

# Public Health Then and Now

## A B S T R A C T

Despite criticism from safety professionals, scientists continue to use the word *accident*, meaning an unexpected, unintended injury or event. Some argue for its use based on tradition, but “traditional” arguments appear to be invalid given our examination of the history of the word and its companion phrase *act of God* in statistics, law, and religion. People who were interested in public health recognized in the 1600s that unintended injuries were neither random nor unexpected. Legal scholars in the 1800s saw the word was useless for technical purposes. The word does not appear in the Bible until the mid-1900s, and then only in a paraphrased edition. Others have maintained that the meaning of *accident* is well understood, even though it has not been perfectly defined. We maintain that without a clear definition, people substitute an image, which may be distorted or damaging. (*Am J Public Health*. 1996;86:101–107)

## Accidents and Acts of God: A History of the Terms

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### Introduction

The word *accident* often obstructs the study of injury prevention.<sup>1,2</sup> The word suggests an event that takes place without foresight or expectations, yet such events as a group are not random and do not occur by chance; they can be expected to happen, even if the time, place, and precise circumstances cannot be foreseen.<sup>3,4</sup> When the word is used to describe human error, it frequently does so in a way that inhibits examination of the factors contributing to the error and consequent injury.<sup>5</sup> The public usually associates the word with an event, not with the damage that results. For example, many people understand *accident* to mean a car crash, rather than the transfer of energy associated with the crash. This distinction is important to the science of injury prevention because air bags or design features can prevent the transfer of energy, which causes injury, even if the “accident” (e.g., car collision) occurs. Moreover, the word *accident* has acquired a biblical connotation, an “act of God,” which makes it a particularly poor choice to describe unintended events or catastrophes. People try to excuse negligence such as drinking and driving by claiming that accidents are acts of God (i.e., beyond their control)—a defense that too often has been successful.<sup>6,7</sup> Overall, the word provokes various levels of frustration in the professional safety community. William Haddon, a leader in the field of injury prevention and the first administrator of the National Highway Safety Bureau, asked people at his meetings to put a ten-cent fine in a penalty jar each time they used the word. Donald Robinson, president of the National Safety Council’s Campus Safety Association, put a harder edge on the issue: He called for the elimination of the “A” word.<sup>8</sup>

Criticism notwithstanding, the use of the word has been remarkably persistent (see photo of National Safety Council publication). For example, in 1989, an international conference was titled “First World Conference on Accident and Injury Prevention.” The organizers justified the word *accident* on the grounds of traditional usage.<sup>5</sup>

This article explores the history of the word *accident* and the associated phrase *act of God* to determine whether there is a traditional usage and how it may have arisen. Historical examinations frequently provide insight and a logical structure to examine controversial subjects.<sup>9,10</sup>

### Background

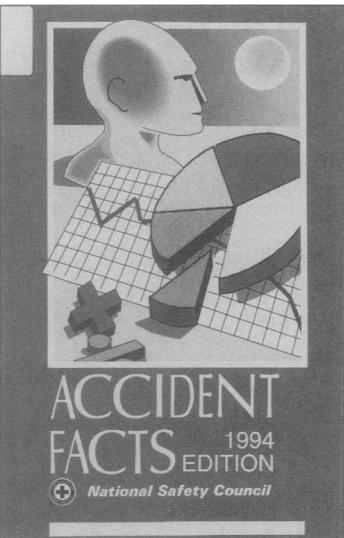
*Accident* is a word with a rich philosophical pedigree and an interesting etymological history.<sup>11,12</sup> Aristotle used it to define nonessential or extrinsic characteristics. Thus, people and things had substantial and accidental qualities. Two legs were not a substantial quality of humans; they were an accidental quality because some animals also walk on two legs, and a man or woman with one leg is no less human. Greek, Roman, and medieval philosophers applied Aristotelian philosophy to questions of law and causation.<sup>13,14</sup> The physician Maimonides (ca. 1200) wrote:

Every body is necessarily composed of two things and is necessarily accompanied by accidents. The two things

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Cover page from the National Safety Council's 1994 yearly publication of Injury facts.

constituting it are matter and form; and the accidents accompanying it are quantity, shape, and position.<sup>15</sup>

About the 14th century, at the peak of Norman influence, the English began to use another meaning of the word, the meaning commonly understood today: to happen by chance; a misfortune; an event that happens without foresight or expectation. This meaning is associated with the French word *accidence*, which may be a corruption of the Latin verb *accidere*, meaning to fall down or to fall to.<sup>16-18</sup> This usage is found in 1374 in Chaucer and subsequently in 1483, 1571, and 1604 in Caxton, Queen Elizabeth, and Shakespeare, respectively.<sup>18</sup> In 1633, Stephen Bradwell, an English physician, used the modern meaning in his publication of the original first aid guide, *Helps for Sudden Accidents Endangering Life*.<sup>19</sup>

Two other meanings should be noted. The word has been used to designate an unfavorable symptom or a component of a patient's illness, but this usage appears confined to medical practice in the 1500s through the 1800s.<sup>20</sup> The derivation is uncertain. One may suspect the influence of Maimonides, whose treatises on poisons strongly influenced medieval medicine.<sup>19,21</sup> Foster's *Medical Dictionary of 1890* describes an accident as an "epiphénoménon."<sup>22</sup> Such usage is largely excluded from current medical dictionaries.<sup>23-25</sup> Another meaning describes the accent marks on royal emblems and in

musical scores.<sup>16,26</sup> These last two meanings will not be discussed because they have no bearing on the present topic.

## Statistics

The modern word *accident* appears in 1592, in London's vital statistics, "The Bills of Mortality." John Graunt published an analysis of these records in 1662 in his classic work, *Natural and Political Observations made upon the Bills of Mortality*.<sup>27</sup> The "Bills of Mortality" listed approximately 65 categories of death, mainly infectious diseases, which killed most people. In 1647, for example, 13 142 deaths were recorded. There were 1260 deaths from ague (malaria) and fever, 1369 child deaths before 1 month, 2423 deaths from consumption (tuberculosis), and 3579 deaths from plague. Twenty-seven deaths resulted from the deceased's being "Killed by several accidents." Two additional categories, "Drowned," and "Burnt and Scalded," which would be classified as accidents in modern records, added 47 and 3 deaths, respectively, to the total for the year 1647.

Graunt noted that the number "Killed by Several Accidents" was "chronical," that is, about the same every year. The predictability of these deaths, like those from suicide and homicide, stood in dramatic contrast to "epidemical" deaths from plague, smallpox, and measles, whose numbers rose and fell apparently at random. Graunt was a devout man, but there is little to suggest that he adhered to the fundamentalist notion that plagues were divinely inspired. Fire and water provided two more ways for God to signal His subjects. Still, Graunt avoided comment about morbidity from burns and scalds. He further separated the Almighty from unintended injuries by observing their occupational nature. "We shall say nothing of the numbers of those, that have been drowned, killed by falls from scaffolds, or by carts running over them, etc. because the same depends upon the casual trade, and employment of men."

Graunt's *Observations* used both the philosophical and modern meanings of the word *accident*. For example, his dedication describes his good fortune in realizing the importance of vital statistics: "Now having (I know not by what accident) engaged my thoughts upon the Bills of Mortality," while his conclusion discusses various applications of the data, "which particulars I call the intrinsic value: for there is also another value merely accidental, or extrinsic."

The philosophical meaning of the word appeared to dominate in other parts of Europe. M. Andrea Reyher published his *Total Synopsis of Philosophy* in Germany in 1669. Reyher defined *accident* as an extrinsic quality; his index listed seven entries for the word, all related to the nature of a person or thing. His references to statistics contained no mention of accidents.<sup>28</sup> A century later, the modern meaning appears in Germany. Kirschius's *Latin-German Dictionary* defines *accident* as an extrinsic quality; it also gives the modern meaning: to fall by chance, *Unfall*; to have misfortune or a happy event, *Zufall*; and so on.<sup>29</sup>

Did unintended injuries have a public health impact before the Industrial Revolution? This remains an open question. Drownings, dog bites, assaults, and child abuse may have been as much of a problem then as in modern times.<sup>30</sup> Notable works of art such as Botticelli's *Miracles of St. Zenobius* (ca. 1504) describe miraculous cures of injured children. Klaus Beitl's book *Votivbilder*<sup>31</sup> describes woodcuts of Austrian disciples of Lucas Cranach that illustrate miraculous healings of persons with severe injuries (see photo of woodcut). The medical historian Norman Gevitz notes that evidence from diaries and medical records suggests that injuries were serious, but perhaps not so serious that the reading public rushed to buy first aid books. Bradwell's well-written and instructive guide made little public impression; neither his contemporaries nor writers of the 17th and 18th centuries saw fit to imitate it.<sup>19</sup>

The predominant fear in the Middle Ages was epidemic diseases. Famine (but not malnutrition) had largely disappeared from Europe by the 1400s. War always threatened, yet most premature deaths came from smallpox, measles, bubonic plague, malaria, tuberculosis, and enteric diseases. The collective death rates for these diseases far exceeded those for injuries. The "Bills of Mortality" for the year 1647 in London give an estimated death rate from unintended injuries as 2.1 per 100 000, or 0.6% of all deaths.<sup>27</sup> Gevitz calculated a similar value for the year 1633.<sup>19</sup> For reference, the same rate for Philadelphia was 50 per 100 000 in 1870 and 36.6 per 100 000 in 1900.<sup>32</sup> The rate for the United States was 34 per 100 000 in 1992.

As the Industrial Revolution took hold, injury rates escalated in the late 1700s and expanded rapidly in the 1800s. Railroad, textile, and mining industries

began recording work-related injuries in the early 1800s. The data often were controversial, and because there were no records of farm injuries, one cannot say whether industry was more dangerous than agriculture (see photo, "An Accident"). Low death rates from injuries before the Industrial Revolution could be misleading because the incidence and severity of injuries cannot be measured from mortality data. After the Industrial Revolution, however, a growing number of influential people believed that careless use of high-powered machinery had created unacceptable risks.<sup>33,34</sup>

Safety legislation became an issue in the early 1800s, an issue that eventually led to the workmen's compensation acts of the early 1900s.<sup>33,35</sup> During this period, it is difficult to find any credible effort to associate injuries with divine influence. Industrialists could have been tempted to call forth the easy excuse and apparent moral association between accidents and acts of God. Instead, they simply blamed workers for carelessness. Others, however, called for an end to inhuman working conditions, child labor, and female sweatshops. Both sides believed human actions rather than acts of God were the source of unintended injuries. Religious persons confined themselves to reminding legislators that child labor and certain work practices were immoral.

## Legal Traditions

Abraham Fraunce, a practicing lawyer, used the philosophical and personal-injury meaning of the word *accident* in 1588 in his book, *The Lawyer's Logic*.<sup>36</sup> Despite Fraunce's modern interpretation, legal scholars avoided the word for more than two centuries. The modern word is not found in legal dictionaries until the 1800s,<sup>37-40</sup> and then only as a minor reference.<sup>41-45</sup> Several reasons could account for the neglect. From the Middle Ages through the mid-19th century, lawyers were first trained in classical natural philosophy; the philosophical meaning of *accident* undoubtedly served as their primary definition. Legal scholars understood that the modern word was not suitable for judicial matters because, outside of philosophy, it was not a technical term. It was difficult to define; and although in its popular sense no one misunderstood it, no one—even those who spoke as experts—had been able to state the definition with sufficient sci-



Aines armen man khind fiel yn ainentieffen Brunndarin vber nacht gelegen. Do verthies er es zw vnter frawen gen Zell es war lebendig oder todt do fandt Er das khind todt vnd als er Mariam mit großer anacht annehmen ward es lebendig vnd prachts gen Zell.

Mirakeibild: Rettung eines Kindes aus einem tiefen Brunnen.  
Holzschnitt um 1520.

Woodcut (ca. 1520) attributed to student of Lucas Cranach. The text written in Early High German says, "A poor man's child fell into a deep well and lay there all night. He [the father] made a vow to Our Good Lady of Zell asking her to protect his child alive or dead. He found the child dead. But as he prayed to Mary most affectionately the child returned to life and he brought the child to Zell." From Beiti's *Votvbilder*.<sup>31</sup>

tific or critical exactness to command universal approval.<sup>41,42</sup> The modern word was too ambiguous; it could embrace both trivial damage and the loss of life. Moreover, the injured party could not be compensated for an accident. Victims were compensated for injury and property

damage arising from negligence. Figlio cites Blackstone:

If a [horse or ox] of his own motion, kill as well an infant as an adult, or if a cart run over him, they shall in either case be forfeited . . . which is grounded upon this additional reason, that such misfor-



**"An Accident," by Dagnan-Bouveret, 1879. A doctor bandages the hand of a 12-year-old farm boy in a realistic scene from peasant life. Courtesy of the Walters Art Gallery, Baltimore.**

tunes are in part owing to the negligence of the owner.<sup>35</sup>

The phrase *act of God* has a much older tradition.<sup>46</sup> Its legal origins can be found in Roman law, which heavily influenced the development of civil law in England.<sup>47-49</sup> In Roman law, obligations arose from duties and contracts.<sup>48</sup> For example, a person had a duty to answer a summons or writ. Judges could grant an *essoin* (excuse) for failure to appear in court or failure to answer a writ if the person were detained by a superior force, *vis maiorum*.<sup>49</sup>

Obligations generated by contracts became more complicated with the growth of mercantilism and the middle class. Judges began to consider that *vis maior* could excuse a failed contract. The Roman concept of *vis maior*, similar to the French *force majeure* and the Scottish *damnum fatale*, was not limited to natural disasters. Acts of war and crimes by pirates and robbers also could exclude a person from an absolute liability. A tenant would not have to pay rent if the crops were destroyed by *vis maior*; violent storms and pirates exempted a captain from responsibility for his cargo.<sup>46</sup>

As Christianity cemented its hold on medieval England, the phrase *vis maior* became an "act of God." True believers declared that what had been Aristotle's "prime cause" was in fact their "Christian

God."<sup>36</sup> English jurists in the late 16th and 17th centuries found it politically expedient to use English rather than Latin. In addition to being an important literary figure, eminent lawyer, and influential government minister, Thomas Wilson denounced pedantry, "strange inkhorn terms," and the use of French and "Italianated [words that] counterfeited the kinges Englishe."<sup>50-52</sup>

The translation, however, did not mean a transition. English law traditions were based on narrow case rulings rather than broad legal generalizations. These traditions also carried a large dose of skepticism that directly opposed any movement toward religious fundamentalism. *Essoins*, for example, did not excuse an obligation, and the potential *essoinee* had to supply witnesses and documents to validate the excuse. "If he falls among thieves who bind and rob him and so detain him that he cannot send a messenger [he will be excused from appearing in court] provided the impediment is proved."<sup>48</sup> A man could be excused from court if he believed that storms or flood waters, *vis maior*, made the road too dangerous. But he had to prove that he could not take another path, and it would go against him if another took the path without difficulty.<sup>49</sup> Judges continued to rule that in law, an act of God did not depend on divine influence, including

violent storms at sea, unprecedented rainfall, extraordinary floods, earthquakes, and death.<sup>44</sup> In 1609, a British court ruled that a fire caused by lightning was an act of God. In 1785, a court ruled that a fire not caused by lightning was not an act of God (see reference 45 and cases cited therein). In 1886, England's Lord Esher ruled, "In the older, simpler days I have myself never had any doubt but that the phrase does not mean act of God in the ecclesiastical and biblical sense . . . but that in a mercantile sense."<sup>44</sup> By the 1800s, the courts routinely rejected claims that God was responsible for human negligence.<sup>44,45</sup>

Inevitably, the courts had to contend with common language in negligence suits, language that made unforeseen events "accidents" and superior forces "acts of God." Legal authorities defined an *act of God* as an extraordinary event that could have been neither predicted nor prevented.<sup>43,45</sup> An American legal reference defines an *act of God* as "any accident, due directly and exclusively to natural causes without human intervention, which [could not] have been prevented."<sup>43</sup> Despite this semantic juggling, legal authorities in England and America took great pains to keep the Almighty separate from human responsibility. The courts ruled that to qualify as an act of God, the accident must be due to natural causes without human intervention.<sup>43</sup>

### **Religious Tradition**

An example of the unfortunate association between accidents and religion comes from a modern translation of the Bible—a translation of which over 38 million copies had been printed by 1994. This translation of Exodus 21:12-13 (from the *Living Bible*, published in 1971), paraphrases Old Testament sources<sup>53</sup>:

- 12: Anyone who hits a man so hard that he dies shall surely be put to death.
- 13: But if it is accidental—an act of God—and not intentional, then I will appoint a place where he can run and get protection.<sup>53</sup>

Translations of Exodus 21:13 based on traditional Hebrew sources are "but God caused it to happen,"<sup>54</sup> "and God had caused it to come to his hand,"<sup>55</sup> and "but God placed him into his hand."<sup>56</sup> Original English translations are similar: "But God delivered him into his hands."<sup>57-59</sup> The Latin *Vulgate*, published in English in 1609, contains neither the word *accident* nor the phrase *act of God*.<sup>60,61</sup>

We are aware of no 16th- or 17th-century translations of the Bible that translate or paraphrase human misfortunes as accidents. A likely reason is that the philosophical meaning of the word played a role in a notable theological argument in which its philosophic meaning was critical. The *Oxford Dictionary of the Christian Church* frames the argument as follows: how do bread and wine retain the "accidents" of the former, e.g., taste and color, after being transformed into the body and blood of Christ?<sup>62</sup> This argument was more than an academic exercise; it symbolized another Reformation attack on Rome. The Catholic Church held the theory of *accidentia sine subiecto*, meaning, in brief, that the sacred Eucharist had the "accidents" of bread and wine without compromising its substance. John Wycliffe, Jan Huss, Martin Luther, and the Reformers generally rejected this theory, thus ensuring that the debate remained active. Medieval intellectuals undoubtedly were aware of the controversy and would not lightly attempt to paraphrase religious text. Translations of religious documents customarily required permission from an authority. In 1543, Parliament passed laws restricting translations and the use of the Bible; women, unless they were "noble or gentle women," were forbidden to read the Bible under pains of fines and imprisonment.<sup>63</sup> Heresy could be punished by death. Wycliffe, who was among the first English translators, only lost his job; Tyndale, forerunner of the great King James version of the Bible, was strangled at the stake and his body burned.

In the 1500s, as printing and vernacular translations made the Bible available to commoners, one began to find expression of a fundamental idea that God acted in daily life; sickness and misfortune were the wages of sin. Fraunce captured the idea in *The Lawyer's Logic*, a book licensed by the Bishop of London<sup>64</sup>:

But indeed, this name of Fortune, Chance, Hap, or Hazard, was only invented by such as knew not the first cause, Gods providence: And therefore when any thing fell out contrary to their expectations, whereof they neither understood the cause, nor could yield any reason, they said it came by chance, fortune, and hazard. Whereupon fortune was made a goddess of good luck: and many christians used these profane terms, God send me good luck, and good fortune.<sup>65</sup>

Preachers undoubtedly attributed human misfortunes to providence. Infectious diseases were widely regarded as divine



"Where the wind blows." From the art series *Meltdown*. Courtesy of the Ronald Grant Archive, London.

intervention. Yet plagues were a special case. They were so poorly understood that even intellectuals despaired of comprehending their etiology. Injuries, however, presented no such mystery. Thus, the concept that accidents were acts of God never was officially recognized by Western religions. Moreover, any reader of the Bible would recognize the frequent admonitions for preventive care in, for example, Deuteronomy 22:8 on guard rails: "Every new house must have a guard rail around the edge of the flat rooftop to prevent anyone from falling off" and Exodus 21:28–29, 36 on animal control: "If a man's ox injures another . . . [an ox that] was known from past experience to gore, and its owner has not kept it under control . . . the owner of the living ox shall pay in full." It seems doubtful that preachers could make medieval citizens accept claims that God was responsible for human errors. The sense of the citizens can be seen in their acceptance of numerous court rulings that upheld human accountability for injury and property damage, rulings that found, for example, that fog, ordinary snowfall, and fires not caused by lightning were not acts of God.<sup>66</sup>

The translation of Exodus 21:12–13 cited above, which linked accidents with acts of God, did not appear until the mid-1900s.<sup>63,65</sup> The *Living Bible* is a paraphrase, and its publisher carefully advises readers about the values and problems of paraphrases.<sup>63</sup> Although there is no evi-

dence that organized religion sanctioned such modernization, organized religion may not be entirely free from interference in this matter.

In certain cultures of Old Europe and the Orient, an almighty, eternal goddess was worshiped. She was believed to be present as a young maiden, a marriageable woman, and an aged wife; she symbolized spring, summer, and winter and phases of the moon—waxing, full, and waning. According to ancient Greek, Latin, Teutonic, Celtic, and other mythologies, men's fate was guided by three mystical women winding life's thread from a reel, cutting off that thread when it reached its full length. In Teutonic mythology, three sisters sat under the world's ash tree spinning and manipulating the threads of life. Two of the sisters were white and benevolent, one was dark and hostile. The most powerful was "urd" (*wurt* in old High German, *wyrd* in old English; therefore, the witches in Shakespeare's *Macbeth* were the "weird sisters").<sup>66</sup> Christian missionaries, parish priests, and church authorities were remarkably successful in extinguishing the pagan belief in holy women who spin and weave fate. The most important results were achieved between the 1500s and 1600s when the classical concept of fate and destiny was overcome and subdued.<sup>67</sup> The apparent advantage of religions with many gods was lost: the thoughtful person was skeptical about assigning human injuries to only

one of them. From the 16th century on, "mothers" or "sisters" did not allot men's destiny, but righteous Christians believed that God—always portrayed as a man—guided the way and determined fate. Officially, fate falls (from the Latin *accidere*) to a person by the grace of God. Some myths about fate survived as legends and fairy tales (e.g., Sleeping Beauty) and, ironically, as Christian saints (St. Barbara, St. Margaret, and St. Catherine).<sup>68</sup> Yet by the 1700s, fate was a masculine idea.

## Discussion

The present study shows that the modern meaning of *accident* appeared in the 1400s. Its success was understandable, for the new word conveyed a mixture of ideas: injury, property loss, unexpected events, and unintended results. As the medieval world had few scientific tools to investigate causation, it was not surprising that the word eventually associated itself with the phrase *act of God*. There is little evidence to suggest, however, that the appearance of the modern word created any tradition in science, law, or religion. To the contrary, whenever the word *accident* was examined for technical use, it was rejected.

Given no objections from religion or the law, it seems an easy matter for science to use the proper semantics in describing unintended injuries. However, this is no easy matter. First, legal authorities frequently note that science and the law can take widely different views of similar facts. Science argues for rigorous studies to prove cause and effect, whereas the courts are ready and willing to compensate plaintiffs with much lower standards of proof.<sup>69</sup> Judges may have no use for the word *accident*, but practicing attorneys find it increasingly important to advertise their skills. A brief review of the advertising sections of the 1993 through 1995 Baltimore telephone directories showed that approximately 30% of the 225 to 250 lawyers advertising each year list some type of accident expertise. Moreover, a number of sovereign states ruled by religious fundamentalists find it convenient to blame acts of God for the substantial loss of life and suffering that accompany natural disasters, though such disasters are not unexpected and enforcement of building codes, for example, would greatly mitigate the loss of life. Third, the word *accident* has remarkable political uses. Government and corporate bureaucrats disguise negligence by camou-

flaging mistakes costing millions of dollars with those costing pennies under the single line item "accidents" (The word sometimes used is *incident* or *mishap*.)

Scientists also can use words inappropriately. Two weekly journals, both leading publications in their fields, recently carried articles claiming, "Accidents will happen." The first was a book review about the nuclear industry<sup>70</sup>; the second described a public interest report on the chemical industry.<sup>71</sup> The cartoon accompanying the book review (see photo) showed a hapless couple in the foreground with a rising mushroom cloud in the background. In both cases, the writers use the word *accident* to mean an unexpected or random event and also to mean significant damage and injury. Safety professionals have understood for decades that unexpected events (accidents) will happen, yet injuries and property damage can be controlled and prevented. The less informed reader, however, could conclude that certain technologies are unusable. □

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