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POLICE SCIENCE

SPONTANEOUS HUMAN COMBUSTION AND PRETERNATURAL COMBUSTIBILITY

Lester Adelson

Lester Adelson is Pathologist to the Coroner of Cuyahoga County (Cleveland) Ohio, and an instructor in Legal Medicine in the Department of Pathology at Western Reserve University School of Medicine. During 1949 to 1950 Dr. Adelson served as a Research Fellow in Pathology and Legal Medicine in the Department of Legal Medicine at Harvard Medical School where much of the research was done for his present article. The author is a member of the Academy of Forensic Sciences.—EDITOR.

Spontaneous human combustion is that phenomenon wherein the body takes fire without an outside source of heat and is rapidly reduced to a handful of greasy ashes. Paradoxically, inanimate objects nearby escape relatively unharmed. Preternatural combustibility implies a similar situation, differing from the spontaneous variety in that a spark or a minute flame is necessary to ignite the body which then undergoes incineration.

At the midpoint of the twentieth century a hypothesis which postulates that a living human body can take fire spontaneously and be speedily transformed into a heap of malodorous cinders sounds fantastic. Yet within the present century spontaneous human combustion and preternatural combustibility have been the subjects of serious medical writing, calling forth editorial comment by the *British Medical Journal*. Dixon Mann's treatise, *Forensic Medicine and Toxicology* published in 1922 describes the features of preternatural combustibility. As recently as 1942 Glaister, in the seventh edition of his *Medical Jurisprudence and Toxicology*, dignified these matters by duly noting them. He solemnly states that modern concepts are entirely opposed to the idea of spontaneous human combustion because the human body contains so much fluid. The text continues, "We hold the opinion that no single undoubted case of spontaneous combustion during life has been seen, and that everything contraindicates its possible occurrence." The reader is warned that no medico-legal bearing should be attached to the contingency of "whether or not the subtle processes of physiological chemistry can effect changes which increase the general inflammability of the human body."

During the eighteenth and nineteenth centuries serious medicologists devoted much effort and thought to finding, carefully recording, and attempting to explain cases ascribed to these two mechanisms. Ad-

mittedly rare, instances of spontaneous human combustion were considered proved beyond any doubt. Henke asserted that spontaneous ignition (*incendium spontaneum*) and spontaneous combustion (*combustio spontanea*), formerly considered fabulous and mythical, had been established as real events through the repeated and authentic (*glaubwürdige*) observations of impartial scientists. John Gordon Smith stated "It can no longer be doubted that persons have retired to their chambers in the usual manner, and in place of the individual, a few cinders and perhaps part of the bones have been found."

In the literary world there were writers who regarded these subjects with the respect and belief granted to well-proven and generally-accepted scientific truths. Charles Dickens, noted for his common sense, believed in the occurrence of spontaneous combustion in the living human body. In *Bleak House* he described the death of Krook, a rag and bottle shop owner, from this cause, sparing no pains to make the event as thrilling and mysterious as possible. Considerably criticized and taken to task by a weekly periodical, the *London Leader*, for "giving countenance to such an absurdity" by thus removing Krook from the scene, Dickens poured scorn on the "authorities (of course the wisest) who hold with indignation that the deceased had no business to die in the alleged manner." In a preface dated August 1853 the novelist refers with such complacency to correspondence on the subject between himself and a Mr. G. H. Lewes that it is evident Dickens thought that he had had both sufficient authority to justify himself and the better of the controversy. Captain Marryat, a novelist, disposes of Jacob Faithful's mother in similar fashion. She took fire on board a barge and was burned to ashes, but strange to say, did not ignite the vessel.

ILLUSTRATIVE CASES

Of the forty to fifty cases described in the literature, the following may be taken as typical examples.

"A poor woman at Paris used to drink spirit of wine plentifully for the space of three years, so as to take nothing else. Her body contracted such a considerable combustible condition that one night she, lying down on a straw couch, was all burned to ashes and smoke, except the scull and the extremities of her fingers."¹

"This was the case of the priest Bertholi, described in one of the Journals of Florence for October 1776, by M. Battaglia, the surgeon, who attended him; . . . Don Gio Maria Bertholi having spent the day traveling about the country, arrived in the evening at the house of his brother-in-law; he immediately requested to be shown to his destined apartment, where he had a handkerchief placed between his shirt and shoulders, and being left alone, betook himself to

1. Knott.

his devotions. A few minutes had elapsed when an extraordinary noise was heard from the apartment, and the cries of the unfortunate priest were particularly distinguished; the people of the house hastily entering the room, found him extended on the floor, and surrounded by a light flame which receded as they approached, and finally vanished. On the following morning, the patient was examined by M. Battaglia who found the integuments of the right arm almost entirely detached and pendant from the flesh; from the shoulders to the thighs the integuments were equally injured; and on the right hand, the part most injured, mortification had already commenced, which notwithstanding immediate sacrifice rapidly extended itself. The patient complained of burning thirst, and was horribly convulsed, he passed by stool putrid and bilious matter, and was exhausted by continual vomiting accompanied by fever and delirium. On the fourth day, after two hours of comatose insensibility, he expired; during the whole period of his suffering, it was impossible to trace any symptomatic affection. A short time previous to his decease, M. Battaglia observed, with astonishment, that putrefaction had made so much progress that the body already exhaled an insufferable odor, worms crawled from it on the bed, and the nails had become detached from the left hand. The account given by the unhappy patient was, that he felt a stroke like the blow of a cudgel on the right hand, and at the same time he saw a lambent flame (*bluette de feu*) attach itself to his shirt, which was immediately reduced to ashes, his wristbands (*poignets*) at the same time being utterly untouched. The weather on the night of the accident was calm, the air very pure; no empyreumatic or bituminous odour was perceived in the room, which was also free of smoke; there was no vestige of fire, except that the lamp, which had been full of oil, was found dry, and the wick reduced to cinder."² (This is the only case where the victim survived for several days. It is unusual in that there is no history of alcoholic excess by the victim. The absence of the characteristic odor and ash is noteworthy.)

"The Countess Cornelia Bandi, of Cesena, in Italy, aged 62, and in good health, was accustomed to bathe all her body in camphorated spirits of wine. One evening, having experienced a sort of drowsiness, she retired to bed, and her maid remained with her until she fell asleep. Next morning, when the girl entered to wake her mistress, she found nothing but the remains of her body in the most horrible condition. At the distance of four feet from the bed was a heap of ashes, in which the legs and arms were alone untouched; between the legs lay the head. The brain, together with half the posterior part of the cranium, and the whole chin, had been consumed; three fingers were found in the state of a coal, and the rest of the body was reduced to ashes, which, when touched, left on the fingers a fat foetid moisture. A small lamp which stood on the floor was covered with ashes, and contained no oil; the tallow of two candles was melted on a table; but the wicks still remained, and the feet of the candlesticks were covered with moisture. The bed was not deranged; the bedclothes and coverlid were raised up and thrown on one side, as is the case when a person gets up. The furniture and tapestry were covered with a moist kind of soot of the colour of ashes, which had penetrated into the drawers and dirtied the linen. This case is related by Bianchini and confirmed by other writers."³

"Grace Pett, the wife of a fishmonger of the parish of St. Clement, Ipswich, aged about 60, had contracted a habit, which she continued for several years of coming down from her bed-room every night, half dressed, to smoke a pipe. On the 9th of April, 1744, she got up from her bed as usual. Her daughter,

2. Paris and Fonblanque.

3. Beck.

who slept with her, did not perceive that she was absent till next morning when she awoke. Soon after this, she put on her clothes, and going down into the kitchen, found her mother stretched out on her right side, with her head near the grate. The body was extended on the hearth, with the legs on the deal floor, and it had the appearance of a log of wood consumed by a fire, without apparant flame. On beholding the spectacle, the girl ran in great haste and poured over her mother's body some water, to extinguish the fire. The foetid odour and smoke which exhaled from the body almost suffocated some of the neighbors who had hastened to the girl's assistance. The trunk was in some measure incinerated, and resembled a heap of coals covered with white ashes. The head, the arms, the legs, and the thighs had also participated in the burning. The woman, it is said, had drank a large quantity of spirituous liquor in consequence of being overjoyed that one of her daughters had returned from Gibraltar. There was no fire in the grate, and the candle had burnt entirely out in the socket of the candlestick, which was close to her. There was also found, near the consumed body, the clothes of a child and a paper screen, which had sustained no injury from the fire. Her dress consisted of a cotton gown."⁴

"We propose to refer only to such cases of spontaneous combustion as have been reported at a comparatively recent date, and by men of standing and authority. The first which we quote is reported by M. Devergie. A washer-woman named Marie Jeanne Antoinette Bally, fifty years of age, and of intemperate habits, returned to her lodging one evening in December in a state of drunkenness. Her room was not more than ten feet long by six to seven feet wide, and was lighted by two little windows from a corridor. The only furniture consisted of a chair, a chest in the corner, and *muslin window curtains*. (Italics his). There was no bed. The next morning at eight o'clock, the neighbors, perceiving a strong smell of smoke, entered her room, and there found the unfortunate woman upon the floor almost completely burned, with her feet turned toward the chimney place in which, however, there was no fire. Under one of her arms there was still a portion of the chair upon which she had been seated, and underneath her an earthen pot such as is used by the poor to hold a few coals to warm their feet. The chair was almost entirely burned, the floor was covered with a black soot, and an exposed beam in the wall of the room was charred upon the surface. The chest, however, was untouched, as were *also the muslin curtains* (Italics his), which were only three feet distant from the body. The body was sent to the Morgue, and examined by direction of the judicial authorities. The body was lean; the face and hair, the anterior portion of the neck and upper part of the shoulders were not injured. The skin and muscles of the back were, however, thoroughly burnt, as were also the sides and anterior portion of the trunk. The anus and vulva escaped. Nothing was left of the upper extremities but the bones; there was, however, a portion of the chemise in each armpit still intact. The upper portion of the lower limbs was also burnt. *The stockings were entire.*"⁵

Many physical facts considered closely analogous furnished plausible explanations for these terrifying and awe-inspiring happenings:

1. The known spontaneous combustion at low temperature of certain chemical elements and compounds.
2. The known inflammability of intestinal gases and of gases produced by post-mortem decomposition.

4. Beck.

5. Wharton and Stillé.

3. The peculiar inflammability of alcohol and ether which some people used excessively.
4. The great inflammability of fats and oils.
5. The ease with which certain animal products and vegetable matter (imperfectly dried grasses) took fire spontaneously when piled in a heap.
6. The weird phenomena of electrification and phosphorescence, inexplicable by the science of older centuries.
7. The discovery of explosive compounds by mingling two or more apparently inert materials.

Static electrical phenomena were considered especially significant. Voluminous writings attested to the "ignes lambentes" resulting from friction. It was surmised that such "flames" were harmless only for want of appropriate fuel. Under suitable circumstances "such sparkels reduced to ashes the hair of a young man."⁶ A member of the Royal Society assured that organization that "truly such flames would often arise in us, if the natural moisture did not quench them." At a meeting of that scholarly fraternity on June 20, 1745, Paul Rolli declared, "... a feverish fermentation, or a very strong motion of combustible matters, may arise in the womb of a woman, with such an igneous strength that can reduce to ashes the bones and burn the flesh."

Opinion concerning spontaneous human combustion and preternatural combustibility was not unanimous. Many denounced them as the product of a fevered imagination. "It is sad to think," says Casper in his *Handbook of the Practice of Forensic Medicine*, "that in an earnest scientific work, in the year of grace 1861, we must still treat of the fable of 'spontaneous combustion', a thing that no one has ever seen or examined, the very proofs of whose existence rest upon the testimony of perfectly untrustworthy non-professionals, upon newspaper paragraphs, all of which in their statements laugh to scorn every known physical law." Other authors were no less vehement, stating that no worthwhile evidence supported the thesis of spontaneous combustion. Knott introduced his scholarly dissertation by remarking that doubt had arisen as to the reality of the intellectual progress of the human race when authorities on medical jurisprudence and leading medical periodicals accepted spontaneous human combustion as an article of pathologic faith.

Between the above two extremist opinions was a group who vigorously denied the occurrence of spontaneous combustion in the sense of self-ignition (spontaneous ignitability) of the human body and advocated instead the concept of preternatural (i.e. increased) combustibility. In this latter state the tissues took fire and were incinerated with

6. Knott.

extreme ease, feeding themselves somehow to their own burning.⁷ The end result was an advanced degree of "carbonization" without the aid of any heat derived from the consumption of combustible matter other than that of the tissues themselves.

The attitude of the adherents of preternatural combustibility is well summed-up by the Becks (1860): Opening their discussion with "Can there be such a thing as *Preternatural Combustibility of the Human Body?*" they state that "the term 'spontaneous combustion' was used in a former edition to express this phenomenon, but as that takes for granted what is denied by many (i.e. self-ignition) . . . have preferred the present appellation, the correctness of which . . . *will not be denied by any who have examined the accumulated testimony on the subject.*"

Wharton and Stillé asserted that there was sufficient evidence that the body, under certain circumstances, acquired a preternatural inflammability. This peculiarity manifested itself by the trifling source of the fire as compared with the rapidity and extent of its progress. They affirmed that belief in the actual occurrence could be entertained, even without satisfactory scientific explanation.

Finally, there was a group who rejected the possibility of spontaneous human combustion during life, but admitted that it might well take place after death. Poore remarked, "I can no more believe in a living body igniting than I can believe in grass when it is still growing catching alight before it is stacked." He explained that after death highly inflammable gases were produced as a result of putrefaction, and that these gases took fire spontaneously from heat generated by fermentative microorganisms. He concluded, "There can be no doubt that some bodies are very inflammable, and I see no inherent impossibility in the spontaneous ignition of a body post-mortem."

ETIOLOGY AND DISTINGUISHING CHARACTERISTICS OF SPONTANEOUS HUMAN COMBUSTION AND PRETERNATURAL COMBUSTIBILITY

Review of the cases in the medical and popular literature led to apparently valid conclusions concerning etiologic factors and distinctive criteria in the two related conditions. That medical journals of different nations yielded a variety of examples, all attended by the same phenomena, was freely interpreted as affording irrefutable internal evidence of the authenticity of the cases. Their veracity was further strengthened by the fact that they were reported and seriously discussed by many of the outstanding physicians of the day. Several of

7. Briand and Chaudé.

the cases had been reported to and weightily considered by the Royal Society and subsequently published in their "Transactions", thus receiving the imprimatur of that learned scientific body. Few outside that omniscient company had either the knowledge, the ability, the inclination, or the leisure necessary for an attack on a position thus captured and fortified. The orthodoxy of spontaneous combustion thus solidly established, future contributions sought to account for its occurrence rather than to question its possibility.

Several probable etiologic factors and unique aspects were universally accepted as being intimately concerned with or integral parts of the pathogenesis and course of spontaneous human combustion and preternatural combustibility.

1. The subjects were of either sex with a preponderance of females and were usually far-advanced in life. The increased vulnerability of women was ascribed to the many articles of clothing worn which trapped large quantities of air, thus encouraging vigorous burning. However, cases had occurred where the victim wore only a night dress.

2. The great majority of individuals involved in this species of combustion had made immoderate use of spirituous liquors over a period of years. Almost invariably they were intoxicated at the time of fatal burning. Frequently the conflagration took place following a debauch. The occurrence of spontaneous combustion or preternatural combustibility in temperate or sober persons evoked special comment.

3. Most of the subjects were extremely fat and bloated. Rarely was the body described as being lean or spare.

4. The combustion occurred either truly "spontaneously" or started from a slight or trivial cause such as a spark.

5. Burning proceeded rapidly, the trunk was usually completely consumed, and the extremities were generally spared. Fontenelle offered the valuable diagnostic aid that hair, ordinarily a readily combustible substance, was never burned in preternatural combustibility, whereas the liver and spleen were always damaged.

6. Water, instead of extinguishing the flames, frequently increased their activity, causing them to burn more briskly.

7. The fire did little damage to combustible objects which were in contact with the body or close to it. Wooden floors or chairs on which such bodies were found were merely scorched, and curtains almost touching the body were not burned. The absence of correlation between the extent or burning of the body and the degree of burning of near-by inanimate structures was a hall-mark of this type of conflagration.

8. The combustion of the body left a residuum of greasy foetid ashes with an unctuous stinking ("empyreumatic") odor and a penetrating soot.

9. The combustions occurred at all seasons and in northern and southern countries.

10. The flame was light blue, lambent, and receded as one approached the body.

11. If the individual did not perish at the instant of the accident, "sphacelus" set in promptly. Battaglia's account of Don Gio Maria Bertholi, the unfortunate priest who survived his accident four or five days, stressed the presence of an insupportable odor, detachment of the nails, and the generation of worms during the brief interval between burning and exitus. The prompt occurrence of gangrene and putrefaction in this variety of burning was unknown in other conditions.

Major differences were said to exist between bodies involved by spontaneous combustion or preternatural combustibility and those burned in ordinary conflagrations. The latter were never as completely consumed and usually revealed redness and blisters not seen in the former. Especially noteworthy was the rapidity with which spontaneous combustion produced its effects.

Writings of nations who cremated their dead, descriptions of widow-burnings in India, and accounts of executions of criminals and martyrs at the stake demonstrated conclusively that large amounts of fuel were required to reduce a body to ashes. In the case of a baker's boy named Renard, condemned to be burned at Caen, two large carts of faggots were used to consume his body, and at the end of ten hours remains were still visible. The incombustibility of the human body was shown also by the case of a Mrs. King, murdered by a "foreigner" who attempted to destroy the evidence by burning the remains. "It took several weeks, and after all he did not succeed in its completion." Calculations and experiments indicated that as much as 100 pounds of wood were needed to produce partial combustion of a body of ordinary stature. Bemis stated his view: "I look upon it as no small operation to burn up a body." The detailed descriptions of spontaneous human combustion and preternatural combustibility indicated that only a small quantity of wood or other combustible material had been consumed. Moreover, cremation and burning at the stake were slow and incomplete as compared to the rapidity and thoroughness of the destruction in the published cases. These data pointed to increased combustibility of the bodies of these individuals which permitted their utter and speedy incineration without the help of additional inflammable

materials. It was therefore readily inferred that some extraordinary chemical change had taken place wherein substances of high combustibility had been generated within the body.

A number of hypotheses were offered as explanations for the observed phenomena. The close alliance between alcoholic over-indulgence, acute and chronic, and unnatural combustibility indicated that there was probably an intimate relation between the two, perhaps as close as cause and effect. The remarkable property of the inflammability of alcohol, a water-like appearing liquid, prepared both the uneducated and the scientific mind to readily accept strange stories of its effect on living tissue following prolonged intake. Sturmius informed the medical world of his day, "Often in the northmost countries, flames evaporate from the stomachs of those who drank strong liquors plentifully. About 17 years ago, three noblemen of Curland, whose names, for decency sake, I will not publish, drank by imitation strong liquors, and two of them died, scorched and suffocated by a flame forcing itself from the stomach."⁸

Lair and others spoke of "alcoholic impregnation" of the body, wherein the individual "given for a long time to the use of alcoholic liquors" absorbed the alcohol which was carried to all the tissues. The latter, heavily saturated, were highly inflammable, and took fire at the mere approach of an ignited body.

This theory was vigorously denied. It was pointed out that was no proof that the organs were saturated with alcohol. Moreover, experiments with bodies steeped in alcohol and with animals who had been given alcohol intravenously and their carcasses then put into a fire, failed to indicate an increased inflammability. Attempts to incinerate museum specimens preserved in alcohol resulted in quick burning of only their outer surface with scorching of these areas. The solid tissues of the interior fizzled, burned slowly, and took much longer to be destroyed. Taylor dismissed the theory by stating that alcohol absorbed in sufficient volume to kill the drinker could not possibly have the slightest effect on the combustibility of the body.

To circumvent the above objections, Dr. Thomas D. Mitchel upheld in a "very satisfactory manner the opinion that combustible gases are generated in the system of drunkards by the decomposition of the alcohol which is continually drunk." Speaking before a Parliamentary Committee in 1834, a Doctor Dodds remarked, "What condition of the body tends toward such a fatal issue (i.e., spontaneous combustion or

8. Knott.

preternatural combustibility) or how the various fluids and solids of the human body acquire a chemical constitution fitted for such a phenomenon, it is difficult to explain; but it is well known that alcohol contains in itself all the elements of an olefiant gas, with oxygen and hydrogen in excess, and it is not improbable that after a while its elements might assume that condition which would give rise to such a catastrophe."⁹ John Gordon Smith held the same opinion stating, "Now, if we recollect what is the composition of this substance (alcohol), and that when it is decomposed in chemical experiments, a great quantity of carburetted Hydrogen is evolved, we may perhaps advance one step toward the solution of the problem. We know that Hydrogen is highly inflammable, readily ignited by contact with burning bodies, and also by electricity. That we are more subjected to the action of this power than it were perhaps easy to demonstrate is the opinion of good authorities; and it is perfectly allowable to proceed further, and say that certain states of the system admit of actions that under ordinary circumstances are unknown. These are hints that may not appear of much importance, but they are countenanced by observations that have been made on other occasions."

Forsyth attributed the combustion "to the generation of some subtle gas in the body, arising as a consequence of intemperate habits, which has vitiated every part of the animal economy, so that when once ignited, whether by coming in contact with a fire or flame, it becomes its own supporter as long as any of it remains unconsumed."

Some authors felt that the influence of alcohol resulted from its being responsible for the deposition of body fat. The high inflammability of fatty and oily substances had been familiar since the earliest attempts to construct a primitive candle or lamp. Booth, reporting a case of preternatural combustibility and discussing the underlying factors said "that increased combustibility exists cannot be denied though at first sight it is not clear to what it owes its existence." Dismissing as untenable all but one of the theories, he stated that the only valid hypothesis was that increased combustibility was due to an excess of fat. Review of the reported cases, he asserted, demonstrated that incineration was most extreme in the skin, subcutaneous tissues, and other areas where fat was abundant and least in organs and regions with little fat. The fatty degeneration of various organs plus the fat deposited in other parts of the body represented a mass of oleaginous matter sufficient to account for the combustion. Once ignited, it would burn *in situ* rather than flow out, thus explaining the great destruction

9. Ryan.

of the corpse as compared to the objects in its vicinity. The clothes and fat of the body were compared to the wick and tallow of candle. Sédillot combined the alcohol and obesity theories. He stated that abundant adipose tissue and the habitual use of alcohol were the two factors responsible. Under these conditions the body presented a cellular tissue whose elements were combustible and "hydrogenated."

The simple and obvious explanation that alcohol rendered the subjects of these strange accidents unconscious and thus defenseless to this type of injury was rarely mentioned.

A hypothesis promulgated by Maffei, LeCat, Kopp, and others ascribed spontaneous human combustion and preternatural combustibility to the "electric fluid" in the body, eliminating the necessity of an ignited substance to initiate the process. Citing various organic substances which took fire spontaneously, they described morbid states of the body in which simple friction elicited electrical sparks. It then sufficed to postulate a similar situation within the body with production of enough electricity and heat to set fire to the combustible elements. Marc endeavoured to fortify this theory by predicated that inflammable gases accumulated in the "cellular tissues," and so "primed" the body. The gases consisted of hydrogen and its compounds, explaining the failure of water to extinguish the fire and the minimal damage sustained by contiguous and neighboring objects. The heat required for the "inflammation" (i.e., the kindling-point) of these gases was much lower than that necessary to ignite the wooden or cloth objects in the room. This theory, which did not necessitate the presence of alcohol or its decomposition products, was used to explain spontaneous combustion in sober victims. The concept was valuable inasmuch as no ignited body was called into play, and the process could then truly be called "spontaneous."

Fontenelle and Luff proposed an "internal decomposition" with the formation of highly inflammable substances as a probable explanation for the thoroughness and rapidity of the combustion. Cases had been recorded in which sober individuals had set fire to their breath in blowing out a match, or had burned their faces when they belched while holding lighted objects close to their mouths, illustrating vividly the presence of inflammable and explosive vapors within the living body. In slightly modified form this theory was offered as recently as 1924 by Dixon Mann as a basis for preternatural combustibility. He asserted that inflammable gases were formed in the abdomen either during life or from abnormal changes commencing immediately after death. The gases, once ignited, burned vigorously and raised the tem-

perature of the soft tissues (especially the fat) so high that they became carbonized and gave off gases which also took fire, establishing a chain type of reaction.

Discovery of the element phosphorous and study of its properties plus the fact that it was readily found in human urine and bones provided data for a possible physical basis for spontaneous human combustion and preternatural combustibility. Its rapid oxidation with heat and flame at low temperature and its gradual (and very obvious) transformation into "dust and ashes" were strong presumptive evidence that the human body could take flame from within itself without external aid. Willis, in his "Urinary Diseases" suggested that "the phosphorous which is commonly eliminated in such quantity by the kidney is not duly discharged"¹⁰ by habitual drunkards, and the body became filled with an oily solution of phosphorous, ready to ignite at any time. Apjohn spoke of a "phosphoretted hydrogen" which was generated in the body.¹¹

A new approach was suggested by Hava¹² in 1894. He felt that preternatural combustibility resulted from a progressive accumulation in the tissues over a period of years of "carbonic oxide" (carbon monoxide); contact with flame or fire was indispensable to start the conflagration. According to his view, the continuous piling up of carbon monoxide in tissues led to expulsion of oxygen with resultant slowing of the oxidative metabolic processes. This favored the deposition of fat and explained the continual complaints of prospective victims that they felt cold. (No other author makes mention of this complaint.) The subjects of preternatural combustibility usually inhabited poorly ventilated rooms heated by stoves and frequently employed charcoal foot-warmers to keep comfortable. These unfortunates were thus exposed to atmospheres containing moderate quantities of carbonic oxide. The luminous flame seen in bodies undergoing this form of combustion was said to be identical with the flame produced by carbon monoxide, further strengthening the impression. The victims, unconscious or dead, came in contact with a flame and the carbonic oxide started to burn, producing intense heat and carbonizing the skin, subcutaneous, and muscular tissues. The carbonized tissue, light and porous, absorbed the melted fat and burned with a characteristic smoky sooty flame. A continuous reaction was thus established. Hava described experiments with rabbits and roosters, wherein he kept the

10. Beck and Beck.

11. Beck and Beck.

12. Luff.

animals for several months in an atmosphere impregnated either continuously or periodically with carbonic oxide. As a result of this exposure their tissues were said to acquire an increased combustibility. The shortest interval in which he succeeded in accumulating sufficient carbon monoxide in a rabbit to produce increased combustibility was 169 days of continuous administration. Such animals burned readily with a bluish flame, leaving porous charred masses which retained the shape of the consumed parts. Under similar conditions the flesh of a rooster required eight months to attain a like degree of inflammability.

Keysor's analysis of thirty "ardently reported and warmly defended" cases led him to conclude that the combustible persons had been elderly, of either sex, and "too despicable to die in some regular way. The consuming fire came like an angel unawares and departed like a thief in the night. No lambient flame played around these alcoholic fiends like the graceful and entwining blaze over a Christmas pudding; no holy light illuminated their transition from animate soap-grease to inanimate potash. Combustion began gently at some modest anatomical part, and insinuatingly and soothingly worked its way toward the extremities like fire in smouldering cotton or a piece of punk. When it ceased its beneficent labors, nothing of the unfortunate inflammable was left but a bad reputation, a horrible odor, a lot of fatty soot, and, perchance, a limb or two. Such cases are neither accidental deaths nor homicides; they are simply acts of God."

The small group who accepted the possibility of post-mortem spontaneous combustion believed that fat flabby alcoholics who died in an intoxicated stupor, and in whom the cessation of life had been due to a fatty heart, furnished especially favorable circumstances for the growth of a microbe which "brewed" combustible gas or a "combustible something."

The foregoing theories are representative of the "scientific arguments" invoked to explain the genesis of spontaneous human combustion and preternatural combustibility. Some are quite ingenious, others are comparatively simple. Most striking is the feature, common to all, of not questioning even slightly the possibility of these rare and unusual events. When disagreements arose between these investigators, it was almost always about the "*how*"; rarely did it concern the "*yes*" or "*no*."

MEDICO-LEGAL ASPECTS

Few phases of medical jurisprudence evoked controversies as violent as those precipitated by preternatural combustibility and spontaneous

combustion. Deep interest in these rare and catastrophic events was stimulated by the important legal implications. The commission of a capital crime frequently presented itself when bodies were found under circumstances where the issue of either type of conflagration would be raised.

The proponents of spontaneous human combustion viewed with misgiving the miscarriages of justice that could and did occur (they said) when the possibility of these phenomena was disregarded. They contended that innocent persons had been found guilty of either homicidal burning or of murder followed by attempted cremation of the body, when in truth the entire chain of events including both death *and* incineration resulted from spontaneous self-combustion. References were made to "judicial murder" perpetrated on two innocent men, whose wives, according to the testimony of experts, had perished by spontaneous combustion. Nonetheless, the accused were executed because a stubborn inexperienced jury found them guilty. The admonition was offered that even though the true nature of the process was obscure and not readily explained by current theories, those concerned with investigating such matters should be well-acquainted with the situation to prevent such unfortunate errors. No difficulty or confusion should arise in differentiating a body burned as a result of spontaneous combustion from a body burned in the ordinary way. In the latter instance one could readily demonstrate that a murderer was attempting to destroy tell-tale evidence of homicide. Such bodies differ markedly from one another. Moreover, examination of the surroundings would immediately disclose what had actually transpired.

The preternatural combustibility partisans declared that even though one accepted the fact that the human body or parts of it might acquire increased inflammability, the medical jurist would perceive that this admission created no difficulty in determining judicially the question of murder by burning. The theory contended that the fire could not start except by contact with a substance already in a state of combustion. Whether ignition of the deceased or his clothing had occurred accidentally or as a result of criminal intent would be determined by examination of general and circumstantial evidence. The contention that some bodies burned more readily and completely than others was therefore no answer to the charge of causing death by fire. Should the accused maintain that the clothing was ignited without malicious intent, and that death would not have resulted but for the preternatural combustibility of the deceased, the obvious answer was that the intention motivating a person to set fire to the clothing of another when he did

not know to what degree burning would extend was a matter for the jury to decide.

Finally, those who rejected the existence of spontaneous human combustion and preternatural combustibility pointed out that a defense of spontaneous combustion would be most convenient for assassins. "After the commission of a murder, it would be possible for the criminal to burn the body and ascribe the charred remains to spontaneous combustion." Criminal investigators were advised to approach the problem with caution, and it was emphasized that a murderer could employ petrol, benzine, paraffin, methylated, spirit, or other inflammable liquids which left no trace after having been set aflame. The value and necessity of thorough and complete post-mortem examination in severely burned bodies was repeatedly stressed in order to eliminate the possibility that death resulted from criminal action. Baron Liebig summed up the duties of physicians in alleged death from burning. "In case of fire, when the investigation is extended to all those who had access to the place where it broke out, it often happens that the incendiary or the actual originator of the fire is discovered. Legal medicine, even if the theory of spontaneous combustion were true, which it is not, ought not to interfere with so simple a proceeding, justified as it is by experience, until all other probable causes of the fire have been excluded. If such interference takes place, those who adopt this course deprive science of its proper rights, and become partakers of the incendiary's guilt; they protect the criminal by misleading those whose duty it is to conduct the investigation. The physician who is called in to give evidence in such cases can only say, if he act according to his duty and conscience, in what state the body was found, whether death was caused by fire alone, or before the action of the fire, by other means, such as wounds, strangulations, or a blow on the head, etc. In no case is it permitted to him to explain anything he has not seen by means which he has also not seen, or by a theory which he cannot understand."

SUMMARY

Spontaneous Human Combustion and Preternatural Combustibility are relics of an age when love of the marvellous, the miraculous, and the seemingly inexplicable titillated the mind and imagination of scientist and layman. One must appreciate the effect on the intellect of the uninitiated observers of older centuries when they noted and recorded the phenomena of spontaneous ignition and combustion of organic and inorganic materials. The uncanny powers of Nature were immeasurably

more impressive in an era when faith, superstition, and awe were more abundant than they are in our own materialistic age.

A desire for fame and notoriety, not always a negligible factor in physicians or men of science, appears to have been accountable for some of the contributions. Others were made available to posterity by the then-current tabloids and sensation-seeking periodicals. No single dramatic incident, spectacular case, or philosophic exposition killed off the concepts of Spontaneous Human Combustion and Preternatural Combustibility. Belief in them slowly ebbed and was replaced by complete lack of interest.

The cases in the literature are readily explained as accidents or (rarely) as homicides. The severe generalized destruction of the body formerly considered to be at variance with the ordinary effect of fire is known now to be quite possible. It is not improbable that the degree of burning was exaggerated by writers and sensation seekers to help emphasize a point, a feature of news reporting not unknown today.

The most noteworthy feature of the entire topic is the prolonged acceptance of these phenomena by educated scientific men when chemistry, physics, and biology should long have effectively relegated them to the status of spontaneous generation, witchcraft, necromancy, and black magic. As with other facets of human knowledge, belief died slowly and the scientific *status quo* had sufficient inertia to resist any sudden change. Only the slow processes of intellectual attrition and gradual intellectual awakening placed Spontaneous Human Combustion and Preternatural Combustibility in their proper locus . . . monuments to bygone days when arm-chair speculation furnished the answers to "burning questions."

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