air, and the oxygen in the air would react immediately with the substance X, which would have been chosen precisely to give no volatile products but only heat.

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"The heat so generated would be at too low a temperature to burn the tobacco but sufficient to liberate a certain amount of the nicotine and tobacco flavours. Thus the smoker would obtain a puff of air bearing nicotine, tobacco flavour, together with any other flavouring matter that had been added. After about 10 or 15 puffs the "cigarette", still having the same outward appearance, would be used up and all of the substance X would have been consumed."

I worked further at this concept, and discussed it with Battelle when I visited them in September, 1961, the result being that they produced on the 27th October a draft proposal for research on this Project ARIEL.

Records show that I worked on this with them until the proposal culminated in a final form, dated 3rd January, 1962. Work started on March 1st, 1962.

2. The first report by Schachner and Williamson, dated June 20th, 1962, contains the first reference to the idea of an inner tube containing tobacco or nicotine-bearing material from which nicotine is liberated by heat generated by the burning of some material in a surrounding tube. Various devices are shown in Fig. 3 in this report. This report also contains references to the necessity for forming a nicotine aerosol by self-condensation, or a nicotine containing aerosol by condensation on the particles of some other aerosol. It is clearly pointed out that only by the use of an aerosol can a reasonable amount of nicotine be got to the mouth of the smoker. In this report there is also clear mention of the "smoke-forming chamber", which we subsequently called the "nucleating chamber".

On 27th June, 1962, Dr. Haselbach visited me at home and I made a note of my discussions with him [ARIEL I, file 1, encl. 58], in which is contained this reference to Schachner and Williamson:-

"They have already come up with the following quite promising idea.

The idea is that the outside cylinder would be ignited and would then smoulder peacefully away, thereby transferring enough heat to the inner tube to make

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"it possible to draw in some of the nicotine. It might well be necessary to adjust the moisture content of the inner rag, and possibly increase the smoulder rate of the outside tobacco.

This device is attractive because it would have the outside appearance and smoulder appearance of a cigarette, and even give some tobacco aroma from the side stream. The absence of visible smoke from the "main-stream" would be scarcely noticeable."

3. The conclusion from this is that the overall concept of a device providing nicotine without the combustion products of tobacco, but yet which has many of the social and psychological attractions of a cigarette, is due to Charles Ellis. He is also responsible for the idea of a mixture of pyrophoric material with tobacco.

Schachner and Williamson jointly are responsible for the idea of the inner tube of nicotine-bearing material with the outer wrapper to provide the heat, and are also responsible for the concept of the nucleating chamber.

4. Throughout the whole of this work to date there has been a close liaison between Charles Ellis, Schachner and Williamson, with frequent visits and interchange of reports.

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