

Medicinal uses of tobacco in history

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The tobacco plant, *Nicotiana*, has probably been responsible for more deaths than any other herb. At present, tobacco smoking is causing over 3 million deaths a year worldwide, and if current smoking trends continue the annual mortality will exceed 10 million by around 2030.¹ Add to this the mortality from cancers caused by oral uses and the death toll becomes still higher. Undoubtedly, tobacco is the most important avoidable cause of premature death and disease in the world.²

Tobacco leaves and the smoke generated when they are burned contain over 4 thousand chemicals,³ the best known of which is nicotine, first isolated from tobacco leaves in 1828 by Posselt and Reimann.⁴ It is the nicotine that causes smokers to become addicted to tobacco, and the chemical itself is lethal in small doses.⁵ When tobacco smoke is inhaled, the nicotine passes quickly to every organ of the body. The brain and nervous system are stimulated by small doses and depressed by larger ones.⁵ Nicotine increases the heart rate and the blood pressure, and may contribute directly to the excess of thrombosis and atheroma in smokers. Nevertheless, nicotine replacement therapy is used in helping people to stop smoking, because it spares them the many other harmful contents of tobacco smoke—for example, the carcinogenic polycyclic aromatic hydrocarbons and N-nitroso compounds; irritant substances such as acrolein; benzene; formaldehyde; ammonia; acetone; acetic acid, and carbon monoxide.³

The evidence that tobacco causes cardiovascular disease and lung disease took several hundred years to emerge. In the 15th century, when the use of *Nicotiana* by the indigenous populations in the New World was first observed by Columbus and the plant was brought to Europe, all herbs were considered to have potential therapeutic properties and this new one was used to treat a wide range of conditions. Indeed, *Nicotiana* acquired a reputation as a panacea, to the extent of being called the 'holy herb' and 'God's remedy'.⁶ To understand the enthusiasm of Tudor doctors for this newly discovered herb, it is useful to look at the background.

PRECOLUMBIAN AMERICA

There are over sixty species of *Nicotiana*. Apart from a few which appear to be native to Australia,⁷ most are indigenous to America.⁸ *Nicotiana tabacum*, the plant now raised for commercial tobacco production, is probably of South American origin and *Nicotiana rustica*, the other major species which was carried around the world, came from North America. In 1492, Columbus found Native Americans growing and using tobacco, sometimes for its pleasurable effects but often for treatment of various ills. Some of his sailors observed natives of Cuba and Haiti smoking the leaves,⁹ and subsequent European explorers and travellers corroborated both these observations. The name tobacco was originally applied to the plant in error. In fact this term referred to the cane pipe, called a *tabaco* or *tavaco*, with two branches for the nostrils, which was used by the Native Americans for sniffing tobacco smoke.¹⁰ The tobacco itself was variously called *petum*, *betum*, *cogioba*, *cohobba*, *quauhyetl*, *picietl* or *yietl*, and these names sometimes appeared later in herbals or pharmacopoeias.^{10,11}

As early as 15 October 1492 Columbus noted that dried leaves were carried by a man in a canoe near the island of Ferdinandina because they were esteemed for their healthfulness.⁹ In the same year, two members of his crew observed people in what is now Cuba carrying a burning torch that contained tobacco, the purpose of which (it later emerged) was to disinfect and help ward off disease and fatigue.⁶ Snuffing of *cogioba* through the *tabaco* caused loss of consciousness, Columbus observed, and it is tempting to speculate that this property was used as an anaesthetic for the trepanning operations which were frequent at that time.

Tobacco, probably mixed with lime or chalk, appears to have been used in these Native American populations as a toothpaste to whiten the teeth, as observed by Nino and Guerra in 1500 and by Vespucci at about the same time in Venezuela.¹¹ This practice continues today in India, where powdered tobacco, or *masheri*, is rubbed on the teeth for this purpose and tobacco toothpaste is marketed commercially.¹²

It was perhaps in 1500 that the notion of tobacco as a panacea became prevalent. In that year, a Portuguese explorer, Pedro Alvarez Cabral, in Brazil, reported the use of the herb *betum* for treating ulcerated abscesses, fistulas, sores, inveterate polyps and many other ailments, and said it was called the holy herb because of its powerful virtue in desperate cases.⁶ Also, reports on medicinal use of tobacco

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by Native American populations continued to emerge in quantity. For example, in 1529, a Spanish missionary priest, Bernadino de Sahagun, collected information from four Mexican physicians about use of tobacco for medicinal purposes. He recorded that breathing the odour of fresh green leaves of the plant relieved persistent headaches. For colds and catarrh, green or powdered leaves should be rubbed around inside the mouth. Diseases of glands in the neck could be cured by cutting out the root of the lesion and placing on it crushed tobacco plant hot and mixed with salt, on the same spot.⁹

Later reports of tobacco use by the Native Americans might be less reliable than those from contemporary sources, but in 1934 Fernando Ocaranza summed up the medicinal uses of tobacco in Mexico before 1519 as antidiarrhoeal, narcotic and emollient; he said that tobacco leaves were applied for the relief of pain, used in powdered form for the relief of catarrh and applied locally to heal wounds and burns.⁶ There are many other reports of medicinal uses of tobacco by precolumbian Native Americans, but the foregoing list is sufficient to indicate the wide usage^{6,9,13} and to explain why travellers wished to take the plants and seeds back to Europe.

EARLY USE IN EUROPE

In the days when treatments for many diseases were being sought and herbs of all kinds were considered worth trying, the news of an unfamiliar herb with reputed therapeutic efficacy generated much enthusiasm. So great was the excitement that Nicolas Monardes, the Spanish physician-botanist, included it in a work originally published in the 1570s and later rendered into English as *Joyful Newes out of the New-Found World*.¹⁴ It contains much of what we know about medicinal tobacco at that stage. Tobacco came to feature in a plethora of herbals and pharmacopoeias produced throughout Europe by physicians, botanists, explorers, missionaries and historians. Between 1537 and 1559, books published in Europe and Mexico commonly referred to the medicinal uses of tobacco among the indigenous populations of the New World, with eyewitness accounts of its therapeutic application in general bodily ills, catarrh, colds, and fevers, as an aid to digestion and in prevention of hunger and thirst, as a purgative and as a narcotic.¹³

There is some uncertainty which species of *Nicotiana* was first brought to Europe. Probably it was the Flemish herbalist Rembert Dodoens, in Antwerp, who in 1554 published the earliest figure of *N. rustica*, in his *Cruydeboeck*, seemingly drawn from a specimen plant.¹⁵ Dodoens incorrectly captioned the figure *Hyoscyamus luteus*, yellow henbane, possibly because of its narcotic qualities. Fuchs in Vienna included four illustrations of *N. rustica* and *N. tabacum*



INDORUM SANA SANCTA

Figure 1 The first published illustration of *Nicotiana tabacum* by Pena and De L'Obel, 1570–1571 (*shrpium adversana nova*: London). The small illustration on the right of the picture shows how the Indians and sailors smoked *Nicotiana* leaves in a funnel [from New York Public Library with permission]

in his extended herbal of 1542, though this had not been published.¹⁰ Figure 1 is from about 1570.

Herbals at this time described not only the plants but also their medicinal applications. A notable example is the illustration from about 1555 by the Franciscan monk André Thevet in Brazil, of smoke being blown at a man from a primitive cigar.¹⁶ The condition being treated was later identified as yaws.¹⁷ He warned that the smoking of this material (*petum*) could cause weakness and fainting, and Thevet was not the only one to express reservations about the safety of tobacco. Conrad Gesner, the botanist, physician and scientist, analysed tobacco leaves and reported on their poisonous qualities.¹⁸ However, numerous herbs used in medicine had similar toxic properties, and during the sixteenth century there were few ailments for which tobacco was not prescribed.¹⁹ The most interesting, and perhaps the most convincing, indication was in the treatment of *Noli-me-tangere*. This name was given to slow-spreading ulcerating lesions of the skin.²⁰ Later publications suggest that the condition embraced such conditions as lupus and syphilis but that the most frequent cause was probably basal cell cancer (rodent ulcer).²⁰

In about 1560, according to Monardes, the French ambassador to Lisbon, Jean Nicot, was presented with a herb by the keeper of a prison he was visiting.¹⁴ It was described as a strange plant brought from Florida. The ambassador had it planted in his garden where 'it grewe and multiplied maruellously'. One of Nicot's pages had a *Noli-me-tangere* on his cheek which was beginning 'to take root

already in the gristles of the nose', and had himself been applying bruised tobacco leaves and juice to it. Hearing of this, Nicot ordered that the tobacco treatment should be continued for eight or ten days, and at the end of this time 'this saide *Noli me tangere* was utterly extinguished and healed'. Throughout the treatment Nicot had the patient's progress monitored by a respected physician to the King of Portugal, who certified the happy outcome. So pleased was Nicot with this cure that, when he heard of two ladies in France who had carcinomas for which no cure could be found, he sent the herb to King Francis II, the Queen Mother and many Lords of Court. Nicot was so liberal and generous with tobacco that it became known as the ambassador's herb or *nicotiane*—the origin of the name by which we now know it. Nicot used it to treat the father of one of his pages for an ulcerated leg of two years' duration, and healing was reported after ten to twelve days. Similarly, complete healing was described after eight or ten days' treatment in 'a woman that had her face covered with a Ringworme rooted, as though she had a visor on her face', and a captain's son was cured of the 'king's euill' (scrofula). When a cook in Nicot's household nearly cut off his thumb with a chopping knife, the steward ran for the tobacco plant and bound the thumb back on; after five or six dressings of the same sort, the wound healed. All these uses involved external application of tobacco leaf and its juice, and various recipes are described. Monardes, for instance, specifies that the leaves must be stamped in a clean mortar and both the juice and the leaves applied to the lesion. To 'cleanse, incarnate, and knit together all maner of wounds',

'Take a pound of the freshe Leaves of the sayed Hearbe, stampe them and mingle tham with a newe Waxe, Rosine, common oyle, of each three ounces, let tham boyle altogether, untill the juice of the Nicotiane be consumed, then add thereto three ounces of Venise Turpentine, straine the same through a linen cloth, and keep it in Pottes to your use.'

However, even in this first flush of enthusiasm for the medicinal uses of tobacco, there were those who questioned its efficacy.²¹ Philaretus, a doctor writing in 1602, raised many criticisms, especially of the indiscriminate use of the herb for all diseases in all age groups without specific measured prescriptions.²² Vaughan in 1612, although declaring that 'tobacco well dried, and taken in a cleane Pipe fasting, in a moist morning, during the Spring or Autumne, cureth the megrim, the toothache, obstructions proceeding of cold and helpeth the fits of the mother', warned that it could do much harm when abused.²³ John Cotta, commenting in 1612 on the use of tobacco as a panacea, remarked 'Is not this high-blased remedy now manifestly discovered, through intemperance and custome,

to be a monster of many diseases?';²⁴ and in 1633 James Hart, another Doctor in Physick, wrote 'let no man deceive himself so farre, as to think this to be some famous Panacea, Nepenthe or some golden Elixir, whereof hath beene much bragging, but small benefit as yet reaped', and added 'And of this I am verily perswaded, that the excessive and disorderly use of this simple, is as no small cause, as of the more frequent raining of divers dangerous diseases among us . . .'.²⁵ As the seventeenth century moved on, doctors increasingly mistrusted tobacco as a medicine, but this did not prevent its retention in pharmacopoeias. John Wesley's *Primitive Physick*, first published in 1747, recommended it for earache ('blow the smoke of tobacco strongly into it'), for falling sickness, and for piles ('apply a tobacco leaf steeped in water twenty-four hours'). Such advice continued as late as the edition of 1847.²⁶

THE NINETEENTH CENTURY

After the isolation of nicotine from tobacco leaves in 1828,⁴ the medical world became yet more mistrustful of tobacco as a general treatment, now aware that the plant contained a dangerous alkaloid. Nicotine began to be used alone and more effort was made to measure doses. For example, a preparation of nicotine salicylate as a 0.1% salve replaced an infusion of leaf tobacco boiled in water as a treatment for scabies.¹⁷ However, even tobacco smoke *per rectum* was still being advocated, for conditions as varied as strychnine poisoning, constipation, strangulated hernia, tetanus, hydrophobia and worms.⁹ In a 1958 paper Silvette and co-workers¹⁷ scanned the medical press for case studies of tobacco treatments published between 1785 and 1860 and provided an overview of treatment outcomes for a range of conditions. Subsequently Stewart¹³ analysed these 128 cases and came up with the following breakdown: 97 treatments successful, 4 fatal, 10 poisoned the patient, 17 other outcomes. The allegedly successful ones are summarized in Box 1.

Box 1 'Successful' uses of tobacco as identified by Stewart

Tobacco administered externally
Bites of poisonous reptiles and insects; hysteria; pain, neuralgia; laryngeal spasm; gout; growth of hair; tetanus; ringworm; rodent ulcer; ulcers; wounds; respiratory stimulant

Tobacco administered by rectum
Constipation; haemorrhoidal bleeding

Tobacco administered by mouth
Strangulated hernia (smoke by mouth); malaria or intermittent fever; dislodging obstructive material from oesophagus by inducing vomiting

Tobacco administered by inhalation
Nasal polyps.

Among those who doubted the claims of success was Todd, in his Lumleian Lecture of 1849. 'Tobacco', he declared, 'undoubtedly reduces the polar state of the cord, but it produces at the same time a state of fearful depression. It is likewise an unsafe and not a manageable remedy. I have seen more than one patient die, cured of Tetanus under this remedy.'²⁷ During the nineteenth century, new methods of administering tobacco treatments included aetherial tincture, poultices and snuff patches.

THE TWENTIETH CENTURY AND AFTER

Even in the twentieth century, the therapeutic use of tobacco did not completely lapse. For example, in 1924, a salve made of burned tobacco leaves mixed with lanolin was said to be dessicant, stimulant and antiseptic for pruritus, ringworm, athlete's foot, superficial ulcers and wounds (it was also said to be good as a metal polish).¹⁷ Moreover, its disinfectant properties continued to generate debate. We have seen how, in the New World discovered by Columbus, tobacco smoke was used to ward off disease, and the sixteenth century doctors applied the leaves or a tobacco ointment or poultice to infected wounds. During the London plague of 1665 children were instructed to smoke in their schoolrooms;²⁸ and in 1882, in a Bolton outbreak of smallpox, tobacco was actually issued to all the residents of a workhouse.²⁹ However, claims for such protective effects did not go undisputed. For example, in 1889 an anonymous article in the *British Medical Journal*,³⁰ whilst acknowledging the experimental evidence that the pyridine in smoke kills germs and the evidence that smokers appeared to be at lower risk of diphtheria and typhus, concluded that people who can tolerate tobacco are likely to be robust in other ways and thus able to resist infection; non-smokers, the article concluded, would be ill advised to take up smoking, which would make them more vulnerable. An anonymous article in *The Lancet*³¹ in 1913 discusses the 'pyridin' content of tobacco smoke and describes experiments showing that tobacco smoke destroys the comma bacillus of cholera; but again it warns that tobacco smoking can 'give rise to constitutional effects which diminish the resisting power of the body to disease'.

Later in the twentieth century, attention switched to diseases affecting the brain and nervous system. In 1926, Moll reported that, when thirteen patients with post-encephalitic parkinsonism were treated with subcutaneous injections of nicotine, nine showed immediate improvement in muscular movement.³² He concluded that, although the benefit was only temporary, 'the immediate results were indisputable'. A kindred observation is that, in at least three case-control studies, the relative risk of Parkinson's disease was lower in smokers than in non-smokers, though other factors could be operating to produce this apparent effect.³³

Case-control studies also suggest a possible inverse association between cigarette smoking, Alzheimer's disease³⁴ and Tourette's syndrome,³⁵ but the same reservations apply.

CONCLUSION

Tobacco has long been removed from pharmacopoeias and from medical practice. Stewart's conclusion from her review to 1860 was that 'The best that can be said of it was that in many cases tobacco alleviated pain.'¹³ In my own review of the published work four points struck me forcibly. First, too much was expected of tobacco. In medieval times, most herbs would be used only for a few conditions in which it was deemed effective—not for a vast range of disorders from head lice to haemorrhoids, from hysteria to tetanus, as happened with tobacco. Secondly, writings on this subject commonly imply that nicotine is the only active medicinal constituent, yet the various species of *Nicotiana* contain many other alkaloids.^{36,37} Thirdly, the leaves and juice were much used for skin disorders, possibly including basal cell cancer. Might tobacco leaves contain an anticancer agent, as proved to be the case with periwinkle (vinca alkaloids)? Fourthly, in therapeutic applications of tobacco, dosage was largely uncontrolled. With any useful agent, excess dosage will do harm. I suggest we should set aside the prejudices generated by the ill-effects of tobacco smoking and examine the leaves systematically for substances of therapeutic value.

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