

# The influence of pott's irritation theory of occupational cancer during the 19th century: a review with hypothesis on albinism sunlight-induced cancer

## Abstract

Percival Pott [1] in 1775 made the important observation that irritation is a forerunner of cancer. This paper reviews the observations of 19<sup>th</sup> century writers from his own angle as well as from other angles. It is hypothesized that,

- I. Just as thrusting up children into chimneys was stopped through Government action thus eliminating classical cancer,
- II. Stopping the exposure of albinos to the deleterious sunlight by employing their indoors statutorily though Government action will achieve the same sanguine solution.

**Keywords:** pott, irritation, chimney sweepers, scrotum, cancer, albinism

Volume 2 Issue 5 - 2015

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**Received:** April 03, 2015 | **Published:** June 01, 2015

## Introduction

The alliteratively named Percival Pott<sup>1</sup> wrote his epochal paper on occupational cancer. He had drawn attention to the peculiar liability of chimney sweepers to death from cancer of scrotal origin. As he wrote, "It is a disease which always makes its first attack on, and its first appearance in the inferior part of the scrotum; where it produces a superficial, painful, ragged, ill-looking sore, with hard and rising edges". "The trade," he continued, "call it the soot-wart". As he further surmised, this occupational disease "seems to derive its origin from a lodgment of soot in the rugae of the scrotum".

Indeed, Andral G<sup>2</sup> had occasion to caution against indiscriminate adoption of the doctrine of irritation in cancer and other diseases. However, before long, Pott's irritation theory was fully accepted between 1845 to 1892.<sup>3-6</sup>

## Historical texts

In the following commemorative comments, let me draw attention to the writings of some 19<sup>th</sup> century authorities on the role of irritation in cancer causation. Their recommendation of preventive surgery for early irritation-induced cancer will also be spotlighted. Concerning cancer of the scrotum, Warren JC<sup>7</sup> of U.S.A. wrote thus: "It is called in England, *chimney sweeper's-cancer*". "I have never", he remarked, "seen it in chimney sweepers in this country, but have met with a few instances in persons not of that business".

Budd G<sup>3</sup> generalized that cancer frequently appears to originate in "prolonged irritation" of some part. He instanced cancer of the lip in persons addicted to smoking, associating it with irritation from the pipe or tobacco juice. As he saw it, cancer of the penis follows irritation by the long retained and acrid secretions seen in men with congenital phimosis. He felt that the best example of the ill effect of irritation was "the cancer of chimney-sweepers, which appear to originate in prolonged irritation by soot." To reinforce this conclusion, he cited the case of a gardener who developed cancer of the hand due to the habit of handling soot when spreading it as manure!

Hutchinson JC<sup>4</sup> defined cancer in terms of "insurrection" among cells exposed to some form of irritation. He wrote as follows: "so I think we have, in different individuals, some sort of different mobility of tissues. In one person the tissues are held together by a somewhat slighter tie than they are in others, and, under certain kinds of irritation, they rebel, and the cells set up on their own account, and establish a little *imperium in imperio*, and to that rebellion of cells we give the name of 'cancer'".

Within a decade, he returned to the same theme with special reference to chimney sweeper's cancer itself [8]. He wrote of it as being "induced by non-specific but long-continued irritation." He expatiated thus: "A man engages in an occupation which exposes his skin to constant contact with coal-soot. He soon becomes hopeless as to cleanliness, and only attempts the removal of the irritating material from the more exposed parts. In the course of years, on that part of his cutaneous surface on which most folds occur, and which is far beyond all others likely to harbor the soot, there are, in the presence of warty growth, evidences of irritation. In the course of a few more years, one of these so-called 'warts' has enlarged and ulcerated. The disease is let alone, and by-and-by the inguinal glands coalesce into a tumor, which ulcerates, bleeds, extends widely and deeply, assumes all the features of an open cancer, and, in the course of a few months, destroys life".

Significantly, Hutchinson JC<sup>8</sup> related the development of cancer not only to other sooty occupations but also to other forms of unclean habits. He wrote: Many instances are on record in which men not sweeps, but who in the course of their occupations exposed one or other part of the body to the irritation of soot have had soot-cancer there developed. I have seen it on the hand of a gardener who was accustomed to scatter soot as a manure, on the hand of a bricklayer who was habitually employed in setting and resetting fire-ranges, and on the scrotum of a stoker and fireman. Analogy may also afford us strong corroborative testimony. Can any reason be offered in explanation of the fact that for every three women who suffer from cancer of the lip, there are one hundred men affected by that disease, excepting that this disease is usually caused by smoking, and is, in fact,

clay-pipe cancer? It is very rare amongst the richer classes, because they are careful to use clean and smooth mouth-pieces to their pipes”.

He also gave additional sites of irritation-induced cancer, namely, penis with phimosis, cheek with broken tooth, skin with burn cicatrix, tongue with old syphilitic ulcer, and perineum with urinary fistula. Paget J<sup>9</sup> included most of the above instances in his list of examples of long continued irritation leading to cancer. “Similar to these,” he added, “are the soot cancers, and the petroleum cancers, and those of the abdomen and thigh, which are seen in Kashmir, in consequence of wearing a hot brasier over these parts”. In this connection, it is noteworthy that, when he wrote his classic paper on disease of the mammary areola, this old master had earlier on theorized on the role of “surface-irritation” in cancer causation.<sup>6</sup>

Billroth T<sup>11</sup> wrote that the frequency with which cancer appears at certain parts, such as penis and lips, may be due to “the irritations to which the openings are exposed.” He mentioned some irritants which act on the lips, e.g. bad shaving, smoking, wind and weather. After referring to chimney sweeper’s cancer, he wondered why such cancers “always result, rather than chronic inflammations, catarrhal affections, or the like”. However, Hutchinson JC [8] knew that irritations gave rise to a spectrum of scrotal lesions. “All gradations,” he appreciated, “may be observed between indurated and inflamed tubercles containing no positive elements of cancer, and the genuine epithelioma”. Power DA<sup>12</sup> kept animals for long periods of time with some of their tissues in a state of irritation and his histological study of such tissues led him to appreciate the series of changes which irritants produce on tissues.

Soot itself was the subject of research by Spencer WG.<sup>13</sup> He presented before the Royal Medical and Chirurgical Society some microscopical sections showing soot in various layers of the skin. He concluded, among others, that this explained why cancer may occur “long after all contact with soot.” On the strength of his findings, he recommended that scrotal excision should include even parts which appear normal to the naked eye.

Concerning such basically preventive surgical practice, Pott P<sup>1</sup> himself did acknowledge the necessity to remove “all that portion that is distempered”. A century later, Paget J<sup>10</sup> considered this question at some length: “In practice, the question must be sometimes raised whether a part through whose disease or degeneracy cancer is very likely to be induced should not be removed. In the member of a family in which cancer has frequently occurred, and who is at or beyond middle age, the risk is certainly very great that such an eruption on the areola as I have described will be followed within a year or two by cancer of the breast. Should not, then, the whole diseased portion of skin be destroyed or removed as soon as it appears incurable by milder means? I have had this done in two cases, but, I think, too late. Or, again, when one with a marked family-liability to cancer has syphilitic disease of the mucous membrane of the tongue, with frequent recurrences of inflammation, should not all the worst pieces of the membrane be removed?”

As regards chimney sweepers, Hutchinson JC<sup>8</sup> noted that surgical excision of the incipient ulcer may result in complete cure. “Of course”, he stressed, “if the man continued to subject himself to the same irritation, he will be very likely to have a renewal of the same morbid action.” In one of the patients, whom he mentioned, excisions were carried out twice, “the man remaining at his occupation, but, of course, being more careful as regards cleanliness”.

## Comparable current condition

It is now over three centuries since Percival Pott P<sup>1</sup> drew attention to the first cancer of occupational origin. Today, advances in this field have been such that Hueper WC<sup>14</sup> and others have written tomes on it. In the present brief account, the arguments advanced by 19<sup>th</sup> century authors, who wrote in the wake of Pott, have been spotlighted. Their views on preventive surgery are also of more than passing interest. However, there is a comparable modern preventable cancer. Elsewhere, I have hypothesized on it.<sup>15</sup> In sum, from childhood to adulthood, the pitiful plank of albinism has stood out.<sup>16,17</sup> by inheriting the sun-induced skin cancer. Consequently, reversal ought to emanate. Thus, there are four ingredients in the salad prepared for their survival, viz, maternal attention, public health education, women empowerment consideration, and statutory institution of indoor employment. Not to be exposed to sunlight is the desideratum. In fact, the author’s personal experience is conclusive. Thus, two of my female medical students, although albinos, have over the years achieved the status not only of being consultant physicians but also of being comfortably aged normal citizens with unblemished faces!

## Acknowledgments

None.

## Conflicts of interest

The author declares that there is no conflict of interest.

## Funding

None.

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