SMOKING and HEALTH†

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Imagine the surprise of Christopher Columbus and the members of his crew, when, on their first trip to the New World in 1492, they saw natives blowing smoke from their mouths and noses ! It was in this way that Europeans gained their first knowledge of tobacco, and its use in smoking. The Indians had learned to wrap the tobacco leaves in the delicate inner husks of maize, thus making crude cigars. Others explorers in various parts of the New World found that tobacco was being cultivated and used by the aborigines. The superstitious New World Indians credited tobacco with having various mysterious properties and medicinal effects.

It is easy to understand the attention attracted by returning explorers, as they demonstrated in Europe the mysterious American plant which could be smoked with supposed beneficial effects. The first tobacco was brought to the old world in 1558 when Francisco Fernandes carried some to Spain upon his return. The following years, Jean (from whose name the word "nicotine" is derived), introduced tobacco into France, and in 1585, Sir Francis Drake and Ralph Lane took it with them to England. From these simple introductions, the use of tobacco spread rapidly through the countries of Europe and even the Orient.

It wasn't until the 1800's that some people began to recognize that the effects of tobacco smoking might not always be good. "The American Medical Gazette," (1861) describes a study of students smoking conducted among the pupils of the Polytechnic School in Paris.

Dividing the young gentlemen of that college into groups, the smokers and the nonsmokers, it is shown that the smokers have proved themselves in the various competitions, examination far inferior to the others. Not only in the examinations on entering the school are the smokers in a lower rank, but in various ordeals they have to pass in a year, the average rank of the smokers had constantly fallen, and not inconsiderably, while the men that did not smoke enjoyed a cerebral atmosphere of the clearest kind.

A woman by the name of Ellen White, (1866) felt of some to be unusually gifted, wrote of tobacco as a "slow, but sure and deadly poison." This same woman wrote further of tobacco as a "slow, insidious, but most malignant poison." (Ellen White 1905)

However the Big Blast against smoking came, with the report of the Surgeon General of the United States. (1964)

The purpose of this presentation is to

1. Review some of the physiology and pathology associated with smoking.
2. See what the medical world, and other authorities have had to say about the effects of smoking since the 1964 report.
3. Raise questions on the value of smoking to the average Nepali citizen, and the contribution of the smoking industry to the strength of Nepal, and
4. Explore together some of the possible ways in which enlightenment along these lines may be carried out.

Tobacco smoke contains up to 27 poisons that a smoker inhales into his lungs; we will here consider only three: Nicotine, Carbon monoxide, and Coal tar,

There is enough nicotine in one regular-sized cigarette,—if extracted, placed in a soluble solution, and injected into the blood stream, to kill person in 60 seconds. The first action of nicotine we will review is its action on the transmission of nerve impulses. In the brain alone are 15 to 16 billion nerve cells, each with its axone, dendrites, and synapses. It is the release of acetyl choline at the synapse that is responsible for the transmission of nerve impulses. Nicotine acts at the synapse, depresses the release of acetyl choline, and thereby produces a depression paralysis of nerve impulse transmission. The action takes place throughout the entire autonomic nervous system, producing, first, a transient stimulation, and then a prolonged paralysis. In the peripheral blood vessels, for example, there is first a transient dilation, producing a sense of warmth, followed by a prolonged period of constriction, lasting as long as 30 minutes. This results in a drop in temperature of the fingers of from 2 to 5 degrees centigrade, and a drop in the temperature of the toes of from 3 to 7 degrees.

The net result on the cardiovascular system, is first, an increase of blood pressure of 10 to 25 mm. systolic; second, an increased heart rate, of 5 to 20 beats per minute; third alterations in cardiac rhythms, as described by Greenspan et al (1969) and summarized as follows:

The results of this study suggest the theoretical possibility of still another manner in which nicotine may effect a decrease in longevity.

The simultaneous production of enhanced ectopic pacemaker activity and the production of slowed conduction, in both Purkinje's and ventricular fibers, would predispose to the development of serious, possibly fatal arrhythmia

The second action of nicotine we will review is its action to bring about an increased cholesterol blood level, leading to more rapid development of atherosclerosis. Quoting from Dr. M. R. Pandey, (1969)

The role to cigarette smoking seems certain. Epidemiological studies have definitely shown that coronary heart disease is two to six times commoner among smokers than among non-smokers, and the risk increases in proportion with the number of cigarettes smoked... Nicotine releases catecholamines and thereby elevates blood lipid level and facilitates clotting. 6

We can add, then, a fourth effect on the cardiovascular system: A predisposition to coronary artery disease. (At this point four slides were shown on coronary disease.)

Carbon monoxide, as you know, is produced with incomplete combustion. There is enough carbon monoxide in cigarette smoke to produce a significant amount of carboxyhaemoglobin, resulting in decreased available oxygen. Assuming, 95% oxygen, saturation of red blood cells to be normal (100% is seldom achieved), smoking 20 cigarettes a day decreases the available oxygen to 88% of normal, while smoking 40 cigarettes a day decreases the available oxygen to 75% of normal. Or, to put it another way, a person smoking 20 cigarettes a day at sea level would have the same blood oxygen levels as a non-smoker at 8,000 feet, and a person smoking 40 cigarettes a day at sea level would have the same blood oxygen levels as a non-smoker at 16,000 feet, -all other factors being equal. This was demonstrated in an article by Chevalier et, al (1966) summarized as follows:

Differences have been found in the cardiopulmonary responses to exercise between young male cigarette smokers. The present study was undertaken in an attempt to determine the cause of such differences. Since smokers carry a chronically elevated carboxyhaemoglobin level (greater than 4%), carbon monoxide was inhaled by nonsmokers to raise their carboxyhaemoglobin level to the range seen in a control group of smokers. This manouvre caused the development in nonsmokers of an increased oxygen debt with exercise and a reduced pulmonary diffusing capacity at rest. The changes after carbon monoxide inhalation were similar to those found when comparing smokers to nonsmokers. The pathogenesis of these change are unknown, but support carbon monoxide as a possible etiologic factor accounting for the less efficient exercise and poorer pulmonary function performance of smokers compared to nonsmokers.

A study (Cooper et al 1968) seems to be related: By means of a 12-minute field test, the effect of cigarette smoking on endurance performance was measured in 419 airmen, before and after six weeks of basic training. In 47 airmen, cardiopulmonary indexes also were obtained during maximal treadmill performance. Field testing showed that endurance performance was inversely related to the number of cigarettes smoked daily and the duration of smoking. The training response also was impaired significantly in the smokers. During treadmill studies, smokers had a decrease in respiratory minute volume and a lower oxygen consumption at equivalent heart rates than nonsmokers. Let us consider the effect of tobacco smoke on the pulmonary mechanisms of defense. It has been shown that tobacco smoke weakens the lung's defensive mechanism against foreign particles by interfering with the normal functioning of the cilia in the respiratory tract, thus permitting cigarette tars to damage normal cells. (Two slides were then projected on the screen, the first showing

normal cilia, and the second showing damaged cilia) However, not only is the mechanical functioning of the cilia interrupted, but also there seems to be definite interference with the phagocytic activity of the alveolar macrophages, as brought out by Green et al (1967.)

In an in-vitro phagocytic using rabbit pulmonary alveolar macrophages small amounts of cigarette smoke quantitatively inhibited the capacity of the cells to inactivate "Staphylococcus albus" bacteria. The inhibiting action of the smoke, as obtained from the burning cigarette, varied quantitatively with the volume of smoke used, the type or brand of cigarette and the kind of filtration (mechanical or aqueous) employed. . Nicotine acetaldehyde, formaldehyde and cyanide did not by themselves affect the alveolar macrophages in doses comparable to their content in smoke. . The role of cigarette smoke in the pathogenesis of pulmonary diseases may be mediated through an inhibition of the phagocytic activity of alveolar macrophages and impairment of this integrated defensive function at the respiratory membrane level of the lung. Particularly the coal tar in the tobacco smoke causes irritation of the trachea and bronchi, producing chronic cough. This chronic cough is associated with the development of emphysema. A study (Auerbach et al 1967) incriminating tobacco smoke in the production of emphysema, is summarised as follows:

Ten dogs smoked cigarettes daily in two sessions each day by voluntary inhalation through a tracheostomy tube. Five dogs died during the course of the experiment, and the remaining five were killed after more than 420 day of smoking. Hematocrit values increased markedly during the first several weeks of smoking and then declined somewhat but remained higher than presmoking levels. The heart weight relative to body weight was markedly higher in the ten smoking dogs than in the ten control dogs. Pulmonary fibrosis and emphysema, similar to those conditions in human beings, were found in all five of the smoking dogs killed. No such lung parenchymal changes were found in ten control dogs.

It is a well-accepted fact that 3,4-benzpyrene, one of the ingredients of tobacco smoke is a villain responsible for bronchogenic carcinoma. According to a statement made by Senator Robert Kennedy (1967), "death from lung cancer increased from 2,500 in 1930 shortly after cigarette smoking became a national habit, to 50,000 now," and that was for the United States alone.

Lemon and Walden (1966) did a study in which they report that among this group of Seventh-day Adventist men, "there were only nine death from cancer of the lung whereas 56 were expected;" six of these nine had been smokers prior to becoming members of this church, and of the remaining three, one was attributed to malignant melanoma. It should be pointed out that Seventh-day Adventists do not smoke. It is also interesting to observe from their study that there were only 43 deaths from respiratory tract diseases, other than cancer, whereas 134 were expected. Major deficits from the latter classifications are tuberculosis, 1 observed vs 12 expected; pneumonia, 19 observed vs 68 expected; and bronchitis or emphysema or both, 5 observed vs 25 expected.

We have said nothing of the effect of tobacco on the eyes, resulting in an occasional tobacco amblyopia, the larynx, resulting in "smoker's larynx," the stomach and its effect

on the incidence of ulcers in either of these organs, the liver and cirrhosis, the bladder and carcinoma, or the uterus and premature births.

Have there been any major comprehensive medical pronouncements on the matter of smoking and health since the 1964 blast ?

In 1967 a World Conference on Smoking and Health, already alluded to, was held in New York City in September. At that conference, 33 nations participated. The late Senator Robert F. Kennedy, in an address, stated.

Every year cigarettes kill more Americans than were killed in World War I, the Korean Conflict, and Vietnam combined; nearly as many as died in battle in World War II. Each year cigarettes kill five times more Americans than do traffic accidents. Lung cancer alone kills as many as die on the road. The cigarette industry is peddling a deadly weapon. It is dealing in people's lives for financial gain. ¹¹

In the late summer, 1967, the Public Health Service of the United States published another review of current medical research findings entitled, THE HEALTH CONSEQUENCES OF SMOKING. This is effectively summarized by Luther L. Terry, M.D. (former Surgeon General of the United States who produced the 1964 report), in the October, 1969, issue of "Listen," an international journal devoted to better living:

The current publication is based on an analysis of more than 2,000 scientific research reports published by independent scientists since the 1964 Surgeon General's SMOKING AND HEALTH report. The new publication not only confirms and strengthens the conclusions of the original document, but it makes available more accurate information on the specific age groups who are affected and the kinds of diseases caused or made worse by prolonged smoking.

This latest Public Health Service report indicates that cigarette smoking is associated with as many as one third of all deaths among men between thirty-five and sixty years of age. ¹³

In 1969, a supplement to the 1967 Public Health Service report was issued which declares into the substantial negative evidence has appeared to refuse these (earlier) judgements. On the contrary, studies made available since... confirm previous finding and add evidence the smoking is a health hazard. ¹⁴

If a food additive, or pharmaceutical product brought about any of the symptoms and pathological changes produced by the ingredients of tobacco smoke, how long do you suppose it would stay on the market?

What have been some of the reactions of the public, both medical and nonmedical, to these latest medical finding? (and here I'm limited in my information primarily to the United States):

FIRST, in the field of Tobacco Advertising:

May, 1969 "Boston Globe" bans cigarette ads: First major daily newspaper to do so; New England's largest newspaper (circ. 438,000), ⁵¹

- July, 1969: Total ban on cigarette advertising (radio, TV, newspapers, magazines) approved by California State Senate by vote of 28/7; measure moves to the Assembly. ¹⁶
- July, 1969: Federal Trade Commission urged total ban on cigarette advertising on TV-radio.
- Sept. 1969: "Good Housekeeping" magazine stops cigarette ads. ⁸¹
- Oct. 1969: Nation's broadcasters plan to stop cigarette commercials on radio-TV by September, 1970, but plan to continue anti-smoking messages another four years. ¹⁹

SECOND, Tobacco Consumption:

- Jan. 1969: Japanese male smoking down 3.8% for 1968. ²⁰
- Jan. 1969: U.S. Cigarette smoking dropped 1.3. billion (out of total of 526.5 billion) during 1968 compared to 1967. ²¹
- Aug. 1969: Cigarette consumption in Canada drops 5% per year since 1966. ²³

THIRD, Action of Medical Groups:

- June, 1969: U.S. Air Force bans smoking by patients in all its medical facilities. ²²
- June, 1969: Johns Hopkins University School of Medicine and School of Hygiene and Public Health announced ban on sale of cigarette machines and removal of all cigarette machines from their building. ²⁴
- July, 1969: The American Medical Association called on its members for a "strong stand" against smoking through personal example and advice. The AMA House of Delegates points out to Congress the "incongruity" of spending tax dollars to promote the production and sales of tobacco, while spending other tax dollars to discourage cigarette smoking because of its hazard to health. ²⁵

FOURTH, Medical Warnings:

- Feb. 1969: Stillbirths, smoking linked in 10-year British study: one of five unsuccessful pregnancies might be saved if women were not smokers. ²⁶
- May, 1969: Cigarette smokers run four times the risk of fatal oral cancer compared to non-smokers, testified the the American Dental Association. ²⁷

FIFTH, Miscellaneous:

- Dec. 1967: Nine out of ten California physicians believe that smoking is a health hazard. Only one physician in five smokes; twice that number used to smoke but has quit. ²⁸

May, 1969: State Mutual of America (a life insurance company) states that its Non-Smoker Policy, first offered in 1964, has grown to over U.S. \$200,000,000 by 1968. ²⁹

Sept, 1969: State Representative Jame R. Nolan asks ban on cigarettes in Massachussetts. ³⁰

Sept. 1969: Gallup poll reports 71% of all adults accept cigarette cancer link; 40% of adults smoke. ³¹

Now I would like to raise some questions: What is the prevalence of smoking in Nepal? Are there any figures? Have any studies been done? How long has the Hooka been used? How long has cigarette smoking existed in Nepal? what is the prevalence of tuberculosis in Nepal. Is it true that the incidence is among the highest of any country in the world. Are we helping combat tuberculosis with our pretent in prease in cigarette smoking. Do we have any figures on bronchogenic carcinoma in Nepal. perhaps cigarette smoking has not been in vogue long enough,—as we know it takes about 20 years for bronchogenic carcihoma to develop.

Is smoking really good for Nepal, Are we going to increase the health and vigour of the citizens and make Nepal a stronger, more vibrant nation by promoting smoking At the World Conference on Smoking and Health held in 1967, Dr. Lester Breslow, Director of California's State, Department of Health,

Special attention should be given at once to the developing nations, where the cigarette industry has not yet taken hold as a major source of employment and income.

Substantial capital investment and large-scale industrial organisation are now committed to the manufacture and distribution of cigarettes in the "developed" "nations; the "developing" nations are tending to follow this same pattern as one of the elements of the "improvement" of life ³²

Do we, as an enlightened medical group, want to see Nepal develop a strong cigarette industry, upon which many people could become dependent for their livelihood, but which would at the same time increase, the amount of suffering due to coronary artery disease, emphysema, bronchogenic carcinoma and other diseases, Do the responsible people, of Nepal want to see this deadly weapon peddled to the many for the sake of financial gain for the few.

Let us explore together some of the possible ways in which enlightenment along these lines may be carried out. We feel very fortunate in having Mr. L. Charles Shultz at our Scheer Memorial Hospital at Banepa; he has just completed his Masters in Public Health, and has a special interest in health education.

Mr. Shultz, I wonder if you would give us some of your ideas along this (Mr. Shultz then addresses the group:)

Recognising the dangers of smoking in regard to health is not enough: people must want to change their smoking habits and those who don't, smoked must be taught the dangers of smoking.

As a health educator I am interested in education,—and education means behavioural change. Changing behaviour is often very difficult, especially when it involves a habit as deeply engrained in a person as smoking.

Naturally, the best place to begin education is in the school before the making habit has to be learnt. In the spring of 1969 the Loma Linda University School of Public Health undertook the task of giving a DON'T SMOKE programme to 3000 students from the fourth to the sixth grades in the Redlands, California Unified School District. This program consisted of three forty-minute class periods spaced a week apart. During the first meeting, the function of the heart and lungs was studied. The second meeting covered the effects of smoking on the heart and lungs. During the concluding program the children were encouraged to make a decision against smoking.

President Richard Nixon sent a note of appreciation to Loma Linda University School of Public Health, congratulating them on this DON'T SMOKE programme various children from the school also wrote personal letters of appreciation to the program directors; for example:

Dear Sir,

I sure did like your speech about smoking. I want to ask you some questions: why do they have to make cigarettes with tar? Who ever started cigarettes? Why do they keep making cigarettes if people know it's no good? Why do they keep smoking? Why doesn't the President stop letting them make cigarettes?

Alber

Dear Sir,

Thank you very much for getting it through my head how bad cigarette smoking is for you. I have made up my mind about smoking; the answer is, I'm not going to smoke.

Thank you for. I told my Dad how bad cigarette smoking is for you and how bad it hurts the body. I asked him please to stop, but all he said was, "I'll try, but it's not that easy." I don't know if he has tried to stop because he still buys cigarettes. I wish he would stop because it would save a lot of money.

Karen

An energetic adult education programme has been carried out by the Smoking Research Foundation in San Diego; California. During 1961 a test, and test result interpretation booklet was mailed to all in a certain area of Southern California. This test was then given over television. Those participating in this test could then analyse their motives for smoking, and understood more fully their psychological reasons for smoking.

Adult education has also been carried on by the Seventh-day Adventist 5-day Plan to stop smoking. In this programme a doctor describes the harmful effects of smoking, while another qualified person deals with the psychological implication of breaking the smoking habit. Group therapy is an important factor in the success that results from this programme.

The field of adult education is open for many possible approaches to helping people to stop smoking. In the United States, a club for those who are overweight has recently become very popular: TOPS (Taking Off Pounds Sensibly); this could have a stop-smoking counterpart such as SOS (Stamp Out Smoking).

General education for the public consists of a variety of mass media material. The American Cancer Society, the Tuberculosis Association, and the American Heart Association, have all used with good success a series of provocative posters. These agencies also have fine films that show the dangers of smoking.

Many doctors in the United States resent the poisoning of the public that is occurring through cigarette smoking. Dr. W. R. Spence is one doctor who is fighting back at the cigarette industry. He is connected with an organisation called, Truth About Smoking, that produces "lung ashtrays" that turn black from cigarette smoke. Other products include stop-smoking buttons, wall plaques with a doctor's appeal for his patients not to smoke, and a mechanical smoking device that turns paper lungs black. Truth About smoking has caused many to think more seriously about their smoking habits.

Often mass media education can be done in a public place such as a food bazaar. Such an experiment was conducted during the spring 1969 by the writer in Redlands California. A large cancerous lung was shown to busy shoppers with a brief explanation of the dangers of smoking. Many decisions to stop smoking were given as a result of this brief encounter.

Nepal as a growing country also needs to be educated concerning the harmful effects of smoking. Especially the small children should be discouraged from smoking so that they will have an opportunity to develop strong bodies. The Scheer Memorial Hospital at Banepa uses hand puppets in a short programme in which a smoking monkey is convinced not to smoke by a large elephant. (At this point the actual puppet show was demonstrated.)

A strong country requires strong men and women. Surely Nepal could be an ever at anger nation if its children, men and women were not disabled physically by smoking. Education is the key that will help people see the harmful effects of smoking.

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