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CHAPTER 3

ACCIDENT

> Man has a persistent tendency to tamper with his environment and so lives in one of his own making, frequently without anticipating the consequences.
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> Albert P. Iskrant and Paul V. Joliet, *Accidents and Homicide*

Simple accident is a subject of less intrinsic human interest than either homicide or suicide. Almost nothing relevant has been written about its history or sociology, and the sources are nearly as brief as the bibliography. With a few spectacular exceptions, a line or two in a coroner's report or newspaper is all that records any given accident in nineteenth-century Philadelphia. But if only because of the greater numbers involved and the relatively noncontroversial nature of their collection and registration, the changing indices of accident are in some ways more important than suicide or homicide in providing a rough quantitative dimension to the study of behavioral change during Philadelphia's industrial age.

For the three most important kinds of accident, the figures are at first sight meaningless or even contradictory.[1] As with suicide in chapter 2, the sixty-three years from 1839 to 1901 are divided into nine seven-year intervals, to show the incidence of fatality per 100,000, as in Table 5.

Table 5. Crude average annual accident rates per 100,000 population, by period, 1839-1901.

Years	Casualties	Burns and scalds	Drownings
1839-1845	10.5	7.4	16.5
1846-1853	14.2	8.8	16.6
1854-1859	25.6	9.1	19.8
1860-1866	23.2	11.4	19.5
1867-1873	28.6	10.7	18.0
1874-1880	24.4	8.9	15.0
1881-1887	34.8	8.2	10.6
1888-1894	41.7	8.3	8.8
1895-1901	39.5	11.3	7.8

Source: See appendix A.

The problems these numbers present are different from those in chapter 2. With suicide, the major difficulty is verification of the figures; apart from motive, there is no question as to physical responsibility for death, which rests by definition with the victim. But accident typically results from the conjunction of two kinds of agency, human and technological. A fall from a precipice on a still day is a different matter from an unexpected boiler explosion. What Table 5 records, at least in the first two categories, is changing combinations of elements. To interpret it, it is necessary to determine how much results from the behavior of people on the scene and how much results from technology, especially the new industrial technology of the later nineteenth century. It is this last factor that creates the apparent contradictions; once it has been accounted for, the reality behind the figures turns out to be much simpler than the table indicates at first sight.

> The body of a man who was killed by a train near the Germantown and Norristown Railroad Bridge, near 20th Street, last Friday night, has been identified as that of John Hermanson, 32 years, of 1729 Juniata Street. He was employed at the Midvale Steel Works, and was on his way home when he was killed.
>
> *Public Ledger*, January 14, 1901

The most complicated of the three major types of accident is "casualties" and the minor categories associated with it. The word itself almost never appears on death certificates; the category is an artificial one, created by the health office to cover a variety of lethal mishaps. The common denominator is not the medical but the circumstantial cause of death, not "skull fracture" but "train wreck."

Some types of accident, especially falls by people not at work, are as old as the species. Trees overhead proved fatally attractive to young men, as ice underfoot was fatally treacherous to old women; one Philadelphian was gored to death by an elk in 1892, another by an elephant in 1886. Other sorts of mishaps dated from the invention of roofs, wheels, and stairways.

But most casualties were related to making a living in the money economy. If the victim was not at work, it often happened that he was struck down by men who were. Failing eyes and reflexes kept the numbers of accidents to the elderly high. Both in 1869-1871 and 1899-1901, the highest casualty *rates* recorded were for people in their sixties and older, although because of their relatively small numbers their *totals* were not very great. Children and teenagers, on the other hand, had nearly as many accidents as people in their twenties, the result of dodging in and out of traffic, scaling fences, and teasing horses; however, because of their larger numbers in the population, their rates were not so high. Females of all ages were victimized less than one-fifth as often as males, a disproportion that was almost certainly greater among those in the prime of life.

Many working accidents, too, might have occurred as easily in the time of William Penn or Ramses II, the result of falls from masts and scaffolds, collapsing walls, collisions with loaded wagons and fractious animals. These account for the majority of the casualties of 1840 and many of those of 1900. But the long and sometimes sharp rise in accidents recorded in Table 5 was obviously the result of newer ways of making a living, principally in manufactories and on railroads. The figures reflect the sorts of people who held the more dangerous jobs, which were generally tough but by no means the least desirable. According

to Dr. Billings's study of deaths from 1885 to 1890, transportation, construction, farm labor, and factory work led the list of hazardous jobs.[2] The black population, generally barred from such work, was slightly underrepresented among victims, the foreign-born more heavily overrepresented.

Aside from the somewhat limited data on occupations, it is impossible to find out just what proportions of these deaths were attributable to which industries. But the coroners did grant separate listing to one major source of accidents, in later years by far the leading violent killer in Philadelphia: the railroad. The period covered, in fact, encompasses the development of railroading from its infancy to its apogee. In 1839 the first track in the United States was only a decade old, and from Philadelphia one could ride no farther west than Harrisburg. In 1901 the directors of the giant Pennsylvania Railroad, still unable to hear the hum of automobile engines, issued $600,000,000 worth of capital stock.[3] Meanwhile the number of fatal casualties in the city served almost as a barometer of this growth.

The death rate from railroads was a matter of concern on several levels. There were no workmen's compensation laws in that period, and few carried commercial life insurance. Major employers customarily paid funeral expenses in cases of fatal injury, but according to the one relevant study, of Pittsburgh in 1906-07, fewer than half of the victims' families received any other compensation.[4] The Pennsylvania Railroad, beginning in 1886, sponsored a widely copied benefit association, at minimal cost to itself, as a device for avoiding liability; but with workmen as with others, if anything else was at stake, the matter was left to the rivalry between contingency lawyers and claims agents.[5]

Here the judgment of a coroner's jury could be critically important. In most cases an inquest verdict consisted simply of pronouncing a probable cause of death after hearing the relevant medical and other testimony. In a few cases the verdict suggested human responsibility, as in homicide and suicide, occasionally medical malpractice or negligence. Since juries rarely censured anyone, especially the victims, the absence of any assignment of blame was not, presumably, decisive in case of lawsuit. But a deliberate censure could be, precisely because it occurred so seldom. The political atmosphere of nineteenth-century Philadelphia cannot be considered hostile to corporations in general and railroads in particular, and the coroners as a class were perhaps as well inclined toward the great roads as toward the petty lawyers who represented the victims. But when the juries did return censure verdicts, the railroad companies were usually the targets. In 1854-1857, there were just eight censures, against three doctors, one druggist, one contractor, one landlord, one canal boat captain—and the North Penn Railroad, for an accident on July 17, 1857, which killed twenty-one persons, eleven of them Philadelphians.[6] In 1878-1880, the only other period for which full dockets exist, there were twenty-seven censures—twenty-one of them directed at the railroads, for such faults as excessive speed, failure to provide proper signals, and poorly lit conditions.[7]

Late in the century these protestations and others, from newspaper campaigns to official condemnation by the secretary of state of internal affairs, may have had some effect on street railways.[8] The greatest proportion of fatalities on these intraurban routes occurred immediately after electrification in the early 1890s; horses had an instinct for avoiding pedestrians that moving machines did not. Within a few years some simple safety precautions somewhat reduced the number of these deaths.[9] But the great steam roads rolled on and over unheeding. During the first generation of their operation, big wrecks such as the North Penn disaster were not uncommon. These were greatly reduced in later years, and as the companies insisted, the passengers were safe enough—once they had managed to get aboard. But primitive safety standards continued to take a heavy toll of employees; almost incredibly, accidents accounted for well over half of all deaths among the city's blue-collar railroad workers from 1885 to 1890.[10] And deaths of employees amounted to only one-quarter to one-third of all railway deaths registered; pedestrians, especially the young and the old, paid the heaviest price.[11] The number of fatalities of all sorts climbed almost as a function of traffic mileage. The first year for which any coroner's figures are available is 1855, the last 1900. All available

totals, including those from horse railways, are listed in Table 6.

Although these scattered figures cannot be extrapolated with any confidence, it is possible with the help of other information to calculate that around 1870 about thirty people were killed in railroad accidents annually.[12] Thirty years later this largest single component of the casualties category had multiplied by a factor of five and accounted for roughly as many fatal accidents, in proportion to population, as motor vehicles in the modern city.[13]

The railroad was simply the most dramatic symbol of the Age of Industry. Already by 1840 and clearly by 1870, technological progress had created several new sets of dangerous possibilities. By 1900, in addition to the increased use and higher speed of whirring machinery and the greater height of buildings using structural steel, man's inventiveness had created even more means of dying. Stock clerks slipped down elevator shafts, old men fell into open manholes, young ones ran bicycles into immovable objects, citizens of all ages tangled with live electric wires.

For the last thirty years of the century it is possible to calculate very roughly the changes in the accident rate, with results that reveal something about changing behavior. The aim is to estimate how much of the difference resulted from a changing level of careless or reckless individual action, as distinct from

Table 6. Number of street and steam railway casualties, by year.

Year	No. killed	Year	No. killed	Year	No. killed
1855	20	1884	139	1893	216
1856	19	1885	121	1894	236
1874	55	1886	153	1895	221
1875	40	1888	166	1896	199
1878	72	1889	143	1897	145
1879	84	1890	193	1899	167
1880	105	1891	176	1900	168
1882	128	1892	208		

Source: See appendix A.

that which resulted from changes in the technological or physical environment.

The first step is to define more accurately the real rate of accidental death. Casualties, as an artificial category, covered most, but not all, accidents other than burns, scalds, and drownings. Distinct records were kept of certain others, which must be added in. They include "strangulation," "gunshot wounds," and "tetanus," which contemporary physicians understood as associated with puncture wounds and invariably fatal within a day or two.[14] "Asphyxia" and "suffocation" seem to have been interchangeable, although there was a tendency over time to use the former term for infant deaths and the latter for persons dying of inhalation of smoke or gas. (In the counts that follow, deaths of infants from either of these causes are omitted because they may have been cases of "crib death.") A few incidents, moreover, that might have been lumped under casualties were for unexplained and inexplicable reasons listed under separate headings. Among these are "fractures," listed by type; "shock," which was understood, then as now, to result from traumatic injury; and "compression of the brain" and "concussion of the brain," which were interchangeable with each other and sometimes with "skull fracture" as well. "Electric shock" is clear enough. But even counting all of these additional categories, the list is still conservative. It excludes most problematic cases and includes, in effect, only those who died instantly or within a very few days. While the last thirty years of the century did not witness any significant advance in the treatment of shock or maiming, there were improvements in dealing with infection, "septicemia," and "gangrene." Thus these categories, "surgical shock," and ambiguous categories such as "hemorrhage" are not included—nor are "Bright's disease," "erysipelas," and a few others which, by the evidence of coroner's returns, include some victims of sudden violence.

All together these "minor" categories add up to about a third of the number of casualties for 1869-1871, somewhat less for 1899-1901. When they are added in, the fatal accident rate for the two periods seems very similar. It follows that, since technology accounted for more fatalities around 1900, simple hu-

man error, as in "falls," must have been proportionately more common around 1870. And it is possible to estimate that proportion by attempting, somewhat crudely, to discount the impact of technological advance, in order to calculate what the rate for the 1900 population might have been under the physical conditions of 1870.

This calculation requires four steps, beginning with the number of casualties and allied deaths in 1870—314—and in 1900—618. The first step is to standardize for the differing age structures in the two census years, a process that makes a greater difference in this case than in most others; it can be estimated that because of the greater proportion of older persons in 1900, the number of accidental deaths in 1870, given the same distribution of ages, would have been 340 rather than 314. The next step, numerically the most important, is to eliminate differences caused wholly by the expansion of the railways. The railroad deaths for 1870 can be estimated at 33; extrapolated to the size of the 1900 population, this would be 63. The actual number of railroad deaths in 1900 was 168, 105 more than the extrapolated figure. Subtracting 105 from the original 1900 death total of 618 leaves 513. The next two steps depend upon newspaper reports of deaths, which are undercounted and somewhat hard to compare.[15] The 1870 deaths directly attributable to machinery—persons dying instantly from being caught in belting or shafting or the like—were reported at 17, which extrapolates to 33 in 1900; the actual newspaper total for such incidents in the latter year was 53, an excess of 20. In addition, step three, in 1900 there were 19 new types of death reported, as from electric shock. These two net differences, 20 and 19, subtracted from the previous total of 513, leave 474. With a rounded population of 1,294,000 in 1900, 474 deaths amounts to a fatal accident rate of 36.6 per 100,000; for 1870, calculated from 340 deaths in a rounded population of 674,000, the rate would be 50.0 per 100,000. The drop in the rate, then, would be something more than 25 percent—a figure that would almost certainly be greater if a way could be found to discount more accurately all of the differences in the working environment.

Of course, the use of any specific number for such a difference implies a false precision, and the procedure sketched above may be flawed as well as crude. But the tendency indicated can be found elsewhere and by other means, as shown below.

> Deputy Coroner John C. Sees held an inquest yesterday in the case of Annie Groetzinger, aged 14 years, who died at St. Mary's hospital on Sunday Evening last from burns received by her clothing taking fire from coal oil that she poured upon a slow fire to hasten its burning. At the time she was employed as a domestic in the family of Mr. Henry Goebel, 1123 Mascher St.
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> *Public Ledger*, December 1, 1870

The results reached in the case of casualties seem confirmed by an analysis of burns and scalds, the other major category of dry land accident.

It is virtually impossible to compare the type and incidence of fires in Philadelphia in 1839 and in 1901, or even for any significant stretch of years in between. Alexander Blackburn, America's first fire marshal, was appointed in Philadelphia in 1856 and held office for fifteen years. His reports and those of his successors supplement the ones issued by the fire department itself, providing an embarrassment of undigested statistical information about the nature, number, and causes of all fires.[16] Read literally, the figures indicate that firemen were called to deal with more incidents over time, but each incident did much less damage. In 1869-1871, the number of fire calls reported was about 587 annually, at a total cost of $2,660,000; in 1899-1901 the number averaged 2,940, and cost $3,387,000. But because of the number of variables involved, such as insurance coverage and practices, fluctuations in the price level, the sobriety of firemen and the number of call boxes, the literal comparison is misleading.

For fatal accidents, however, such comparison is unnecessary. Firemen and others trapped in burning buildings died then as now of suffocation. But these big fires did not contribute much to the burns and scalds category. Newspapers and coroners rarely reported more than one such fatality from the same incident or address; the exceptions were usually involved in

scalds from boiler explosions. By attempting to answer the question, "who was killed?" rather than simply, "how many?" it is possible to deduce something about change over time.

During the period 1869-1871, the age-standardized rate of death from burns and scalds was 9.3; by 1900 it had advanced to 11.4. But this statistic is ultimately less revealing than the set that results from breaking the totals into age groups, as shown in Table 7.

The long generation at the end of the century witnessed a great increase in the industrial use of fire, fuels, and explosive chemicals, as well as the introduction of electric power. (Perhaps it was electricity, in combination with other new agents and operations, that accounted for the rise in the death rate from burns during the later 1880s and 1890s, after the dip beginning in the 1870s). One result of this progress is reflected in the somewhat higher proportion of working people, adults, who died of burns and scalds toward century's end. But only a minority, at any time, died from incidents at work in the money economy outside of the home. Throughout the entire period the majority were victims of household incidents, especially in kitchens.

The collective profile of persons who died from burns and scalds is strikingly different from that of other victims of sudden violence. Most accidents, other than those falls to which old people were especially subject, involved males in the active years between the early teens and the middle fifties, either as agents or principals. But the domestic nature of most burnings and scaldings is shown by the fact that in the reports that make the distinction, in many years women outnumbered men, and minors almost always outnumbered adults. The general tendency for girls to outnumber boys suggests that such accidents often occurred as part of the socialization process, to children helping out, learning the woman's role. Among those under five —toddlers who tipped over boiling laundry tubs or swatted flies around lighted lamps—there was presumably less difference between the sexes.

Death in these cases often resulted from such classic homely ingredients as flaming grease or boiling water. But increasingly

Table 7. Deaths from burns and scalds: 3-year totals and average annual age-specific rates for adults and small children, 1869-1871 and 1899-1901.

	Adults 20 and over		Children 4 and under	
Years	Number	Rate	Number	Rate
1869-1871	82	7.0	99	42.9
1899-1901	180	7.8	150	38.1

Source: See appendix A.

in the late nineteenth century it was caused by newer and more volatile fluids. It is difficult to learn anything statistically about the ordinary domestic technology of heating, lighting, and cooking in this period. About 1840 the simplest wood or charcoal stoves, and candles, were still common. The accident table itself is probably the best gauge of the continued substitution of liquid fuels for solid over the next two or three decades. The earliest reported as cause of fatality was camphene, a mixture of turpentine and alcohol used in lamps. By the 1860s this primitive stuff had been replaced entirely by coal oil or petroleum distillates, benzine, naphtha, and kerosene, often in mixtures, and other similar products. By that time, the peak on the graph, most households had passed beyond wood and candle culture, to the great distress of the excitable Marshal Blackburn. These fluids were all dangerous. To break or spill an oil lamp, especially while wearing the heavy and awkward clothing that burdened the women of the period, was to risk severe burns; indeed, a lighted lamp was sometimes used as a murder weapon. Even more dangerous was the explosive flashback that could result when fuel was poured from an enclosed can onto an open flame.

At the end of the period the situation was again changing. Some kitchens and homes were using more modern appliances; illuminating gas and gasoline stoves had come to many, coal-burning central furnaces to some, electricity to a few. The prob-

lem posed is, what did these changes mean in terms of relative safety?

The kitchens and households of 1840 were obviously less dangerous than those of either 1870 or 1900. And the difference between 1870 and 1900, if not as sharp, is almost equally clear, although the official estimates are not as useful on this point as they might be. Blackburn's, in particular, are a charming blend of vagueness and misplaced precision; his first report, for 1856, lists "Accident, 89," as the most important cause of fire, followed by a long list of such particulars as "Boys Smoking Cigars in Lofts While Hunting Pigeons, 2." The more impersonal tallies of later years are considerably duller and only slightly more illuminating.[17] But one item does stand out. From 1870 until the end of the century, oil lamps were reported as the most frequent source of accidental fires. But by then a new hazard, unknown in 1870, held very close in second place. Domestic historians agree that gasoline stoves became widely popular sometime in the 1880s; perhaps even more than the newly introduced electricity, they account for the upsurge in burning deaths noted in Table 7.[18] Whatever their importance for housewifery, or perhaps cuisine, the most dramatic effect of these devices was to fill "the newspapers of that era with items about death and destruction incident to explosions in kitchens in which they had been installed."[19]

These dangers do not seem to have been concentrated in any narrow class or neighborhood. It is impossible to estimate how many people were trading wood stoves for gasoline, while others were substituting gas or electric lighting for kerosene, and others moved up from candles to lamps. But it appears that by 1900 the hazards had evened out and spread almost equally across the spectrum of class. It is not significant for my purposes that blacks and the foreign-born were slightly overrepresented among victims; blacks and immigrants were overrepresented in kitchens generally, because they managed not only their own but other people's, as servant girls and cooks. But if the object is to find differences in the physical character of households, quite apart from who lit the fires, then the index used in chapter 2 of rich and poor wards is an appropriate measure, and it shows that there was little difference in the number of burn fatalities.[20] Among the twenty poorest wards in 1899-1901, the three-year average death rate from burns and scalds was 12.0; among the twenty richest it was 11.0. At the extremes, the poorest five had a rate of 13.7; the richest five, 11.2. The slightly worse record for the poorer wards may reflect not a difference in domestic danger but rather the substantial minority of such accidents that occurred among blue-collar workers outside of the home and the deaths of servants who did not live in but were counted from the homes of their natural families.

By any measure, then, Philadelphians all over the city, in and out of the home, found their environment more hazardous around 1900 than it had been earlier, yet the death rate in the home was not rising but actually falling slightly, as indicated by the figures for the very young in Table 7. There is no physical fact that accounts for this drop—indeed, all physical changes would suggest the opposite effect. The explanation appears to lie not in the material environment of households and kitchens but in the behavior of the people who lived in them. The care of children is the responsibility of adults, and the parents and older siblings of 1870 seem typically to have been more careless than those of 1900, more likely to leave little ones untended or untaught, less habituated to routine precautions but perhaps more to mixing drinking alcohol with other liquid fuels.

> Fred Spowhouse and Alfred Edwards, aged 22 years, residing respectively at 1064 German Road and 1214 Palethorpe Street, were drowned, yesterday, in the Delaware, near Beiderman's Point, back of Petty's Island . . . No attention was paid to them until they were seen struggling in the water, when, before they could be aided, they were drowned. When the bodies were recovered, about 2 P.M., Edwards had Spowhouse in his arms, and it was supposed that they were drowned while the former was trying to rescue his friend . . .
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> *Public Ledger*, August 13, 1870

The last major accident category is also by far the simplest. Drowning, in the great majority of cases, was accident pure and simple, without any significant technological

component, the result of the elementary human miscalculation of risk. And no other index shows a more dramatic drop over time, as can be seen from Table 5, especially during the critical period beginning about 1870. During 1869-1871 the age-standardized drowning rate was 18.5 per 100,000.[21] By 1899-1901 it had dropped to 8.0. Unlike the other categories, drowning requires no extended argument to show this; the difference is actually absolute, not merely relative, as 365 people drowned, or were found drowned, in the earlier three years and 310 in the later.

My explanation for this is the same hypothesis suggested by the analyses of casualties and of burns and scalds; people in the earlier period tended to behave more recklessly than those in the later. But it is necessary to explore alternatives that might account, even partially, for the difference in some other way.

The first two alternatives that come to mind must be rejected; there is no evidence that people in 1900 were better swimmers than their predecessors, and although rescue facilities may have improved somewhat, the difference was marginal. One reason for consolidating the city and county in 1854 was to better coordinate the policing of the rivers. By 1870 two harbor police units had long been patrolling the waterfronts. By 1900 the lieutenants in charge were making separate statistical reports and boasted of, among other accomplishments, rescuing four or five watersoaked boatmen each year.[22] But if in fact the rescue service was better than in 1870, the improvement was measured mostly by its exploits *ex post facto;* far more bodies were recovered than revived, and these increased rather than decreased the totals at the health office.

The only factors important enough to have made a substantial difference over time are of a different order—geographical and environmental changes that may have led fewer people to expose themselves to watery hazards in the first place. Philadelphians in the nineteenth century drowned in tubs, vats, ponds, and claypits, and a favored few off Mount Desert. But the overwhelming majority died in the two big rivers, the Delaware, which bounds the city on the east, and the Schuylkill, which after flowing through the west side joins the Delaware to the

south. Some victims were working sailors or stevedores, a few ship's passengers, others drunks or children whose falls tumbled them into the water rather than onto the ground. But the great majority were people seeking recreation or relief from the heat. The statistics for drowning by season confirm the count obtained from the newspapers: fishermen, pleasure-boatmen, and above all bathers, young men between fifteen and thirty-five, dominated the totals.

The banks of the Schuylkill remained relatively sylvan throughout the period and almost completely approachable at most points. But the Delaware, in particular, which consistently accounted for more deaths, became somewhat less pleasant and less accessible for recreational use over time.[23] Between 1870 and 1900, however, the construction of Delaware Avenue between Front Street and the docks cut off some casual foot traffic from the bank of the larger river downtown. There were fewer newspaper reports of patrons stumbling out of riverfront "dives" almost directly into the water. And the continual build-up of commercial river traffic, too, may have made swimming and even boating less attractive than in earlier years.

These developments may have "driven" richer residents to the Jersey shore or the coast of Maine to escape the summer heat. But they would not so easily escape the registration rolls. Heavily advertised excursion trains took large numbers of people to Cape May and Atlantic City, and some blades even bicycled down in the 'nineties. But funeral cars took seaside drowning victims back in the other direction; if they were buried in Philadelphia, their certificates were recorded with those of people who had fallen off the docks.

In searching for reasons to account for the decline, the most likely possibility is the proportional movement of the population away from the Delaware. In the old "walking city" of 1840 and earlier, virtually everyone had lived on its eastern curve, within a few blocks of the river. By 1870 this was no longer true, and by 1900 the change was more pronounced. Again, it is impossible to measure the movement precisely, but it occurred and was not fully balanced by the fact that more people lived near the banks of the Schuylkill or the farther northeastern

reaches of the Delaware itself. Throughout the period it was customary for people to drink, play games, and sleep out near the water on the city's notoriously hot summer nights. As they moved away, fewer may have taken the trip required, and similarly, fewer may have made the effort by day to get out and enjoy the river directly by swimming, wading, and boating.

The most thickly settled parts of the city were never very far from a river bank; Delaware to Schuylkill, the east-west streets downtown ran for less than thirty blocks. Most of Philadelphia's wards were bounded by one or both rivers. A few, however, were landlocked: five in 1870, twelve in 1900.[24] It is possible to make a rough test for propinquity as a factor in the drowning rate by comparing the rates for these interior wards with those for the city at large.

For 1869-1871, the landlocked rate was 11.8 per 100,000, compared to 18.5 citywide, and in 1899-1901, 6.4 compared to 8.0.[25] But these differences should be further adjusted and narrowed. Some unidentified persons drowned each year, and despite an ice-cooled morgue, erected late in 1870, all drowned persons became physically difficult to identify in time. In these cases the coroner ran a sort of lost-and-found for missing persons, with descriptive notices in the newspapers, seeking to dispose of their bodies as soon as possible—in fact, a regulation had to be passed to restrain him from burying victims within forty-eight hours. The persons who remained unknown were, however, included in the totals by ward, and while it is nowhere stated explicitly, it appears that they were "credited" either to the spot where they were found, to the harbor police stations, or to the morgue itself. Sixty-three people were thus added to the totals for the river wards in 1869-1871, nineteen in 1899-1901. If these were more evenly distributed, the annual rate for the interior wards would be 14.6 for the earlier period, 6.9 for the later.

In short, the somewhat easier access to the water in the earlier period did make some difference but not nearly enough to account for the drop in rates. If the rates of the interior wards alone are compared over time, it is still apparent that proportionately less than half as many people drowned in 1900 as in

1870. And that test may work in another way as well. If the slight difficulty of access did not much discourage the urban teen-agers and young men who dominate the totals *during* 1870 and 1900, then presumably it did not discourage them in the years *between;* as Table 5 shows, they were not discouraged in the previous thirty years, from 1840 to 1870, when the population was also moving away from the river.

There is no clue elsewhere to any change in the nature of people's exposure to the water. In every testable respect it appears that the pattern of use was almost precisely the same, with the same sorts of people visiting the rivers, or at least drowning there, while doing the same sorts of things at the same times of year, which suggests that there was no decrease in the proportion of swimmers as the result of commercial traffic. The seasonal peaks were of course July and August. Perhaps more significant, during the off-season months of December, January, and February, a total of twenty-seven bodies were recovered in 1869-1871, and twenty-four in 1899-1901, or 7.4 percent and 7.7 percent, respectively, of all drowning victims. The age and sex of victims are also much the same in the two periods, certainly more so than in any other class of accident over time. The ratio of male to female deaths in the three years around 1870 was 8.4 to 1, and in the three years around 1900, taking into account the slight increase in the proportion of women in the population, it was 9.8 to 1. In both periods the ratio of those over twenty to those younger was the same—1.2 to 1.

Since changes in the use of water cannot account for the difference any more than changes in geography, the only reasonable explanation for the dropping rate is my original hypothesis: people were behaving differently. Over time there was simply less drunken horseplay on and around the docks and riverbanks, fewer reckless challenges taken, fewer miscalculations made.

The fact that the pattern for all three of the major accident categories turns out to be so similar, on analysis, strengthens the case for each. It requires argument and a chain of inference to discount the impact of technology and establish that pattern

for casualties. The argument is less elaborate, and the chain shorter, for burns and scalds. Virtually nothing is required to establish it for drownings. The clarity of the pattern in the last and most obvious case appears to confirm in retrospect the accuracy of the analysis in the first and least obvious. And the explanation is comprehensive as well; whether at work, at home, or at play, the people of Philadelphia were typically becoming more careful, more sober, perhaps even more rational in their everyday habits and activities, at least during the last thirty years of the century.