

THE HISTORY AND POLITICS OF
VOTING TECHNOLOGY
IN QUEST OF INTEGRITY AND
PUBLIC CONFIDENCE

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Note: All figures, except for 5.1 and 7.1, are displayed with the permission of the Division of Politics and Reform, National Museum of American History. Figure 5.1 was taken by the author. Figure 7.1 is displayed with the permission of Diebold, Incorporated.

background in public administration and 27 years in government service have similarly assisted me in being able to elaborate the nature of this problem.

An important conclusion of this study is the following: Prior to the Florida crisis, it was not politically possible to translate federal/state cooperation, highly successful in issues of public health and safety, to resolving difficulties in the voting process. The problem first showed itself with opposition to the Election Clause (Article I, Section 4) in the framing of the Constitution in 1787 and has continued through 2005, as pointed out late in the final chapter.

In reviewing literature on American history, I found an unexpected situation. General works do not cover significant changes in voting technology. For example, discussions of political and social conditions in the middle and late nineteenth century do not often indicate that, as a consequence, the movement to adopt the secret (Australian) ballot had begun. While the participants in elections and the major issues of campaigns are described in detail in general histories, the chaotic process of voting before the adoption of the secret ballot is virtually ignored. The spread of the lever voting machine is not covered and misinformation is rampant concerning Edison's voting machine of 1869. One must go to publications devoted to more specific subjects, even to patents, to find appropriate information. I am indebted to historians who specialized in the voting process. Some of their works are cited in the references for chapters 2, 3, and 4.

In 2002, while completing a proposal, it was fortuitous that I discovered Alex Keyssar's impressive book, *The Right to Vote*. He was kind enough to take time to see me, and encouraged me to continue. When I began work in early 2003, after finding a publisher, I had to overcome the lack of a university connection. There were no graduate students eager to assist and no library at my disposal. Many books that I have cited as references, I bought secondhand off the Internet.

Early in my writing, I was most fortunate in establishing a working arrangement with Dr. W. Larry Bird, curator in the division of politics and reform at the Smithsonian National Museum of American History. Richard Smolka's *Election Administration Reports*, an authoritative source on current events in the election field, reported Larry's interest in acquiring *pro bono* expertise to aid in the mounting of an exhibit called *Vote: The Machinery of Democracy*. I applied and was helpful, it appears, serving as a "behind-the-scenes" volunteer. My position enabled me to use the museum's library, consult with Larry and his colleagues, and view some rare artifacts. Later, Larry agreed that I could publish some of the photos of materials from his exhibit and the museum's collection. His magnanimity has made this book considerably more interesting.

Others that I need to thank include the American people and their federal government for making available to ordinary citizens the Law Library Reading Room of the Library of Congress and the search facilities of the U.S. Patent and Trademark Office. Tony J. Sirvello III of IACREOT, an

election officials' organization, smoothed the way for my attendance at the group's annual meetings and election equipment shows. Conny B. McCormack registrar-recorder of Los Angeles County, made herself available to answer questions on several occasions. Personnel formerly with the Office of Election Administration of the Federal Election Commission, Penelope Bonsall, Bill Kimberling, Brian Hancock, and Peggy Sims, have been very helpful over many years. Steven Hertzberg and Eva Waskell of the Election Science Institute provided information about the 2004 general election and its aftermath, which considerably expanded my knowledge. I have benefited also from the writings of knowledgeable experts such as Douglas W. Jones and Michael I. Shamos. My wife, Joan, a professional in her own right, carefully monitored my compulsive work habits and ensured that I would rest for a sabbath each week. In addition, she acted capably in her appreciation that the way to a man's heart is through his stomach.

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according to the 12th Amendment of the Constitution: "The person having the greatest number of [electoral] votes for President shall be the President, if such number be a majority of the whole number of Electors appointed . . ."

Five Tuesdays after the election, on December 12, the U.S. Supreme Court, in *Bush v. Gore*, issued its decision that permanently ended recounts ordered by the Florida Supreme Court. The U.S. court's action allowed the previously attested Florida outcome to stand. That result of the state's popular vote, which showed Bush leading Gore by just 537 votes out of nearly 6 million cast, had been certified by Katherine Harris, the Florida secretary of state, and the redundant Florida Elections Canvassing Commission on Sunday, November 26. Thus, the 25 Electors for George W. Bush would be appointed. Bush's electoral votes would total 271 and he would be the next president. This result would obtain, notwithstanding the fact that Gore received 544,000 more popular votes than Bush out of more than 104 million cast nationwide.

The postelection legal battle that lasted until December 12 involved voting technology as an important factor. Whether or not some or all ballots should be recounted manually in order to determine if there were votes on those ballots that could not be read by machine became an essential question. If manual reviews were to be permitted, then human interpretation—likely to be subjective—was needed to decipher the nonstandard or ambiguous nature in which some voters had punched or marked their ballots. After the conflict was over, data analyses would show that voters' abilities to use different kinds of equipment varied, and that even among voters using the same type of equipment, socioeconomic factors played an important role. These facts had not been previously taken into account by political leaders, and were seldom investigated by social scientists.

During the legal contests, the voting equipment that voters used to record their choices (or failed to record their choices or mistakenly recorded their choices) became an issue. Votes were recorded by different methods in the several different types of ballot systems used in Florida. One particular type of voting equipment, based on prescored punch cards (PPCs) and used by a majority of Florida voters, presented ballot interpreters with an exceedingly difficult problem. The very nature of the system made the level of ambiguity of voters' choices exceedingly high. It was not surprising, therefore, that "intent of the voter," a concept recognized in Florida law, which began to be applied in this country long before there were computer-readable ballots, suddenly became a topic of interest at the U.S. Supreme Court. The court would characterize the different standards by which votes were determined in the different counties as a violation of that simply worded but consummately sublime clause of the 14th Amendment: "No state shall . . . deny to any person within its jurisdiction the equal protection of the laws." That would be part of its rationale for ending the Florida election imbroglio. There were several other instances of denial of "equal protection" in this contest, but they would not come before the court.

Another issue of the election was not contested in the legal disputes leading to the decision of the U.S. Supreme Court but, nevertheless, was vitally important. This issue was the quality of the information systems in Florida used for voter registration, an essential aspect of the voting process. There were persons who claimed the right to vote who, wrongly, were prevented from voting. There were also persons who were not entitled to vote but who were permitted to do so by election officials at polling places. Errors in voter registration did not affect the counting of the ballots actually cast and it was not a point of contention in the litigation. However, in the 107th Congress, elected at the same time as the president (except for senators continuing in office), the issue of voter registration loomed large in considerations of the federal response to the Florida fiasco. The Help America Vote Act, adopted in October 2002, almost at the termination of that two-year Congress, was the first federal legislation since 1899 mandating requirements for voting equipment. It was also the first adopted legislation ever to authorize federal funds for the conduct of federal elections. The law concerned both voting equipment and voter registration, but it was a controversy about the latter that generated the most animosity in debate and delayed its passage the longest.

1.1 THE SITUATION BEFOREHAND

Political bias by Florida election officials played an important role in the first part of the postelection legal struggle (the "protest" phase) in which the final results to be certified by the secretary of state were determined. This situation was not a new departure; there were strong antecedents. In the nineteenth century, in every state, political parties were more controlling of governmental processes than they are today. In the late nineteenth century, and into the twentieth century, reformers and "good government" advocates attempted to insulate aspects of governmental administration that could be nonpolitical from domination by political parties. The institution of the truly secret ballot and the establishment of a nonpolitical civil service at all levels of government were major steps. In some states and local governments, the positions of senior election administrators were made nonpartisan, but not generally in Florida.

The importance of nonpartisanship, or at least bipartisanship, in fostering integrity in elections cannot be overstated. If the power of the state can be brought to bear to favor one side over the other, then public confidence in the democratic process is reduced and many will see voting as a sham. The technology of voting is at the inner workings of democracy, nearly hidden from the political process except when, as in the situation at hand, it stumbles so badly it can't be ignored. Respect for the results that technology produces is dependent on the credibility of the government running the election. Credibility is maximized if the government does not favor one citizen over another in basic rights, as implied in the concept of equal protection.

left-hand pages displayed different candidates of the contest for president. This arrangement had been approved by John Stafford, Duval's SOE. Over 22,000 voters, about 7.5 percent of the total number of voters in that county, attempted to cast votes on both pages. Each of them lost his or her vote in the contest because of "overvoting." Along with voter registration misfeasance, "the cumulative effect of these failures fell disproportionately upon our African-American population" (Duval County Election Reform Task Force, 2001, p. 6). In another county, Palm Beach, the PPC ballot layout, different from Duval's, would become notorious.

Five weeks later, the chief justice of the U.S. Supreme Court would declare "absurd" the need to count ballots that could not be counted by machine, despite a requirement of Florida law that "no vote shall be declared invalid or void if there is a clear indication of the intent of the voter as determined by the canvassing board."

Purging ineligible voters was another source of blundering. In 1998, the Florida state legislature enacted a statute that required the state Division of Elections to contract with a private company to purge all voter files of ineligible voters, that is, deceased persons, duplicate registrants, individuals declared mentally incompetent, and, most significantly, convicted felons whose rights had not been restored. An impetus for the legislature's action was a 1997 election for mayor of Miami whose results had been thrown out by court order due to registration fraud. The contract to develop the list of registrants to be purged cost the state about \$4 million.

Registration files were maintained by each county. Two lists of supposedly ineligible voters containing almost 58,000 names were distributed to county SOEs in June 1999 and in January 2000. Matches to currently registered voters were graded as "possible" or "probable." However, the law was written by the legislature so that the list was to be accepted as correct unless proven incorrect by a prospective voter who found himself or herself cited. The county SOEs sent letters to all named individuals advising them of their right to challenge the list's correctness. Of course, a mix-up in names would not necessarily have yielded the right address for a letter's intended recipient. After distribution of the first list, the SOEs received notices from the state Division of Elections that some 8,000 citizens had been mistakenly included. Throughout the state, there were 7,837 appeals to the Florida Department of Law Enforcement about incorrectly listed convictions, and of these, nearly half were resolved in favor of the voter (Merzer et al., 2001, pp. 106-107).

Among the counties, Miami-Dade received a total of 7,150 names of supposedly convicted felons with unrestored rights, according to the statements of David Leahy, county SOE at the time. Of these, 469 successfully appealed and therefore remained on the voter rolls. In addition, the Division of Elections forwarded to Miami-Dade County a list of 485 additional names that should not have been on the list. Consequently, in that county, more than 13 percent of the names listed were incorrect (U.S. Commission on Civil Rights, 2001, pp. 22-24). Duval County SOE John Stafford is reported to have told an investigator from *The Miami Herald* that he never trusted the

purge list because the husband of a worker in his office was mistakenly listed. Linda Howell, the Madison County SOE, was also wrongly listed. In some other counties, for example, Broward, Palm Beach, and Volusia, the lists were ignored. In Sarasota County, the only felons purged from the list were those who acknowledged letters and admitted that they were ineligible to vote (Merzer et al., 2001, p. 107). The mistakes on the list not reconciled before election day would frustrate the ordinary folks enmeshed in this bureaucratic blunder and would generate considerable indignation and legal actions from civil rights organizations.

1.2 VOTING SYSTEM SELECTION

In Florida, the selection of voting equipment was done at the county level, generally by consensus of the county's senior leadership. A Florida county looking for new equipment could select any model of voting equipment from among those already approved by the state. An approval program begun in 1990 involved testing the computer equipment against hardware and software standards after certification under the national testing system (see sections 6.10-6.12). There have never been any human factors standards—national or state—for the capability of voters to transfer their choices into computer-readable punches, marks, or direct electronic indications. Within each county, implementation of the selected equipment was countywide, except possibly for absentees. Six different types of voting systems were in use; five systems used hard-copy ballots; one was a non-ballot system. Among the five ballot-using systems, there were two different kinds of punch-card systems, and three types of systems in which the voter chose a candidate by filling in a small area on the ballot using a writing instrument. There were a total of thirteen different models of equipment, supplied by eight separate vendors.

Florida's use of several types of voting equipment, with selection occurring at the county level, was typical of conditions throughout the nation in 2000. There are about 3,140 county-level units in the United States, including some 44 cities that are independent of any county and that serve as county equivalents. About 2,870 of these units conducted elections for state and federal offices in the 40 states in which counties and equivalents performed this function. In the 6 New England states and in Michigan, Minnesota, and Wisconsin, subdivisions of counties, which may be called cities, towns, or townships, carried out these elections. There are several thousand of these units. In Alaska, elections are carried out as a state function. The District of Columbia conducts its own presidential election and names Electors as if it were a state (see section 5.3).

1.3 PRESCORED PUNCH CARDS

Prescored punch cards were used by 15 counties including the 5 largest in population. Listed in descending order of size, they were Miami-Dade, Broward and Palm Beach (all along the southeast coast), and Hillsborough

processes of a democratic nation, it seems appropriate that each chad should be individualized and distinguished from the collective noun.

Each PPC *ballot* consists of a rectangular punch card the same thickness and size as an IBM punch card (7 $\frac{3}{4}$ inches by 3 $\frac{1}{4}$ inches). That type of card was widely used for data processing in connection with IBM accounting machines in the twentieth century before electronic digital storage mechanisms fully replaced them. Data being processed was stored on the cards. The invention of punch cards for data processing use is discussed in section 4.9.

The IBM punch card was originally designed with places for holes at 960 "positions" on the card in a rectangular array, 80 along the long dimension and 12 across the short dimension. In a typical business application, each 12-position column was encoded with a hole pattern representing a single alphanumeric character. Thus, a card could store 80 characters and might be referred to as "an 80-column card." IBM cards were not normally prescored; the positions on the card (typically $\frac{1}{8}$ inch by $\frac{1}{16}$ inch) were punched out by machine when that action was needed. Even after the development of computers with electronic storage, IBM cards were still used for data input and sometimes output. Then, newer ways of entering data were developed, for example, keyboards, keypads, pushbuttons, document scanning, laser swiping of bar codes, cursor movement with mouse-clicks and touchscreens.

In a PPC, the positions are individually perforated so that they may be manually punched out. Harris based his concept on the "Port-a-punch," a special-purpose IBM product. This product consisted of a PPC, a backing for the card, and a punching tool called a stylus for directly entering data, that is, punching out chads, on the card. A typical application might be the manual recording, by a meter-reader, of the value of flow displayed on a pipeline meter in a remote location. The advantage of use of a PPC in this application was that writing of the value on a data sheet was avoided. Then, the later transcription of the value into a punch card was circumvented also, eliminating the possibility of a transcription error. In more recent times, such a value might be communicated electronically to a computer at a central station, dispelling the need for any person to visit the site just to manually record the data. The mass use of PPCs by untrained individuals was never contemplated for the Port-a-punch. Harris had obtained the help of William Rouverol, a professor of engineering at Berkeley, in converting the Port-a-punch into a voting device (Nathan, 1983, p. 132).

In 2000, elections were one of the few remaining applications of punch cards and possibly the only use of PPCs. When a PPC is used as a ballot, fewer than 960 positions are employed. In one arrangement, 312 positions in a rectangular array are used, 26 down the long dimension and 12 across the short dimension. (For a recent ballot implementation in Chicago, 456 positions were used.) The designated positions are prescored so that a voter, using a pointed metal stylus, may push out the chad from the card at the position that he or she believes corresponds to the candidate that he or she intends to select. Here, "believes" is used deliberately, because the names of

the candidates are not on the card. Only numbers in small type, uniquely identifying each position, are printed there. Only one side of the card is used.

At a *polling station*, each voter receives a punch-card ballot with a stub attached to one of its short ends. The stub already has two holes punched into it; these holes are significantly larger than the holes that the voter is to punch out in the ballot. The voter is directed to one of several private booths containing a table on which is placed a ballot holder, also called a "vote recorder" or sometimes a "Votomatic device," and a stylus. The ballot holder is a thin hollow rectangle made of metal or hard plastic, and it is placed flat on the table. The voter inserts the PPC ballot into the hollow middle of the device from an opening near the top edge. When the ballot is properly inserted, the two holes in the stub must fit over pins.

Attached to the front of the ballot holder is a loose-leaf booklet. The pages of the booklet have the names of the candidates on them. In the center of the booklet, between the left-hand and right-hand pages, is a line of holes. The holes should line up with a single row (long dimension) of the punch card, which is located beneath. If the card is correctly located and the device has been correctly assembled, each punch-card position in that row lies directly beneath one of the holes.

The voter should start voting from the front of the booklet, that is, with the first page opened to the left and all additional pages under the next page on the right. The most important contest (the "top of the ticket") will be presented on the first pages. In most cases, the candidates will be presented only on the left-hand page. In the Florida presidential race, this could have been done by using small-sized type. Neither Duval County nor Palm Beach County would do it that way; voters in those counties would suffer the consequences.

Each candidate's name on the left-hand page of the booklet is listed to the left of a right-pointing arrowhead that points to the hole directly above the card position that is to be punched out to indicate a vote for that candidate. Each candidate's name on the right-hand page is listed to the right of a left-pointing arrowhead that has the same purpose. Additionally, each candidate's arrowhead has associated with it the number of the position on the ballot card that corresponds to that candidate.

To vote for a chosen candidate, the voter inserts the stylus into the selected hole and exerts pressure. This action is supposed to result in the complete punching out of the chad in the card position beneath and the creation of a hole in the ballot card. Each fully detached chad falls into the hollow space in the ballot holder beneath the ballot.

After the voter completes voting on the first pages seen, he or she turns over the first right-hand page of the booklet to allow a new set of pages to be viewed. A new line of holes should be seen also, and this line of holes is directly over the next row of the punch-card ballot. The voter votes on the new contests shown. Then, he or she continues to turn over additional pages and vote again until there are no more pages to be turned.

After completing the voting process, the voter removes the PPC from the holding device. He or she will have been instructed to remove all partially

Ion Sancho was the SOE of Leon County. Sancho would be drawn into the postelection legal contests by being requested by a Florida judge to supervise a recount (aborted before completion) of PPC ballots from Miami-Dade county. Sancho also would become recognized for his statement in 2001 that Florida spent \$35 million teaching people how to use the statewide lottery and nothing to teach people how to vote.

1.6 MARKSENSE BALLOTS, CENTRAL-COUNT

Gadsden County is just northwest of Leon and it fronts the Georgia border, a surveyed line in this area. Denny Hutchinson was SOE during the 2000 general election, but he was defeated for reelection soon after. Gadsden County was one of 15 counties, containing 4.1 percent of Florida's population, that used a central-count, marksense voting system. Voters using a central-count system cannot benefit from the system's ability to return the ballot if an overvote is detected. The connection of the voter with his or her ballot is severed once the ballots are dropped into a ballot box and, in any event, the voter would not be in the vicinity of the computer to retrieve the ballot when the ballot data is sensed.

Rural Gadsden would be noticed in the aftermath of the election because of its unusual demographics as the only black-majority county in Florida and its unenviable distinction in the election results. It had the largest percentage of uncountable votes in the presidential contest of any Florida county. Marksense central-count systems showed themselves particularly vulnerable on this criterion.

1.7 MECHANICAL LEVER MACHINES—NO BALLOT

Martin County, located on the Atlantic coast just north of Palm Beach County, had 127,000 residents in 2000. Its poll-site voting units were mechanical lever voting machines; Martin was the only county in Florida continuing to employ them. In 1964, at the advent of computerized voting, nearly two-thirds of the voters in the nation, mostly in heavily populated areas, were using voting machines. (See sections 4.3–4.5, 4.7, and 6.1 for more on these machines.) By 2000, use had dropped to 18 percent of the national voting population. Since there are no ballots that can be transported, the system is basically precinct-count. Lever machines have not been manufactured since 1982; thus, there is no current vendor. Special maintenance experts are employed on contract to keep the machines in running order. Spare parts are obtained by the cannibalization of other machines.

The voter, upon approaching the lever machine, sees a rectangular array of small mechanical levers presented on its front. The machine is as tall as a person, and is intended to be used while the voter is standing in front of it. Each lever on the machine's front corresponds to the name of a candidate or a choice (yes or no) for a proposition. Identifications are presented next to the

levers. The voter closes a privacy curtain before starting to use the machine, and then moves the free ends of selected levers to cover the names of the chosen candidates. Interlocks in the machine prevent the voter from voting for more candidates in a contest than are to be elected. Opening the privacy curtain completes the voting process; it returns the levers to their neutral positions and causes counters behind the levers within the machine to increase their stored numbers by one for each lever voted. There is no retention of the choices of individual voters, but the summaries of all votes for each choice are retained on the counters within the machine. Following the close of polls, administrators open the machines and record the values of each counter on official documents. Martin County used Datavote ballots for absentees.

1.8 HAND-MARKED, HAND-COUNTED BALLOTS

In little Union County, with just over 13,000 population, hand-marked ballots were hand counted. It was the only Florida county to still use this type of voting system. Babs Montpetit was SOE, and she was noted as distinctly hospitable by the journalists undertaking a recount of votes in her county. SOEs in certain other counties had the opposite reputation. Union's county seat, Lake Butler, is about 45 miles west-southwest of Jacksonville. It is estimated that 7 percent of voters nationally, in rural counties, townships, and towns, used this system in 2000. An estimate is required because usage data is only available on a countywide basis. Many of the deployments of hand-counted ballots are in the less-populated towns and townships responsible for their own election administration in counties designated as having "mixed" use.

1.9 ELECTION DAY IN PALM BEACH COUNTY

Problems with the ballot layout in Palm Beach County were noticed almost immediately. Other ballot design issues would become clear from later analyses of uncountable ballots.

SOE Theresa LePore had unwittingly approved (no partisanship was intended) a PPC ballot layout that might have contributed to a change in the outcome of the presidential election (figure 1.1 shows this arrangement). LePore had put the ten pairs of presidential candidate names on two facing pages of the loose-leaf booklet of the PPC ballot holder. This arrangement, with the line of holes in between the pages, suggested a butterfly to some observers. From top to bottom on the left-hand page were the candidate names for the Republican, Democratic, Libertarian, Green, Socialist Workers, and Natural Law parties. The arrowheads for these candidates pointed respectively (note that the photo shows misalignment) to hole numbers 3, 5, 7, 9, 11, and 13 of the ballot card's row positioned directly below the slot. From top to bottom on the right-hand page were the candidate names of the Reform, Socialist, Constitution, and Workers World parties, and

evidence points to just the opposite—that election officials were mostly permissive, not obstructionist, when unregistered voters presented themselves. (Merzer et al., 2001, pp. 97–110)

1.11 THE PROTEST PHASE OF THE POSTELECTION STRUGGLE

As it became clear that the result of the Florida election was in dispute, both national campaigns geared up for involvement by legal teams and political operatives from out-of-state. In 2004, the Federal Election Commission (FEC) stated that the Bush 2000 campaign agreed to pay a \$90,000 civil fine for failing to properly disclose fund raising and spending for its postelection effort. The Bush campaign raised nearly \$14 million compared with about \$3.2 million in recount spending by the Gore campaign. Methods of spending (no accusations of bribery were made in Florida in 2000) should be compared with the 1876 presidential election dispute; see section 3.8.

1.12 VOTE TOTALS CHANGE AFTER PARTIAL MACHINE RECOUNT

After the first machine counting of ballots when polls closed on November 7, Bush led by 1,784 votes. State regulations mandate a recount if the totals for the leading candidates differ by less than one-half of 1 percent; the current difference was well within the requirement. In fact, Clay Roberts, the director of the Division of Elections issued a memo to all SOEs that "Florida law requires an automatic recount of all votes cast." After this machine recount, Bush led by only 327 votes. The change could have been caused by certain precincts failing to be included, or by errors based on double counting, or by changes in the conditions of PPC ballots. The latter could be due to chads falling out or to partially detached chads getting pushed back into the cards. When PPC ballots are handled, the status of the hanging or swinging chads may change. This statement was generally accepted as fact by both sides. After machine counts or recounts, loose chads are found in the readers and all over the counting room floors.

In Palm Beach County, Gore gained 643 votes due to ballots that hadn't been counted the first time. In Pinellas County, the machine recount yielded a net gain for Gore of 478 votes. In Nassau County, the recount yielded Gore an increase of 51 votes, but after a reconsideration, the Canvassing Board in that county decided that the first tally was correct. The board rescinded the second submission to the secretary of state. The unusual situation would cause the Gore team to include Nassau County in its contest of the election results approved as final by Katherine Harris.

According to two separate reports, however (Kaplan, 2001, p. 51; Toobin, 2001, p. 66), 18 counties had failed to run their ballots through the machines a second time.

In Lake County, which did not run its ballots through the machines, the *Orlando Sentinel* found 376 uncounted ballots clearly intended as votes for Al Gore—and 246 uncounted ballots showing clear votes for George W. Bush. The swing in this one county—where Gore would have netted 130 votes—illustrates how important a true recount might have been. (Toobin, 2001, p. 66)

What this situation demonstrates also is the autonomy of the SOEs. Katherine Harris, as the state's chief elections officer, could have used the power of her office to assure uniformity in the application and operation of the election laws.

1.13 THE QUESTION OF MANUAL COUNTING

Following the second machine count, the Gore campaign requested a manual count of the ballots in four counties: Broward, Miami-Dade, Palm Beach, and Volusia. All four had produced majorities for Gore. Volusia, containing Daytona Beach, 91 miles south of Jacksonville on the Atlantic coast, was the tenth-largest county in population and had used marksense ballots with precinct-count. According to Florida law, manual recounts could be carried out if any of the candidates requests it within 72 hours of the election. Such recounts had been previously carried out in local contests. Gore's request was within the allotted time. It was up to the Canvassing Boards in each of these counties to order the recounts.

Very few Canvassing Boards voluntarily reviewed their ballots that contained no vote for president to determine if any of these undervoted or overvoted ballots contained a legal vote. Most Canvassing Boards apparently believed that running all the ballots through the machine, some only once, totally satisfied their responsibilities. By not manually reviewing the ballots that showed no-vote by machine, they were, by an interpretive reading of Florida law, voiding legal votes because the relevant statute provided that "no vote shall be declared invalid or void if there is a clear indication of the intent of the voter as determined by the canvassing board." On the other hand, if a Canvassing Board decided not to manually review the ballots showing no-vote by machine, the board members were clearly following the letter of the law that gave them the responsibility to make that decision. Thus, Canvassing Boards that wished to find no more votes because they were pleased with the outcome of the machine count did not need to manually review any ballots. "All politics is local," famously said the late Speaker of the House Tip O'Neill. The different actions of the Canvassing Boards could be classified also as denial of equal protection, but that particular set of wrongful acts was never considered at the U.S. Supreme Court.

Additional votes that might have been found to exist by a manual review might have been classified by a machine count as either "undervotes" or "overvotes," if the software of the machine could make that distinction. Some software could not cause the no-vote ballots to be distinguished by category.

With marksense ballots, a ballot that showed an undervote by machine might be shown in a manual review to contain a nonstandard mark, such as a

by the deadline set by the Florida Supreme Court. The recount by Miami-Dade County was never completed; it was aborted. That occurred when the idea to abort surfaced at a Canvassing Board meeting while a noisy and intimidating demonstration by Republican operatives was going on just outside the doors. (It is likely that the \$14 million spent by the Bush campaign included funds to pay for that operation.) The Board agreed that the recount would never be finished in time (Toobin, 2001, pp. 154-158).

1.14 THE CONDITION OF A CHAD THAT CONSTITUTED A VOTE

There was no state standard in Florida for what constituted a vote during a manual examination of a PPC ballot. (In Texas, such a state standard had been adopted in 1997 in a law signed by the governor, the very same George W. Bush, the Republican candidate for president.) It was generally understood that, in Florida, county Canvassing Boards were responsible for setting their own rules. When writing instruments were used, as with marksense ballots or even hand-read ballots, the human interpretation of ballot markings was reasonably clear to unbiased observers. For example, there was no controversy about accepting or rejecting marksense ballots in Volusia County while the manual recount was being done. With Datavote punch-card ballots, there was rarely a problem since the punches were typically clean and no chads remained. It was a different story with PPC ballots.

According to one report, when the Palm Beach County Canvassing Board started to manually recount ballots, they used the "sunshine rule" to determine if a ballot showed a vote. The substance of this rule was that if light could be seen through a chad that was partially punched out, then a vote was present; if no light could be seen, no vote could be counted. That rule was soon changed. The new rule went back to a standard established in 1990, which said that if a chad was detached by at least one corner, it would count as a vote, but if it was only indented (pregnant or dimpled) it would not count (Correspondents of *The New York Times*, 2001, p. 50). However, a legal scholar who has reviewed the record in *Bush v. Gore* reports that testimony in a lower court stated that Palm Beach began with the 1990 guideline before they switched to the sunshine rule. Then, following the second time that they adopted the 1990 guideline, according to the testimony, they "abandoned any pretense of a *per se* rule, only to have a court order that the county consider dimpled chads legal. This is not a process with sufficient guarantees of equal treatment" (Karlan, 2001, pp. 186, 187).

The Broward County Canvassing Board started its recount with a standard that required two corners of a chad to be separated to constitute a vote but later changed its rule to consider as a vote a chad that was detached by only one corner or just indented. Democrats had pressed for relaxing the standard in hopes that more votes for Gore could be found. Republicans objected to the changes, but a local judge agreed that the Canvassing Board had the right to set its own standards.

1.15 CONCLUSION OF THE SEMINOLE AND MARTIN COUNTY SITUATIONS

Very soon after the election, suits were filed by local Democrats asking that all the absentee ballots in Seminole and Martin counties be thrown out. Bush had a net gain of 4,700 votes in Seminole and 2,815 in Martin due to absentee ballots. While the suits failed and no absentee ballots were affected, the judges who heard the suits said that the actions of the SOEs violated Florida law. Judge Terry P. Lewis, who tried the Martin County case, wrote that the situation

offered an opportunity for fraud and created the appearance of partisan favoritism on the part of the supervisor of elections.

However, the county court decisions stated that there was no evidence of any intentional wrongdoing. The Florida Supreme Court, which heard appeals of the two suits, upheld the results at the lower level but berated the election officials:

Nothing can be more essential than for a supervisor of elections to maintain strict compliance with the statutes in order to ensure credibility in the outcome of the election. (Correspondents of *The New York Times*, 2001, pp. 271, 272, 309)

1.16 THE "CONTEST" PHASE

After the secretary of state certified the election outcome on November 26, opposition to the reported result by Gore would be called, under Florida law, a contest. There were several decisions by the Florida and U.S. Supreme Courts in this dispute. The decisions presented here are those considered most critical to the outcome. Note: case numbers are given for the decisions cited. These decisions have been reprinted and are available in a single volume (Dionne and Kristol, 2001, pp. 9-161).

1.16.1 The Florida Supreme Court—Decision of December 8

The first hearing after the certification, in the dispute called *Gore v. Harris*, was heard by Circuit Court judge Sanders Sauls in Tallahassee (in Leon County). Leon County was the venue established in state law to review all statewide election disputes. Gore's petition alleged that the certified results included "a number of illegal votes" and failed to include "a number of legal votes sufficient to change or place in doubt the result of the election" (the required basis under Florida law to achieve relief in this situation).

One of Gore's witnesses in this hearing was Kimball W. Brace, president of Election Data Services and highly knowledgeable about election equipment. Brace was seen to be carrying a copy of Roy G. Saltman's 1988 report on voting integrity (Saltman, 1988, pp. 1-132), which would be introduced as evidence. The report had called for the abandonment of PPC voting

uniform rules to determine intent based on these recurring circumstances is practicable and, we conclude, necessary . . .

The State has not shown that its procedures include the necessary safeguards. The problem, for instance of the estimated 110,000 overvotes has not been addressed . . .

On voting technology, the decision had this to say:

Much of the controversy seems to revolve around ballot cards designed to be perforated by a stylus but which, either through error or deliberate omission, have not been perforated with sufficient precision for a machine to count them. In some cases a piece of the card—a chad—is hanging, say by two corners. In other cases there is no separation at all, just an indentation . . .

This case has shown that punch card balloting machines can produce an unfortunate number of ballots which are not punched in a clean, complete way by the voter. After the current counting, it is likely legislative bodies nationwide will examine ways to improve the mechanisms and machinery for voting.

Of extreme importance for the future implementation of voting equipment throughout the nation was the following statement, which limited the applicability of the decision:

Our consideration is limited to the present circumstances, for the problem of equal protection in election processes generally presents many complexities.

There were four dissenting opinions, each written by a different justice, and each of the four opinions was joined, in part, by other members of the dissenting group. Justice Stevens, Justice Souter, and Justice Breyer each said that the proper decision would have been to remand the dispute to the Florida Supreme Court with an order that they institute a uniform standard for counting PPC ballots. Additionally, all three of these justices noted that different types of voting equipment are permitted in different counties of a state without having that situation rise to the level of an equal protection issue. Justice Stevens and Justice Breyer pointed out that "ballots of voters in counties that use punchcard systems are more likely to be disqualified than those in counties using optical scanning systems." "Thus," wrote Justice Breyer:

In a system that allows counties to use different types of voting systems, voters already arrive at the polls with an unequal chance that their votes will be counted. I do not see how the fact that this results from counties' selection of different voting machines rather than a court order makes the outcome any more fair. Nor do I understand why the Florida Supreme Court's recount order, which helps to redress this inequity, must be entirely prohibited based on a deficiency that could be easily remedied.

Additionally, Justice Stevens wrote that:

As the majority further acknowledges, Florida law holds that all ballots that reveal the intent of the voter constitute valid votes. Recognizing these principles,

the majority nonetheless orders termination of the contest proceeding before all such votes have been tabulated. Under their own reasoning, the appropriate course of action would be to remand to allow more specific procedures for implementing the legislature's uniform general standard to be established.

Justice Stevens, Justice Souter, and Justice Ginsburg indicated dismay at federal judges substituting their views for those of the state judiciary on matters of state law. Justice Ginsburg's dissent was particularly detailed on this point. Justice Breyer wrote that disputes over presidential Electors, under the Constitution and the Electoral Count Act of 1887 (see section 3.9), are to be resolved by Congress and not by the U.S. Supreme Court.

Chief Justice Rehnquist, joined by Justices Scalia and Thomas, wrote a scathing concurrence to the majority ruling. With regard to the issue of counting the votes, the statement made the following points:

Florida's statutory law cannot reasonably be thought to require the counting of improperly marked ballots. Each Florida precinct before election day provides instructions on how properly to cast a vote . . . each polling place on election day contains a working model of the voting machine it uses . . . and each voting booth contains a sample ballot . . . In precincts using punchcard ballots, voters are instructed to punch out the ballots cleanly . . . No reasonable person would call it an error in vote tabulation when electronic or electromechanical equipment performs precisely in the manner that these voting instructions explicitly and prominently specify. The scheme that the Florida Supreme Court's opinion attributes to the [Florida] legislature is one in which machines are required to be "capable of correctly counting votes," but which nonetheless regularly produces elections in which legal votes are predictably not tabulated, so that in closer elections manual recounts are regularly required. This is of course absurd.

The Secretary of State, who is authorized by law to issue binding interpretations of the election code . . . rejected this peculiar reading of the statutes. The Florida Supreme Court, although it must defer to the Secretary's interpretations, . . . rejected her reasonable interpretation and embraced the peculiar one.

Dissents to the Rehnquist concurrence were filed by Justice Stevens, Justice Souter, and Justice Breyer.

Justice Stevens pointed out that the Florida statutory standard on intent of the voter is consistent with the practice of 33 other states, which apply either a similar intent of the voter standard or an "impossible to determine the elector's choice" standard in ballot recounts. Justice Stevens named, besides Florida, 13 states that use an intent of the voter standard and 22 states (2 states appear in both groups) that employ a standard in which a vote is counted unless it is impossible to determine the elector's (or voter's) choice.

Justice Souter noted that the State Supreme Courts had to define the terms "legal vote" and "rejection," as definitions of these terms do not appear in the most relevant Florida election statute. The court looked to a related statute to define legal vote to mean a vote recorded on a ballot

University (how ironic! see section 3.8), do not agree with those of the chief justice or Judge Posner. Professor Kramer has written:

The statute is question refers to an error in "the vote tabulation" . . . Moreover, nothing in the language of the statute suggested . . . a narrower meaning was intended. On the contrary, when the Florida legislature wanted to refer specifically to the machines that did the counting, it used phrases like "the vote tabulation system" or the "automatic tabulating equipment" . . . (T)he provision governing how returns should be canvassed stated that a mismarked ballot should be discarded only "if it is impossible to determine the elector's choice" . . . This had been Florida policy for nearly a century . . .

(T)he Florida court had the better argument and more plausible interpretation . . . The difference ordinarily owed to . . . an executive official [Secretary of State Harris] charged with enforcing a statute . . . is reduced or eliminated when the interpretation in question is contrary both to long-established policy and to the apparent meaning of the statutory text, as was the case here. (Kramer, 2001, pp. 110, 111, 153)

Particular attention should be paid to Professor Kramer's statement that "This had been Florida's policy for nearly a century." What must be realized is that any policy on vote counting that has been in existence for almost 100 years must have been put into place before the commencement of computerized voting. The policy must have been devised for the hand counting of hand marked ballots, that is, certainly before 1964 when computerized voting first began to be used.

Then, a question that may be asked is as follows: to what extent did the introduction of the sensing by a computer reader of the choices punched into or marked on ballots change the philosophy of determining the results of an election? It is surprising that in a profession so concerned with precedent, lawyers for Gore did not argue strongly that the historical development of the vote-counting process demonstrates the intention of the Florida legislature in establishing the basic rules of interpreting ballots. The Florida legislature in by the secretary of state only provides instructions to a Canvassing Board if a machine fails to properly count. No evidence was presented that the introduction of machines changed the basic philosophy that the intent of the voter is what really mattered. Justice Breyer reported a Connecticut decision about a similar dispute:

Whatever the process used to vote and to count votes, differences in technology should not furnish a basis for disregarding the bedrock principle that the purpose of the voting process is to ascertain the intent of the voters.

1.17 ANALYSIS OF OVERSEAS ABSENTEE BALLOTS BY THE MEDIA

In one of the first studies undertaken and reported about this election, *The New York Times* reviewed the postmarks and signatures of absentee ballots

that were filed from overseas. These were both military and civilian. *The Times* reviewed the decisions made by the county Canvassing Boards as to whether or not the ballots should be counted or thrown out. There were different standards in different counties. The study showed that the decisions made were often partisan and contrary to Florida law. The July 15, 2001 article in *The New York Times* reporting the research states:

Under intense pressure from the Republicans, Florida officials accepted hundreds of overseas ballots that failed to comply with state laws . . . *The Times* found 680 questionable votes . . . The flawed votes included ballots without postmarks, ballots postmarked after the election, ballots without witness signatures, ballots mailed . . . from within the United States and even ballots from voters who voted twice. All would have been disqualified had the state's election laws been strictly enforced. (Barstow and Van Natta, 2001, p. 1)

The "intense pressure" cited is that, after the November 17 deadline for receiving all overseas absentee ballots (10 days after the election), Republicans filed lawsuits against 14 counties. These suits intimidated some individual Canvassing Board members by naming them. The suits asked that rejected ballots be reconsidered. At the same time, Republicans undertook a public relations blitz that pressured Canvassing Board members with charges of a lack of patriotism for rejections of overseas military ballots. The Canvassing Boards of 12 counties won by Bush reconvened and accepted overseas absentee ballots that had been rejected previously. This reversal shows that the valid charge made against re-counters of hanging chads that they changed the rules in the middle of the game also applies to re-counters of overseas absentee ballots.

The difference in decisions by Canvassing Boards between counties won by Bush and those won by Gore is shown by statistics developed and reported by *The New York Times* in table 1.1 (Barstow and Van Natta, 2001, p. 18).

The Times could not relate the content of the ballots to their review of envelopes and signatures since the ballots had been separated. It is seen in table 1.1 that the aggregate set of decisions by Canvassing Boards in counties won by Bush was significantly different than the set of decisions in counties won by Gore. It is highly likely that counties won by Bush had Republican-majority Canvassing Boards while those won by Gore had

Table 1.1 Ballots with flaws that violated state election laws or administrative rules (adapted from Barstow and Van Natta, 2001, p. 18)

	Accepted	Rejected	Percent accepted
In counties won by Bush	530	523	50.3
In counties won by Gore	150	666	18.4
Total	680	1,189	36.4

The *percentage of undervotes* (1.46) when PPC systems were used is a significant item from table 1.2. While the percentage of undervotes for Datavote systems is only slightly more than one-half of the PPC value, the percentage of undervotes for marksense systems with overvote-return is just one-fifth of the value for PPC systems. The much higher value of the percentage of undervotes for PPC systems is consistent with data on this subject obtained for elections in other states and at other times. The higher value indicates that the PPC system is, in general, more difficult for voters to use than other systems.

System performance on overvotes was considerably poorer than on undervotes, as can be seen in table 1.2. There were nearly twice as many overvotes as undervotes, 113,649 of the former against 60,851 of the latter. It would appear that the Datavote system and Union County's hand-counted ballots had the worst records on percentage of overvotes. Some counties had much poorer results than others, due to ballot arrangements established without consideration of the human-factors impact. Datavote-using Desoto County (6.72 percent rate) listed eight of the presidential candidates on the front of the ballot card and the remaining two on the back. Among PPC counties, Palm Beach's overvote rate was 4.15 percent; Duval recorded 7.50 percent. In Duval, where the major parties' presidential candidates were presented on the first left-hand page and the remaining ones on the next left-hand page,

examination of ballots by voters who chose just Bush or just Gore on the front page and one additional candidate from the second page indicates that Bush lost 4,465 votes from that error and Gore lost 7,050, a net loss for Gore of 2,585. (Keating, 2002, p. 18)

Among the marksense counties with overvote-return, all counties but one (Columbia) did very well with a 0.30 percent average, showing that the overvote-return feature was worth its cost. Columbia County's overvote rate was, at 3.20 percent, very puzzling. Staff of SOE Carolyn Kirby reported that "many voters . . . decided not to correct the error and submitted their overvoted ballots." If true, that would make Columbia County voters very different from voters in other counties. Among marksense counties without the overvote-return, Gadsden County's 11.59 percent overvote rate was the statewide record, although the Hamilton, Hendry, and Okeechobee County rates of 8.54, 8.50, and 7.23 percent, respectively, were not far behind.

Votes cast at blank positions is a characteristic of the PPC system, which occurs with no other system type. Data on the occurrence of these punches for the Florida election are available on a per-county basis from *The Miami Herald* Study. These uncountable punches are a special type of undervote. In each of the 15 PPC counties, an average of about 0.11 percent of all votes were cast in this matter, that is, slightly more than one vote in every one thousand cast (the percentage in Miami-Dade was somewhat higher). About 85 percent of these punches were fully punched through with no Chad remaining. The existence of these votes at blank positions was recognized

previously, that is, Florida in 2000 was not the first instance. They were noted, for example, in a special election in Wisconsin's First Congressional District in 1993 in which there was only one contest (also see section 6.14). (Their incidence in that election was considerably higher than here.) It was realized at that time that these were not deliberate protest punches, as it was highly unlikely that a voter would intentionally go to a polling station for just one contest and then punch for a blank position. The existence of these unintended punches for no candidate are not well known because they are not typically reported. They are another indication of the human-factors failure of the PPC system.

1.20 WHICH CANDIDATE REALLY HAD THE MOST VOTES?

According to the Consortium Study, Gore would have won if all ballots, including overvotes and undervotes, had been reviewed statewide. Gore's margin of victory would have varied up to a maximum of 171 votes, depending on the established condition of each Chad that constituted a vote and the acceptance or rejection of certain marks on marksense ballots. On the other hand, for any subset of ballots excluding evaluation of overvotes, Bush would have won. For example, Bush would have won by 225 votes if the full recounts of all ballots in the four counties requested by Gore had been undertaken. Bush would have won by 430 votes if the Florida Supreme Court had had its way and all undervotes statewide had been manually examined (Keating, 2002, p. 8).

The particular results in table 1.3, derived from data provided by Dan Keating, show Gore picking up a net total of 585 votes (12,192 minus 11,607).

Table 1.3 Consortium data summary: votes retrieved for Bush and Gore (for a particular set of Chad and mark standards)

No. of counties	System type	Bush votes retrieved		Gore votes retrieved	
		Undervotes	Overvotes	Undervotes	Overvotes
15	PPC	9,124	163	8,708	388
9	Datavote	72	38	61	34
23	Marksense with overvote-return	817	176	902	238
17	Marksense, no overvote-return	207	939	262	1,532
1	Martin County, absentee ballots	66	0	53	2
1	Union County, hand-counted	0	5	0	12
Totals					
66		10,286	1,321	9,986	2,206
Grand totals		11,607		12,192	

FROM THE REVOLUTION TO THE CIVIL WAR: CONSENT OF THE GOVERNED AND THE ELECTION CLAUSE

2.1 "JUST POWERS FROM THE CONSENT OF THE GOVERNED"

The Continental Congress, which began to meet for the second time in Philadelphia on May 10, 1775, adopted a resolution of independence on July 2, 1776. This resolution had been introduced several weeks earlier by Richard Henry Lee of Virginia. The resolution stated in part that

these United Colonies are, and of right ought to be, free and independent states, that they are absolved from all allegiance to the British Crown . . .

The Congress, only a few days after Lee proposed his resolution and strongly anticipating that it would be approved, appointed a "Committee of Five" to "prepare a declaration to the effect of the said first resolution." The five—John Adams, Benjamin Franklin, Thomas Jefferson, Robert R. Livingston, and Roger Sherman (respectively from Massachusetts, Pennsylvania, Virginia, New York, and Connecticut)—agreed that Jefferson would write the draft of what would be called The Declaration of Independence. Jefferson was chosen because he was generally believed to have an unsurpassed "felicity of expression." The Declaration, which explained to the world why the Americans had so acted, was adopted by the Congress on July 4.

The second paragraph of the finalized Declaration provided the political philosophy that enunciated the ideals toward which the new country would strive:

We hold these truths to be self-evident; that all men are created equal, that they are endowed by their creator with certain unalienable rights; that among these are life, liberty and the pursuit of happiness; that to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed . . .

Other governors were named by the legislatures. Massachusetts, were refused the veto power, possibly a carryover from hated vetoes of royal governors.

The duration of incumbency of many positions were set at one year. This was true for most governorships and all memberships in the lower houses of state legislatures except in South Carolina (Main, 1974 (1961), p. 18). Many people favoring close citizen supervision of the government believed that a short term—preferably one year—was essential for democracy. Upper house memberships had more variability in their terms: one year in New England, New Jersey and North Carolina, two years in South Carolina, three years in Delaware, four years in New York, and Virginia and five years in Maryland. Georgia and Pennsylvania initially had one-house legislatures that had a popular basis and therefore served more as lower houses than as upper houses.

The personal financial assets required for voting were generally reduced. There was considerable popular sentiment that those men who were fighting for independence should be given voting rights regardless of their financial status. In Maryland, in 1776, some soldiers denied suffrage rioted. In that situation, election judges enforcing the law as they understood it were removed under duress and replaced by those more sympathetic to voting by the active military. In some states, a two-tier system for the voting franchise was instituted. For example, in North Carolina, all freemen could vote for the lower house of the legislature, but only freeholders who owned 50 acres or more could vote for members of the upper house. A similar dual system was introduced in New York.

The financial assets required for membership in the lower houses were typically set lower than for the upper houses. The concept was that there should be consistency between the requirements for voting for a position and those for being elected to it.

Redistricting occurred in some legislatures to provide for more equal representation, but some retained a malapportionment that favored particular areas. If representation was initially on a per capita basis, then later increases in population in outlying areas would result in an inadequate number of seats for them. If representation initially had been based on an equal number of seats for each town or city, then more heavily populated cities would be underrepresented. States that failed to redistrict included Maryland, Virginia, the two Carolinas, Connecticut, and Rhode Island. South Carolina's malapportionment was sufficiently notorious to merit a mention in a speech by James Madison at the Virginia ratifying convention (see section 2.4). Redistricting of legislatures would continue to be an important political issue, but it would fester for a long time. Nearly two centuries after independence, a significant aspect of the general question with respect to redistricting would be resolved by the U.S. Supreme Court (see section 5.2).

The number of polling stations was increased in many places, allowing some voters to vote nearer their homes. Places favored for voting locations included churches, courthouses, taverns, mills, schoolhouses, and, in New

Times varied during which polling stations were open. In New England, a one-day election was common because of the use of the town—a relatively small area—as the voting unit. In other states, the difficulty of travel to and from the polling location required the polls to be open for a longer time. In the Carolinas, polls were typically open for two days. New York permitted the polls to be open for up to five days and New Jersey's polling times were measured in weeks, not days. The latter's Essex County is mentioned in several histories because its polling time was unique, at least five weeks. Even after ratification of the Constitution, polling times in some states remained longer than one day. In New York and several other states, a three-day election period was used well into the nineteenth century.

An increase in the use of ballots, as opposed to *viva voce* (oral) voting, began almost immediately following independence. The New England states and South Carolina, which had previously used ballots, continued to do so. Ballot voting began to be required in Pennsylvania, Delaware, North Carolina, and Georgia. Reformers had argued that "the *viva voce* method placed undue pressure on the elector, especially where tenant farmers were forced to vote in the presence of their landlord." Another view is that ballot voting advanced because it was "the quickest and easiest mode of taking the votes of a multitude." Tickets began to be published in newspapers for the edification of voters. In New Jersey, the voting method could be selected by county option under its new constitution. Of the thirteen counties then established, seven counties decided on voting by ballot and the other six selected oral voting. These county decisions changed from time-to-time. In that state, there was criticism of the use of the ballot with the claim that illiterates were being deceived by being given ballots not in accordance with their wishes. "Tickets were often palmed upon such as cannot write or read," it was said.

New York began an "experiment" to employ voting by ballot soon after independence was declared. The framers of its new constitution announced that the public appeared to have the opinion that voting by ballot "would tend more to preserve the liberty and freedom of the people." Ballot voting was officially adopted in 1787. In 1788, one faction handed out tickets supposedly for the other side, but folded over so that its own gubernatorial candidate could not be seen.

Maryland and Virginia generally retained *viva voce* voting statewide. On the day or days of election, each voter would make his way to the table where the judges of election and their clerks sat. A voter would be asked to verify his financial and residence status, and then requested to declare his choices. Votes would then be written down by the clerks, and any candidate present might publicly thank a voter who voted for him.

The president and vice president would hold office for a term of four years (Article II, Section 1). They would be elected in a process summing the votes of

a Number of Electors [in each state] equal to the whole Number of Senators and Representatives to which the State may be entitled in the Congress . . .

The Congress would take part in this process in that

The Congress may determine the Time of choosing the Electors and the Day on which they shall give their Votes . . .

However, the states would have some flexibility in the method of selection of the Electors, in that they would be appointed by each state in such Manner as the Legislature thereof may direct . . .

The states would accept that challenge and would start out with a variety of different methods (see section 2.6). As of 2005, the method still is not wholly uniform throughout the nation. Congress did impose one uniformity. In both the original Article II and the 12th Amendment, which altered part of that article, it is stated that

The Electors shall meet in their respective States, and vote by Ballot . . .

At no time do the Electors from the separate states meet together. Thus, the "Electoral College" is only a way of collectively referring to the Electors, not an actual convocation.

Members of the House of Representatives would be elected by the people. The number of representatives from each state would be proportional to the population of the state, according to a census taken every 10 years. If, a priori, a total number of representatives is to be seated from all states, there must be a formula, approved by the Congress, that converts population figures into whole numbers of seats for each state. A sticky problem is the "fair" allocation of the fractions, and there are a variety of possible methods. (See later, in section 2.5, *The method of apportioning the House among the states*.) Representatives would be chosen every second year. As the delegates could not agree on a single national requirement for voting for representative, they decided that

the Electors in each State shall have the Qualifications requisite for Electors of the most numerous Branch of the State Legislature. (Article I, Section 2, Clause 1)

Thus, with different property, residence, and possibly religious requirements in the several states, men in similar economic and social circumstances might be treated differently in their right to vote by their states of residence.

The establishment of the Senate, consisting of two members from each state selected by their respective state legislatures, was a major subject of the Great Compromise. There was no need to specify requirements for voters as there would be no voting for senators by the public. A Senate term would be six years, and an arrangement was devised to have one-third of the Senate elected every second year.

2.4 THE ELECTION CLAUSE

The differing responsibilities of the states and the federal government in the election of members of Congress was set with the following statement:

The Times, Places and Manner of holding Elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by Law make or alter such Regulations, except as to the Place of Choosing Senators. (Article I, Section 4, Clause 1)

The composition of this clause was controversial in the convention because of its provision for Congressional oversight. The first draft of the Constitution had a similar provision, but it included only "alter" rather than "make or alter," and it did not exempt the "Place of Choosing Senators" as the final product did.

Delegates from South Carolina objected to the draft, arguing that the states "could and must be relied on in such cases."

The clause was stoutly defended by Madison. He observed that:

the times, places and manner of holding elections . . . were words of great latitude. It was impossible to foresee all the abuses that might be made of the discretionary power. Whether the electors should vote by ballot or *viva voce*; should assemble at this place or that place; should be divided into districts or all meet at one place; should all vote for all the representatives or all in a district vote for a number allotted to the district; these and many other points would depend on the Legislatures and might materially affect the appointments. Whenever the State Legislatures had a favorite measure to carry, they would take care so to mould their regulations to favor the candidates they wished to succeed. Besides, the inequality of the Representation in the Legislatures of particular States would produce a like inequality in their representation in the National Legislature . . . (Ferrand, 1911, v. 2, pp. 240, 241)

That Madison should have recognized, in 1787, the possibility that the national government might wish to determine the form of voting technology seems incredibly prescient in the light of the 2000 presidential election and the resulting Help America Vote Act of 2002. That act likely would have been unconstitutional if Congressional oversight had not been included in the Election Clause.

Rufus King, at the time a delegate from Massachusetts, joined in supporting Congressional oversight, saying that: "If this power not be given to the

Time has demonstrated that the fears of the Anti-Federalists were ill founded. The states have not "dropped out of sight," nor has the Congress attempted to force elections for itself to be held in inaccessible places so that only certain individuals would find it convenient to vote.

The state redistricting process was regulated through the Election Clause as desired by Madison, but not until more than 50 years after ratification.

On June 25, 1842, the Congress approved the following language:

That in every case where a State is entitled to more than one Representative, the number to which each State shall be entitled . . . shall be elected by districts composed of contiguous territory equal in number to the number of Representatives to which said State may be entitled, no one district electing more than one Representative. (27th Congress, Sess. II, Chap. 47, Sec. 2)

The reason for this action was to end the practice of some states (e.g., New Jersey) in electing all of their representatives at large, winner take all. The Congress would never vote to require a similar single-member district arrangement for Electors for president, although attempts would be made.

A characteristic of single-member Congressional Districts is that it encourages a two-party system. Since only one person can win per district, coalitions are promoted. Smaller parties are forced into fusion arrangements with larger parties to create a combined majority that can win. Minor party candidates can win on their own only if their supporters are geographically concentrated. A "gerrymander," meaning a convoluted district design, can be used to promote or discourage minority representation. (The word was invented in 1812 in Massachusetts. It referred to a design approved by Governor Elbridge Gerry that looked to an opponent like the shape of a salamander.)

On other occasions, in the late nineteenth century (see section 3.7) and in the early twentieth century (see section 4.11), Congress would attempt to regulate the redistricting process. These later changes would not be permanent. Congress also gradually increased the number of members of the House of Representatives.

The Election Clause has been used for setting dates for federal elections and for the convening of Congress and Electors for president. It has never been used to establish dates for primary elections. In the late nineteenth century, the Election Clause might be identified as the basis for the Federal Election Law of 1871 (see section 3.6), the requirement for a printed ballot (see section 3.7), the Electoral Count Act of 1887 (see section 3.9), and for permission to use voting machines (see section 4.6). It was not applied in the nineteenth century in the adoption of a genuinely secret ballot. That action was taken by the states individually (see section 3.11). In the late twentieth century, the clause could be referenced as providing the basis for laws concerning voting by the elderly and handicapped, by overseas citizens, and for the National Voter Registration Act (see sections 5.9-5.11). It was not until the adoption of the Help America Vote Act of 2002 that the Election Clause would need to be cited again (see section 7.5).

2.5 ELECTING THE PRESIDENT: 1789, 1792, AND 1796

In the summer and fall of 1788, plans were put into effect to choose members of the first U.S. Congress and to name Electors for the first president and vice president. Members of the new House of Representatives were elected late that year (no uniform day had been established), and senators were named by their state legislatures. James Madison was a candidate for the House from Virginia. His enemies in the legislature had configured his district to his disadvantage but Madison, by strenuous campaigning, won anyway.

The First Congress was distinguished by its submission to the states of 12 proposed Constitutional amendments. In its submission, it wrote that these amendments to the Constitution,

as extending the ground of public confidence in the government, will best insure the beneficent ends of its institution . . .

Ten amendments were quickly adopted and became known as the Bill of Rights. The issue of "public confidence" would be a question associated with the announced results of many public elections up through the present time, more than 200 years later. The concern would not diminish as machines began to be used; in fact, it would become particularly important as computer programs became part of vote counting, beginning in the early 1960s.

Electors for president were chosen on the first Wednesday in January 1789, and they would cast their ballots in their respective states on the first Wednesday in February (Cunliffe, 1971, p. 11). They were to:

make a list of all the Persons voted for, and of the Number of Votes for each, which List they shall sign and certify and transmit sealed to the Seat of Government . . . The President of the Senate shall, in the Presence of the Senate and House of Representatives, open all the certificates, and the Votes shall then be counted. (Article II, Section 1)

The seat of government at the time was in New York City. The inauguration of the president had been set for March 4, but a quorum of senators and representatives did not arrive in time to determine the winner of the electoral count. The certificates could not be counted until April 6.

As the states had a choice in the process of choosing Electors, they made use of whatever method seemed appropriate to them. Some of the different methods for selecting Electors for president and vice president are, for example, (a) by a vote of the legislature, or (b) by a popular vote, in which the first two Electors are selected statewide and the others selected by districts, one from each district, or (c) by a popular vote in which all the Electors are selected statewide. Each of these methods has been used. While (c) is the method now used by 48 states and the District of Columbia (DC), and (b) the method now used in Maine and Nebraska, (a) was widely used through the 1820s. For DC, which is entitled to three Electors, and states similarly

and Kentucky having been added. For selecting Electors, the continuing states used the same methods that they had employed in 1789. (This time, the New York legislature managed to agree on Electors.) North Carolina selected Electors by a popular vote by districts, but the legislatures of Rhode Island, Vermont, and Kentucky determined their respective Electors. As in 1789, all Electors gave one of their votes to Washington, who had reluctantly agreed to serve again. John Adams was reelected vice president with some competition from George Clinton, governor of New York. Clinton had been hurt by charges of vote fraud in the New York gubernatorial election earlier that year; it was said that he had "robbed" his opponent John Jay (Cunliffe, 1971, p. 22).

The election of 1796 was of extreme importance in that it would demonstrate that a transfer of power from the hero of the Revolution to a less monumental figure was possible in the new Republic. There were now two strongly dichotomous factions that were essentially political parties. They would be called Federalists, favoring a robust and "energetic" central government and the promotion of commerce and industry, and Republicans, favoring the small farmer and the supremacy of the states. John Adams and Thomas Pinckney (of South Carolina) would form a Federalist ticket and would be opposed by Thomas Jefferson and Aaron Burr (of New York) on a Republican ticket. Both tickets were "balanced," implying a northerner and a southerner running together.

The election was not structured, as it is today, for a voter to make one selection for all Electors in his or her state pledged to a particular pair of presidential and vice presidential candidates. Electors ran as individuals, but they might state publicly for who they would vote if chosen. "During the first hundred years after the adoption of the Constitution, Electors, wherever chosen by popular vote, were presented as individual candidates" (Albright, 1942, p. 101).

For the 1796 election, there were sixteen states, Tennessee having joined the Union. Its Electors were determined by its legislature. All the other states used the same methods of selecting Electors that they had previously, excepting New Hampshire, which experimented with a popular vote process. There were a total of 138 Electors who cast 2 votes each. John Adams won the presidency with 71 electoral votes, one more than he needed for a majority, and Thomas Jefferson was elected vice president with 68 votes. Thomas Pinckney had received 59, Aaron Burr 30, the next highest total was 15 and eight other names shared the remaining 33.

Following Adams's election in 1796, for the first time, "the nation experienced a party administration" (Cunningham, 1971, p. 103). The Federalists held all the Cabinet posts and they had a majority in Congress. Jefferson was the most significant non-Federalist office holder. Adams's signing of the Sedition Act in 1798 would be a stain on his reputation, as seen from a historical point of view. The act likely would have been declared unconstitutional as violating the First Amendment on freedom of speech if adopted at a later time.

2.6 ELECTING THE PRESIDENT: 1800 THROUGH 1832

Electors lost their individuality beginning with the election of 1800. Before that election, both the Federalists and the Republicans held Congressional caucuses to nominate candidates for president and vice president. A significant outcome was that Electors were now to be directed by the parties. That change was permanent. Electors would no longer be disinterested statesmen acting according to their personal understanding of which candidate would serve the nation best. Later changes in ballot designs would eliminate the names of the Electors; they would become totally faceless to the ordinary voter. (See section 4.11, *The presidential short ballot*.) Nevertheless, Electors could continue to make their presence known by violating their oath of support for the party that appointed them. These would be known as "faithless" Electors, and there have been a few of them. There was one in 2000, as noted in chapter 1.

The election of 1800 would pit the Federalists (the "ins") against the Republicans (the "outs"). In their preparations for the election, the parties considered the methods of choosing Electors. The choice of Electors with a popular vote by district maximized the chances that the Electors would be split between the two parties. Selection by the legislature, if controlled by one party, would assure a sweep of all Electors for that party. Selection by a popular vote for all Electors at-large would also assure a sweep for one party or the other; a party certain of carrying the state might desire the latter method rather than legislative appointment. Popular at-large selection would still permit the voters to have a direct voice, yet provide the dominant party with the maximum benefit.

In New Hampshire and Massachusetts, the Federalist-controlled legislatures decided to choose their Electors instead of letting the voters participate. That method would eliminate any possible Republican Electors. In Pennsylvania, also, the legislature took responsibility for appointing Electors, replacing its vote-by-district system. However, in the latter state, the two-chamber legislature (which replaced an earlier one-chamber body) was split between the parties. The result was a set of Electors similarly split. Kentucky, in a countertrend, adopted a popular vote-by-district system, replacing its legislative appointment. Similarly, Rhode Island moved from selection by the legislature to popular voting.

In Virginia, the Republican-controlled legislature agreed to change its system of popular vote by district to a popular vote at-large. They were certain that a statewide vote would favor their party. This action created an administrative difficulty, compounded by the continued use of oral voting in that state. With typical district voting, each voter indicates a preference for one Elector from his district and possibly two additional Electors running statewide. With at-large voting for 21 Electors, the number that Virginia was assigned in 1800, each voter was required to state his separate preferences for 21 individuals.

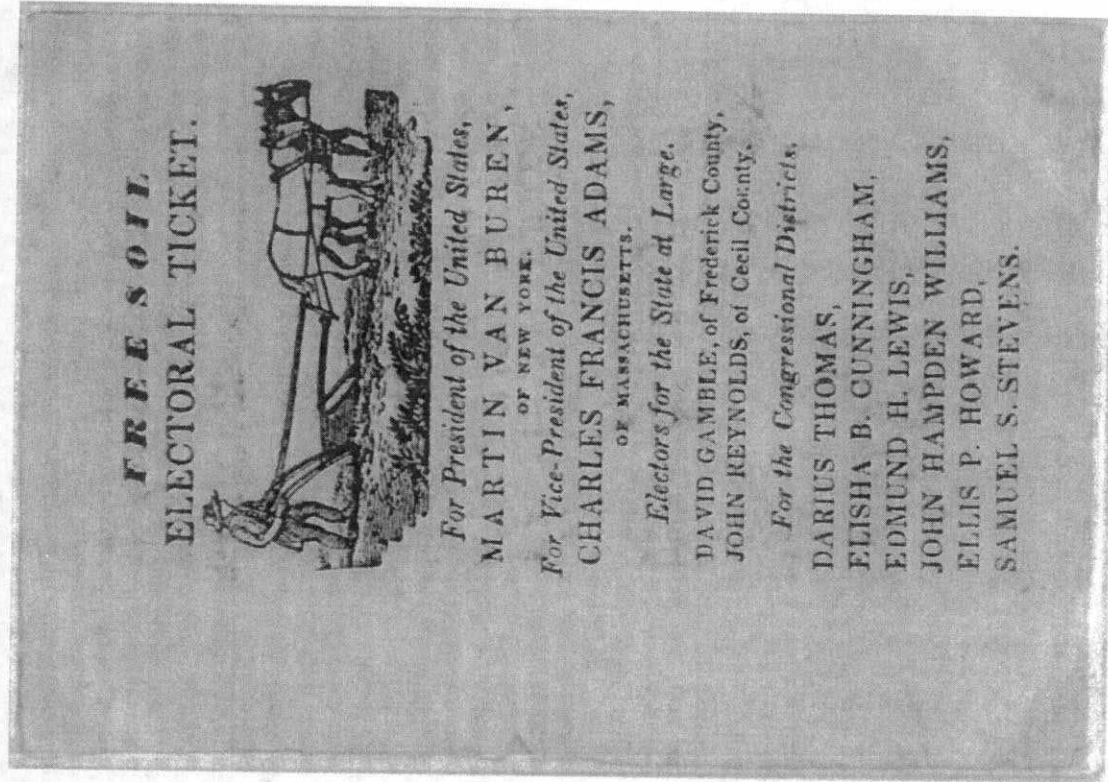


Figure 2.1 Maryland ballot for president, Free Soil Party, 1848.

more attention from the leading presidential candidates and with the hope that other states would follow suit.

There are a variety of other methods of voting by district. In 1804, for example, Maryland, in selecting eleven Electors, had nine districts: seven elected one Elector each; two elected two Electors each. In the same year,

Kentucky elected its eight Electors from two districts; presumably, each of the districts elected four Electors (Dauer, 1971, p. 164). Among other exceptions, legislative selection was used by Florida in 1868 and Colorado in 1876 (Dudley and Gitelson, 2002, p. 156). The method of presidential selection has been a long-standing concern to many thoughtful individuals. The outcome of the 2000 presidential election brought the issue forward again, temporarily.

The 12th Amendment was applied in the election of 1824. Andrew Jackson received a plurality of the popular vote and a plurality of the electoral vote over his three rivals, John Quincy Adams, William H. Crawford, and Henry Clay. Jackson was the military hero of the battle of New Orleans in 1815. Adams, the son of the second president, was secretary of state. Crawford, of Georgia, had been a senator and was secretary of the treasury. Clay, from Kentucky, was speaker of the House of Representatives.

As Jackson did not receive a majority of the electoral votes, the House of Representatives chose the president from the top three candidates. It was the second time for the House and the last time through 2004, except for an aborted role in 1876. Clay, who received the fourth highest number of electoral votes, was excluded from consideration. Thirteen states were needed to name the president and Adams received that number on the first ballot. Seven states voted for Jackson and four for Crawford. Jackson would try again in 1828; at that time, he would be successful.

It was an election without a competition of national parties, as the Federalists no longer were viable. All candidates claimed to be Republicans or Democratic-Republicans. Factions rallied around the aspirants instead. Soon after, a party realignment would occur, resulting in a National Republican party and a Democratic party. The former was soon replaced by the Whig party, which championed what might be called Federalist views. The Democrats were the heirs of Jacksonian ideals.

Additionally, it was the earliest presidential election in which the numbers of popular votes for each candidate were retained for posterity. Of course, there were no popular votes in the six states (out of twenty-four) in which the legislature appointed the Electors.

In 1828, conventions within the states began to replace the Congressional caucus. This new development was a necessity for state parties who had no representatives in Congress. At that time, the Jacksonian party was very weak in New England and supporters of John Quincy Adams had little strength elsewhere. Furthermore, the liberalization of suffrage requirements forced the decision-making process to be more inclusive. Improvements in transportation, including the development of railroads, made it possible for many delegates from various states to meet at a mutually agreeable location.

The first national nominating convention was held by the Anti-Masonic Party in 1831 in Baltimore. They wanted the visibility that they believed a national convention would provide. The National Republicans and the Jacksonian Democrats soon did the same. The national convention provided the venue where the views of different factions could be reconciled. The selection of a vice presidential candidate would often serve to conciliate factional losers for the presidential nomination or to balance the ticket.

Massachusetts, a voter submitted a printed ballot for 55 candidates. The ballot was initially rejected, but the State Supreme Judicial Court ruled that it was acceptable. As a result, parties began to print ballots and each party selected its own ballot color. Secrecy was compromised. Then, in 1851, the legislature required that the ballots be put into standard envelopes, attempting to restore secrecy. In 1853, opponents of secrecy came into power and made the envelope optional; this allowed voters who were coerced or bribed to make public the ballot that they were voting. In Rhode Island, a similar situation occurred, with the same result.

In New York, voting by ballot for state-level elections had been adopted in 1789, but not for local elections. *Viva voce* voting was common. In New York City, landlords could vote in every ward in which they owned property. Several instances of landlords threatening tenants with retribution were reported in the 1790s if the rent payers did not vote as they were instructed. Election inspectors were still appointed in a partisan manner, and this fact made it likely that the lists of qualified voters were padded or pared according to voters' expected voting patterns. A new law in 1804 eliminated plural voting by property owners and established voting by ballot in city elections. Voting by ballot was extended to town elections in 1809.

In Maryland, efforts at election reform began in about 1797 with several proposals submitted to the legislature. Some of these measures were for universal manhood suffrage, elimination of restrictions against holding public office by Jews, and for increases in the number of polling places in each county. At that time, each county had only one polling place. Another suggestion was for the compiling of county voter registration lists "in order to curb abuses [by sheriffs] and the creation of fagot voters." The latter were persons temporarily assigned small plots of land to allow them to meet voting requirements (Williamson, 1960, pp. 141, 142, 149). In 1799, voting by ballot was adopted, replacing oral voting. Election districts were created that were almost equal in size and population. In 1802, universal white male suffrage was achieved, dropping landholding and taxpayer restrictions. In 1810, the state constitution was clarified to assure that all voters in state elections could also vote for members of the House of Representatives and for presidential Electors.

In South Carolina, complaints about fraud in the voting process had started to come forward in the last decade of the eighteenth century. It was stated that polls were opened and closed at the whim of sheriffs, that more ballots were found in ballot boxes than there were voters, and that some persons had voted more than once in an election. The concerns galvanized the opposition to the manner in which elections were being conducted, and resulted in a strong effort to equalize representation in the legislature. As noted by Madison in 1788, malapportionment of the legislature antedated ratification of the Constitution. Success was partially achieved in 1808 with equalization of representation in the lower house. The counties away from the coast would now have a fair proportion of seats, compared with Charleston and its surroundings. The upper house remained in the hands of the coastal planters and their allies.

In Virginia, there were significant property requirements for suffrage in the early years of the nineteenth century. As a result, "both east and west [sections of the state] witnessed a considerable degree of illegal voting and coercion of electors" (Williamson, 1960, p. 230). A state convention in 1829-1830, with its primary focus on reducing requirements for suffrage, did not increase the liberality of the voting process. The popular election of the highest state officials was not approved, nor was the elimination of *viva voce* voting in favor of the ballot. The state also denied reformers' desires to provide an increased number of polling places over the one per county then available. Virginia continued to use oral voting until 1867.

Kentucky, which had first been settled as part of Virginia, became a state in 1792. It continued to use oral voting until adoption of a new constitution in 1891. Kentucky was the last state to do so; it had permitted the city of Louisville to vote by secret ballot in its local elections in 1888 (see section 3.11).

The territory that became Ohio, Indiana, Illinois, Michigan, and Wisconsin was included in the United States under the 1783 treaty that ended the Revolutionary War. The Northwest Ordinance, adopted by the Continental Congress in 1787, included rules under which the new states could be formed. Support for education was contained in this legislation. There would be freedom of religion and no slavery in the new territory. Battles against the indigenous inhabitants were hard fought and bloody before resistance was crushed.

The *viva voce* method of voting was initially introduced into the Northwest Territory in the incorporating legislation of 1794. The first governor, Arthur St. Clair, was instrumental in obtaining approval of the territorial legislature in 1800 to adopt voting by ballot. St. Clair was concerned about excessive power of landlords under oral voting. He told the legislature that "creditors were using their power over debtors to make them vote for certain candidates on promises of extending the time for payment" (Evans, 1917, p. 6).

Ohio and Indiana provided for elections by ballot in their first constitutions, although Indiana, as a territory, had used oral voting before 1811. In Illinois, there was significant conflict over the issue of the voting method. Voting by ballot alternated with *viva voce* voting several times between 1813 and 1829. The state employed *viva voce* voting between 1829 and 1847. Advocates of open voting stated that "it enabled candidates to pledge a man before election" (Williamson, 1960, pp. 219, 220). The first constitutions of Michigan and Wisconsin required voting by ballot.

Soon after Maine became a state in 1820 by separating from Massachusetts, political parties began to distribute their own ballots. These ballots tended to be of different colors and sizes, and used different fonts and printing styles. The result was that secrecy of the ballot was lost, as anyone watching the deposit of ballots by voters could tell whose ballot the voter was casting.

Texas, which had received many settlers from the United States, declared its independence from Mexico in 1836. (Mexico had become a republic in 1823.) Texas allowed slavery. It had been illegal in Mexico, although immigrants were permitted to bring their slaves with them. In 1845, Texans requested annexation by the United States, and the Congress adopted the necessary legislation. The Mexican War began in 1846; the pretext was the clashes that had occurred in the area between the Mexican-claimed border at the Neucenes River and the US-claimed border at the Rio Grande. By 1848, the Mexicans were defeated. They accepted the Rio Grande boundary and ceded California and other territories that became the southwestern region of the United States. An additional strip of land, called the Gadsden Purchase, was obtained from Mexico in 1856. It would finalize the Mexican-U.S. border between Texas and California.

The settlement of California and Oregon by Americans had already begun before the Mexican War. Some prospective settlers took ships around Cape Horn to San Francisco or to the narrower part of Central America. In the latter case, following a trip across the isthmus, emigrants took another ship on the Pacific side north to California. In a land route, wagon trains began the trek west from Missouri. The Great Plains were crossed, generally following the Platte, North Platte, and Sweetwater Rivers. The highest peaks of the Rocky Mountains were circumvented by crossing the Continental Divide by the easiest route, at South Pass in what would become Wyoming. Then the trail split: through the Great Basin and over the Sierras to the Great Valley of California or along the Snake and Columbia Rivers into Oregon. The Oregon country was claimed by both the United States and Britain, but with large-scale immigration from the United States, the British would have difficulty enforcing their control. The result was a treaty in 1846 that extended the border along the 49th parallel from Minnesota to an arm of the Pacific Ocean.

The population of the nation increased significantly along with the territorial expansion. The first national census in 1790 had shown a population of not quite 4 million. A decennial census was required under the Constitution, Article I, Section 2, for purposes of apportionment of the House of Representatives. Through 1860, it showed an average increase of about 34 percent every 10 years, resulting in a population in the latter year of over 31 million. By that year, there were 33 states in the Union, including all the states east of the Mississippi (except West Virginia, still part of Virginia), all the states bordering the Mississippi on the west, that is, Louisiana, Arkansas, Missouri, Iowa, and Minnesota, as well as Texas, California, and Oregon. In the 1860 presidential election, all the Electors that could be named were appointed, and all of them voted. There were 303 electoral votes cast, consistent with 66 members of the U.S. Senate and 237 members of the U.S. House of Representatives. The reconstituted Republican party, specifically antislavery, would win with Abraham Lincoln. That assured the start of the Civil War.

2.10 THE FEDERAL GOVERNMENT CONTRIBUTES TO NATIONAL DEVELOPMENT

The needs of commerce were understood by the framers of the Constitution. Among other powers, they specified (Article I, Section 8) that Congress would have the authority:

- To regulate Commerce with foreign Nations, and among the several States, and with the Indian tribes;
- To establish . . . uniform laws on the subject of Bankruptcies throughout the United States;
- To . . . fix the Standard of Weights and Measures;
- To establish Post Offices and post Roads; and
- To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

In addition, there is more language in this section that Congress could utilize to justify relevant legislation. Congress would have the power to "provide for the general Welfare of the United States" and to enact "all laws which shall be necessary and proper for carrying into Execution [the powers enumerated in section 8]."

In the developing industrialization, patents would be found to be particularly valuable. The regulation of interstate commerce would become significant as rivers were cleared of obstacles, while roads and canals provided the infrastructure by which people and goods moved from place to place without regard to state lines. The federal bankruptcy responsibility fostered interstate commerce in that it prevented individual state sovereignties from interfering with the ability of creditors to achieve their due. It also prevented bankrupts from avoiding responsibility by crossing state lines. The establishment of "post Roads" would be very important for the knitting together of the vast territory that the nation was destined to have. The federal government helped fund the National Road, now U.S. 40. The road started in Cumberland, Maryland, in 1811 and was extended by 1838 to Vandalia, Illinois, not far from St. Louis. "When its 834 miles had been completed it had cost \$6,821,200 and had required thirty Acts of Congress" (Johnson, 1999, p. 366).

2.11 FEDERAL REGULATION FOR PUBLIC SAFETY COMMENCES

The development of the relatively high-pressure non-condensing steam engine occurred around 1800 in the United States and England. The American inventor was the ingenious Delawarean Oliver Evans. The utilization of steam engines to power boats is associated with the name of Robert Fulton, who

THE LATE NINETEENTH CENTURY: STRUGGLING WITH CORRUPTION AND FRAUD

Slavery was abolished by the 13th Amendment to the Constitution, ratified in late 1865 after the carnage and chaos of the war had ended. Lee had surrendered in April of that year, and Abraham Lincoln was shot less than a week later. Republicans, in command of Congress since the inauguration of Lincoln in 1861, were not deterred by his assassination. They imposed military rule on the defeated region after becoming dissatisfied with the results of conciliatory moves by the new president, Andrew Johnson. Occupation would remain in some states until the adoption of an 1877 understanding that helped end the stalemate over the national election of 1876 (see section 3.8).

3.1 POPULATION, IMMIGRATION, AND THE CITIES

National population during this era expanded from about 35 million in 1865 to about 76 million in 1900, an increase of 117 percent. In the same period, the number of immigrants was over 15 million persons; that is, of the total increase of 41 million, over one-third was due to immigration. The highest immigration level in a decade of the late nineteenth century was over 5 million between 1881 and 1890.

Concurrent with high levels of immigration, there was a general movement of population to the cities. While a tendency to urbanization was a fact before the Civil War and would continue afterward, it was a major factor in the last third of the nineteenth century. In 1860, with the national population at 31.4 million, the urban population was a little over 6 million, or just about 20 percent of the total. In 1900, there were 30 million dwellers in places of more than 2,500 population (which defines urbanization), about 40 percent of the whole. New immigrants tended to settle in the larger cities. "The percentage of native-born residents in cities smaller than 25,000 exceeded that of larger ones throughout the late nineteenth century" (Barrows, 1996, p. 94).

The year 1863 was especially fruitful for Tweed, although it was the year of the Draft Riots in New York (see Asbury, 1928, pp. 108-157). He was named chairman of the General Committee of Tammany Hall and later that year grand sachem (supreme leader). Also, in that year, he was named deputy street commissioner of the city and held that position until 1870. He was chief operating officer for that function, which employed thousands of men. Without the constraints of civil service, it was an enormous opportunity to be used for political purposes. It could be used to help influential people who needed jobs for their poorer relatives or for partisans in their wards. It provided the manpower to help secure desired election results by providing a reservoir of repeaters and "shoulder-hitters." The latter term (also "shoulder-strikers") was commonly used for toughs "accomplished in the arts of scuffling and ballot-stuffing" (Fredman, 1968, p. 26), who created disturbances at polling locations and intimidated opposition voters into either staying away entirely or accepting the machine's proffered ballot. Employees could be used for any purpose for which Tweed needed them. Satisfaction of political obligations was first priority. If there were a "job description" that limited a worker's function, no one paid any attention. Each man knew that he could be discharged and someone else hired to replace him.

In 1864, Tweed bought a major interest in the New York Printing Company, which henceforth was the city's printer of all documents. All companies with city franchises understood that they had better obtain their printing requirements from it. Additionally, Tweed was part of a group purchasing a marble quarry; the stone for the new County Courthouse was procured from it at exorbitant costs.

Another senior member of the Ring was A. Oakley Hall, who became mayor of New York during Tweed's ascendancy and continued in that position until his term ended in 1872. As mayor, Hall had to countersign all vouchers for payment to contractors. Many bills were inflated; that was a major way in which the Ring made its money. Of course, Hall signed without protest and would later claim that he had only "ministerial" responsibility; that is, he paid no attention to their content.

In 1868, the Ring was in the midst of its best days. Tweed became a state senator, but was not required to relinquish any of his other positions. Peter Sweeney now was city chamberlain, the equivalent of a county treasurer. Richard Connolly was city comptroller; his annual salary was \$3,600, but he was also cashier and general manager of a private bank. (In 1871, he would be worth \$6 million.) James Watson had become city auditor in 1866. The fact that Watson had been previously convicted of financial manipulation did not seem to matter to Tweed; indeed, it may have made him seem more valuable.

Cooperating judges were on the bench. For example, George Barnard, formerly city recorder, was on the Supreme Court (not the highest court in the state). The control of the legal machinery assured that an operation essential to the Ring, that is, the capability of assuring certain election outcomes, was not in danger of being compromised. The judges would find

excuses to release repeaters who were caught voting more than once. Additionally, they ran a naturalization mill that allowed aliens who did not meet the minimum requirements for citizenship to easily achieve that important goal. October, the month just before the general elections, provided the largest number of aliens naturalized. Certain individuals vouched falsely for hundreds of persons to be naturalized and Tammany judges ignored the obvious contradictions clearly in front of them. Of course, Tweed and Company were generally rewarded with the votes of the new citizens.

The national election of 1868 was one in which significant dishonesties were perpetrated by the Tweed Ring. Gangs of repeaters were organized at particular Tammany locations during days of registration and election day. Each gang member would receive a paper specifying a name and a residential address to use for registration and later for voting. After the first falsification was used, each repeater would return to the headquarters location where an additional false name and address would be given to him to be used. This process would be continued throughout the day (Davenport, 1894, pp. 168-171).

Ballot stuffing was widely employed on election day. At voting locations where the Republican poll workers would not cooperate or could not be bribed, ways would be found to distract or remove them. Shoulder-hitters might be used to create confusion to divert their attention. Incorrect information might be given to them that their services were needed elsewhere. False arrest was not unknown.

After the close of polls on election day, a method using telegrams was employed by Tammany Hall (the telephone had not yet been invented) to determine how the contending parties were faring in the vote upstate. Reports of local vote totals were held back by Tammany until it was determined how many extra votes might be needed to overcome the out-of-city deficit. The Board of Aldermen's 1878 report on the Tweed Ring scandals estimated that the vote cast in New York City in 1868 was 8 percent in excess of its entire population and that there had been more than 50,000 illegal votes cast.

The fall of the Tweed Ring began when County Auditor James Watson died in a sleighing accident in January 1871. Thoughtlessly, the Ring appointed supposed supporter Matthew O'Rourke in his place. Unbeknownst to the Ring, O'Rourke was embittered over his inability to collect a claim. Another anti-Ring Democrat, former sheriff James O'Brien, had hid his disgruntlement over a similar failed claim and had persuaded Comptroller Richard Connolly to hire a friend, one William Copeland. Both O'Rourke and Copeland diligently and independently reported their discoveries of the records of financial frauds to *The New York Times*, a strongly anti-Tammany newspaper (Callow, 1966, pp. 259, 260).

The disclosures by the *Times* began in the summer of 1871, and continued for several months. The public paid attention and reform rallies were held. Many New Yorkers who had become apathetic were suddenly excited that possibly the Ring could be beaten in the state and local elections of

1870. There had been an attorney general previously but, before 1870, he had no significant cadre of officials to assist him.

The act (41st Congress, Sess. II, Chap. 114) defined as federal crimes any action to prevent or attempt to prevent persons from voting or from registering to vote. It identified, as criminal, actions of election officials who, in the wrongful performance of their duties, prevented or hindered the registration, voting, or counting of votes of any persons lawfully so entitled. Administration of the act was put in the hands of local officials of the Department of Justice. These officials included district attorneys, federal marshals and their deputies, and special commissioners of elections. The act gave federal courts jurisdiction over voting rights cases, gave the president authority to use troops or state militia to help enforce federal guarantees, and most importantly, gave the Department of Justice the power and responsibility to enforce all of the provisions relating to the "elective franchise" (Goldman, 2001, p. 17).

At about that time, the U.S. Supreme Court would rule that the 15th Amendment did not require that blacks were to be given the right to vote without qualification; only that blacks and whites would have to meet the same qualifications in order to vote. Thus, literacy tests and poll taxes, if they were administered without racial bias, were Constitutional at that time. As the nineteenth century wound down, the public would have had its fill of racial concerns and the effort needed to assure racial justice. They would want to move on. Thus, the problem of black rights in the South began to be ignored by the great majority of whites nationwide.

3.4 THE APPORTIONMENT CLAUSE

Although much of the effort to assure the voting rights of African Americans was humanitarian, a part of it was self-serving. The Constitution, in Article I, Section 1, had stated the following:

Representatives and direct taxes shall be apportioned among the several States which may be included in this Union, according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons . . . and, excluding Indians not taxed, three-fifths of all other persons.

This wording was superseded by the 14th Amendment, Section 2, which redefined apportionment according to the "whole number of persons in each State, excluding Indians not taxed." The revised clause omits the word "free," which was no longer needed, and the phrase "three-fifths of all other persons."

A concern of Republicans was that, with the former slaves now being counted as full persons (instead of three-fifths of each), the population of the Southern states would relatively increase for purposes of Congressional apportionment. If the freedmen were not permitted to vote, then the (white) voters in the South would overwhelmingly vote for the Democrats. Republicans would have no chance to gain any of the extra seats. With that

concern in mind, the following clause had been inserted into Section 2 of the 14th Amendment:

But when the right to vote at any election . . . is denied to any of the male inhabitants of such State being twenty-one years of age and citizens of the United States or in any way abridged . . . the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

No application of this clause was ever implemented, but the situation was not dire for the Republican Party. The great majority of immigration and population expansion after the Civil War and up to World War I was in the North, Midwest, and far West, counterbalancing the temporary increase in the South's apportionment. Additionally, voters outside of the South were often importuned by Republican politicians "waving the bloody shirt." The message was to vote against the Democrats, the party of disloyalty, rebellion, and postwar racial violence. Immigration to the South was relatively low, because of the lack of job opportunities in a mainly agricultural region and the general xenophobia in that part of the country. The South would remain nearly solid for the Democrats until the Civil Rights movement of the 1960s. This renewal of concern in the late twentieth century, strongly supported by northern Democrats, drove many white southerners out of that party.

3.5 PROGRESS TOWARD INDIAN CITIZENSHIP

"Indians not taxed" were those aboriginal inhabitants who continued to live on lands not yet settled by whites or on lands specifically exempted from taxation by treaty. A few Indian tribes had been granted citizenship as a result of treaties. In 1884, the U.S. Supreme Court had ruled in *Elk v. Wilkins* that the 14th Amendment did not apply to American Indians in general. John Elk, born in a tribal area, could not under this ruling become a citizen by assimilating and living in Omaha, Nebraska. In 1887, Congress made the court's decision moot by adopting the General Allotment (or Dawes) Act (49th Congress, Sess. II, Chap. 119, Sec. 6). It stated that Indians "who adopted the habits of civilized life" and those who accepted private allotments of what had been tribal lands, were eligible to become citizens (Keyssar, 2000, p. 165). The number of American Indians who were citizens was too small to significantly affect apportionment and, assuming states would permit them to register and vote, it was not clear that they would vote overwhelmingly for one party, as in the case of African Americans.

3.6 COUNTERING ELECTION FRAUD IN THE CITIES, 1868-1894

The situation in cities needed to be addressed differently than denial of voting rights in the South. The anonymity of city living, together with the

3.7 FEDERAL LEGISLATION TO ALTER THE VOTING PROCESS, 1871-1872

Section 19 of the Federal Election Law was the first-ever Congressional legislation on voting technology. It states, in its totality:

SEC. 19. *And be it further enacted*, That all votes for representatives in Congress shall hereafter be by written or printed ballot, any law of any State to the contrary notwithstanding; and all votes received or recorded contrary to the provisions of this section shall be of none effect.

In 1871, when the law was enacted, only Oregon and Kentucky were still using *vive voce* voting on a statewide basis. Oregon would adopt the ballot the very next year. The use of *vive voce* voting, should it be readopted or adopted by new states, would thwart the work of the supervisors of election and deputy marshals in identifying falsely computed vote totals. There would be no voter-approved hard-copy record of individual votes cast. With bribery and intimidation rampant, the use of *vive voce* voting would be a step backward. Additionally, the Federal Election Law gave specific instructions to the supervisors of election to position themselves close to the ballot boxes during voting and during ballot counting. If there were no ballots, these directions would be meaningless.

Section 19 was not repealed in 1894 with the other sections of the Federal Election Law. Note that it does not specify a "secret" ballot. The use of the term "ballot" only means that the voter's choices are conveyed by writing or printing on a piece of paper or other hard copy. It has been noted already that differences in the ballots supplied by political parties often made their identification nonsecret by poll watchers.

A reapportionment of the House of Representatives was established under the act of February 2, 1872 (42nd Congress, Sess. II, Chap. XI, Section 1) according to the ninth census of 1870. Section 2 of that act tightened the specifications for design of the single-member districts under which members of the House were to be elected. In 1842, Congress had required that the districts be composed of "contiguous territory." In the new legislation, it was required that representatives were to be

elected by districts composed of contiguous territory, and containing as nearly as possible an equal number of inhabitants . . .

This law would not be considered in force beyond the reapportionment of the next census.

Dates for election of representatives and the start of each new Congress were set under Section 3 of that same act of February 2, 1872. The act established that elections for members of the U.S. House of Representatives were to occur on a uniform day every second year and, in every fourth year, that day would be same as previously established for appointment of presidential

Electors. Additionally, Section 3 reiterated that Congress would commence its new sessions on the fourth day of March next. Thus, if ballots of presidential Electors were to be opened in front of Congress on the second Wednesday in February, that action would occur with the old Congress, not the new one. Specifically, the Act stated:

That the Tuesday next after the first Monday in November in the year eighteen hundred and seventy-six and . . . in every second year thereafter is hereby fixed and established as the day for the election . . . of Representatives and Delegates to the Congress commencing on the fourth day of March next thereafter.

The day for the convening of the new Congress and the day for the inauguration of the new president and vice president would be changed under the 20th Amendment in 1933.

3.8 RESOLVING THE HAYES-TILDEN ELECTION, 1876-1877

The presidential election of 1876 pitted Republican Rutherford B. Hayes, governor of Ohio, against Democrat Samuel J. Tilden, governor of New York. After the resolution of the 2000 presidential election between George W. Bush and Albert Gore, Jr., similarities would be seen between the two contests. In both races, the loser had a plurality of the popular vote and the winner was not finally established until a significant time after the election. After the nineteenth-century match-up, some were noting that Hayes prevailed over Tilden by just one vote, eight-seven, in the special Electoral Commission established by Congress to consider contradictory certificates of election from four states. In 2000, some would claim that Bush won over Gore by just one vote, five-four, in the U.S. Supreme Court. In both cases, the vote count from Florida was controversial but, in 1876, the situation in Louisiana was even more contentious.

Conditions during the previous administration headed by U. S. Grant helped set the stage for the close balance of the political parties in 1876. While Grant was personally honest, many of his close associates were not. In the Congress and in the Executive Branch, graft and bribery were rampant. Special privileges were for sale. Soon after Grant was reelected, the Panic of 1873 caused serious financial harm to the country, putting millions out of work and causing the bankruptcy of many businesses. A result of that disaster was that the Democrats gained control of the House of Representatives in the Congressional election of 1874. The Republicans retained the Senate. This divided outcome would be most significant in creating the stalemate that prevented a quick conclusion to the 1876 election.

As the date of the election approached, the common wisdom was that Tilden would win. That appeared likely despite the fact that the Republicans were very well funded. The latter had been in office since Lincoln's first election,

of 1872 but federal troops assured the dominance of the Republican legislature.

There was evidence that the Republicans in general and U.S. senator John Sherman in particular had provided funds to smooth the way for Hayes' election.

In *Oregon*, the state's voters had elected the three presidential Electors to which Oregon was entitled. They were Republicans but one of them was a U.S. postmaster. This employment made him ineligible, under the Constitution, Article II: "no . . . Person holding Office of Trust or Profit under the United States, shall be appointed an Elector." John Watts, the postmaster, had been told that he could resign after the election and then be rehired after he cast his vote. He resigned one week after the election. Others read the law differently. The contrary opinion was that votes cast for a presidential Elector who was a federal office holder were void; the person who received the next highest number of votes should be appointed.

The governor of Oregon, a Democrat, decided that Watts had not been eligible to appear on the ballot, and appointed the next-highest vote getter among the candidates for presidential Elector. That person was a Democrat, and would vote for Tilden. A certificate signed by the governor was submitted to Congress showing two votes for Hayes and one for Tilden.

The two clearly elected Republican Electors decided that there was a vacancy for the third Elector, and they followed Oregon law for such vacancies by meeting together and appointing a third person. That person was Watts. Their certificate for Hayes was signed by the Oregon secretary of state.

In *Congress*, it was not clear who was to make the final decision to accept or reject a specific certificate. The Constitution, Amendment 12, stated: "The President of the Senate shall, in the presence of the Senate and the House of Representatives, open all the certificates and the votes shall then be counted . . ."

The Republicans controlled the Senate. They insisted that the wording of the 12th Amendment meant that it was the president of the Senate who would decide which certificates to accept or reject. They assumed that the certificates favorable to Hayes would be accepted and all others would be rejected. In the Democrats' view, all competing certificates should be put aside and results announced based on the uncontested certificates. Then, neither Hayes nor Tilden would have the majority of the electoral votes cast, and the election would be thrown into the House of Representatives. Tilden would be the beneficiary of this process, as the Democrats controlled the House. Negotiations finally produced a compromise.

A *bipartisan Electoral Commission* would be empowered to review all the competing certificates and choose the ones to be accepted by Congress. The fifteen-member commission would be composed of ten members of Congress including five Democrats and five Republicans, four Supreme Court justices, including two Democrats and two Republicans, and a fifth justice selected by the other four. It was planned that the fifth Supreme Court justice would be David Davis of Illinois, an independent. No one had taken the trouble to ask

Davis if he would serve. Almost immediately after the Electoral Commission had been established, it was discovered that Davis would decline the honor. The justices selected Republican justice Joseph P. Bradley of New Jersey. That decision would prove to be the death knell of Tilden's chances.

The deliberations of the commission occurred while Congress was counting the electoral votes, beginning on February 1, 1877. As the states were named in alphabetic order, if an objection was raised to its submitted certificate(s), the issue was sent to the commission. Objections were received as the names of Florida, Louisiana, Oregon, and South Carolina were being read. Congress halted its work each time, until the commission had made its decision on the particular state.

All the decisions of the Electoral Commission were on a party-line vote, eight-seven. All the certificates for Hayes were accepted and all the certificates for Tilden rejected. The commission majority refused to investigate the situations, basing their decision on "the face of the returns." In the case of Florida, the commission accepted the certificate signed by a governor who had really been defeated for reelection and rejected the one from the lawful governor because it had been "late." In the case of Oregon, the certificate signed by the lawful governor was rejected.

A *strategy of filibuster* was considered by the Democrats in the House on February 17. They figured that they still had a chance by preventing the count of electoral votes from being completed by talking nonstop until March 4. The latter date was when the term of office of President U. S. Grant ended and the mandate of the Electoral Commission expired. It was not clear what would happen if there were no president, but the northern Democrats were totally frustrated as the commission inexorably voted for all certificates selecting Hayes.

Southern Democrats would not agree to a filibuster. Their first priority was the removal of federal troops and the "redemption" of the last three southern states. In private discussions with influential Republicans, culminating in a meeting in Washington on February 26, they agreed to go along with Hayes' election if federal troops were withdrawn and the elected Democratic governors were allowed to take office. Finally, many Democrats, including northerners, realized that the choice at this late date was Hayes or anarchy. The electoral count was finished and Hayes was declared to be elected to the presidency in the early morning hours of Friday, March 2.

3.9 THE ELECTORAL COUNT ACT

In 1887, Congress enacted a law (49th Congress, Sess. II, Chap. 90) that addressed some of the ambiguities and gaps in the Constitution and federal law that had been the source of the stalemate in counting the electoral votes in 1876. It may have taken the ten years since the finalization of Hayes' electoral victory to eliminate the bitterness and concern for illegitimacy to generate enough rationality and inter-party cooperation. The first administration of Grover Cleveland was in office.

These statistics show that through 1876, there were, on average, about ten indictments issued every week, but in the later period there were somewhat fewer than four cases brought to trial each week with a somewhat lower conviction rate. The difference may be due to the fact that once the southern white elite redeemed their states, less violence and fraud was needed to maintain control. Also, there was less interest in Washington in providing the necessary resources for prosecutions. Goldsman's research did not extend beyond 1893, so that comparison with later activity by the Department of Justice is not possible from his work. To a layperson, the indictment rate of ten per week over seven years, or even four per week over the next seventeen years certainly seems to demonstrate a significant effort unlikely to have been equaled in the twentieth century.

Albie Burke (Burke, 1970, p. 97) presents the costs of the Federal Election Law of 1871, for each year from 1871 through 1894. The total cost of the law was over \$4.6 million, but for 1892 alone, the cost was about \$0.92 million—about 20 percent of the total. The number of deputy marshals used increased every year, and Burke reports that "In 1890, the number of federal officials at the polls in New York City alone was over 10,000." The activity under the act says nothing about its value, but the increasing requests for deputy marshals each federal election cycle demonstrates that some part of the voting public in the larger cities felt the need for additional assurance of election integrity. As the law was repealed in 1894, no comparisons with other periods can be made. The assignment of federal officials to serve in elections began again in the South under the Voting Rights Act of 1965 (see section 5.5). It had been an interval of more than 70 years before the concept was palatable again to members of Congress and the citizenry that they represent.

Two authors concerned with comparing the amount of election fraud in different periods (Allen and Allen, 1981, p. 177) have reported the number of contested elections for membership in the House of Representatives, from the 1st Congress (began 1789) through the 64th Congress (ended 1917). This data was taken from two public documents of the House, Document No. 510 of the 56th Congress and Document No. 2052 of the 64th Congress. Of the 214 elections contested on the basis of fraud, bribery, or intimidation, 127 or nearly 60 percent occurred in the 30 years between 1869 and 1899. From 1789 to 1869, there were 56 contested elections and from 1899 to 1917, there were 31. In the three decades, 1869 to 1899, the South and Border States had two-thirds of all contested House elections. The authors ascribe this preponderance to issues of Reconstruction. The remaining one-third were primarily in the industrialized Northeast and in the Midwestern states east of the Mississippi River.

Additional evidence of election fraud has been provided by historical research into situations in particular states at particular times. Much of this evidence is supported, in different examples, by judicial transcripts, committee reports of state legislatures, articles from newspapers of the times, or

retained correspondence. A categorization, as given here, aids in organizing the descriptions:

The extent of bribery of ordinary voters in the late nineteenth century may be painful to realize for the issue-oriented activist of today. The idealist wants voters to be convinced by the force of political ideas, but that was not necessarily the case at that time. Richard P. McCormick makes the situation quite clear about conditions in New Jersey. He notes that a special committee of that state's legislature found in 1883 that "a large proportion of . . . the voting population depended upon election day as a regular source of income" (McCormick, 1953, pp. 159-162). In 1889, on November 8, the (*Trenton State Gazette* newspaper wrote that "There was never such open, wholesale bribing of voters as in Tuesday's election. Both parties were equally guilty." In preparation for an election, according to a legislative committee report, "ward workers were given stacks of money at the same time that they picked up stacks of ballots to be distributed among their constituents." The number of bribable voters statewide was estimated at 50,000; about 270,000 votes were cast for governor in that year. Another New Jersey researcher has written that "perhaps as much as one-third of the electorate commonly accepted money for their votes."

New Jersey was not unique. "Money, or 'soap' as it was called, with increasing frequency was used to carry elections after the Civil War" (Evans, 1917, p. 11). Many people, particularly in rural environments, expected their party to pay them for the time to go to the polls and return. A study in 1892 claimed that 16 percent of voters of Connecticut were bribable at prices fluctuating between two and twenty dollars. Other research described massive vote buying that began in 1890 and continued for two decades in rural Adams County, Ohio (which borders the Ohio River some 50 miles east of Cincinnati). In 1910 in that county, a quarter of the electorate, about 1,700 voters, were convicted of vote selling (Argersinger, 1986, pp. 673, 674).

In San Francisco during some years in the 1880s, boss Chris Buckley stood outside the polls wearing an overcoat with his hands in "his pockets filled with quarter eagles." (A \$10 U.S. gold coin was known as an eagle. A quarter eagle was worth \$2.50 and was about as large as a dime. They were minted at various times from 1796 to 1929.) After a voter had cast his ballot according to his promise, the worker who accompanied him to the polls and watched him cast his ballot would introduce him to the boss. As the boss shook hands with the voter, "the consideration for the vote was easily passed" (Overacker, 1932, p. 33). In Baltimore, there was a tradition of getting out the vote with funds called "walking-around money." Cash was given to functionaries whose job it was to visit neighborhoods on election day. Such cash may have been passed on to neighborhood leaders who promoted voting to their neighbors of similar party affiliation.

Organized bribery at a higher level was not unknown. The 1888 presidential election, described by historian Peter H. Argersinger as "flagrantly corrupt," was won by Republican Benjamin Harrison of Indiana. Harrison lost the popular vote but defeated incumbent Grover Cleveland in his home state of

"repeaters" brought across [the river from New York City] voted as often as ten times in as many election districts. (McCormick, 1953, p. 171)

Intimidation was a common tactic. Top Republican leaders, including the aforementioned W. W. Dudley, importuned corporate leaders to find ways of assuring that their employees would vote for the party. Threats of economic reprisal were made and, in some cases, deposit of ballots were carefully watched at polling places to assure compliance with management's views. In 1885, it was reported in a Congressional inquiry that workers at one of the federal government's own naval yards were required to take ballots in a folded form from a table presided over by one of the foremen and carry them, unopened, to the polls about 100 feet away, where they were required to deposit them without knowledge of the candidates for whom they were voting (Argersinger, 1986, pp. 678, 682).

In the 1888 national election campaign, intimidation of workers was a significant factor:

The large manufacturers in New York and in the Middle West worked in concert to intimidate their employees. Through them, the [Republican] party organization struck at the pocketbooks of proletarian voters. From Buffalo and Troy in the closing weeks of the canvass came reports that workers in big iron and textile mills were being provoked to panic by threats of unemployment. (Josephson, 1938, p. 428)

This tactic was officially recognized and denounced in 1889 when New York's governor Hill "urged the legislature to punish as a crime the use of pay envelopes which threatened employees with loss of jobs if they should fail to vote as directed" (Bass, 1961, p. 129).

The widespread use of intimidation by employers and creditors was a major reason that the secret ballot was desired by labor organizations. A Philadelphia newspaper, the *Journal of United Labor*, noted in 1889 that the workingman's political preferences "were smothered by the decree of his employer, who dictates what ticket he must vote." A similar sentiment was expressed in *The New York Times* on October 11, 1891, in opposing a lawsuit then being pursued in Ohio to declare the recently adopted Australian ballot unconstitutional in that state. In a column datelined Cleveland, Ohio, the newspaper opined that

the large manufacturing population of this State has always been more or less intimidated, and it is estimated that about 15,000 voters in the two counties of Hamilton [Cincinnati] and Cuyahoga [Cleveland] alone have been more or less influenced by their employers.

Blatant disregard of election results occurred. Third parties and other independent upstarts were more often the victim of these kinds of frauds than either Republicans or Democrats, the Hayes/Tilden situation excepted. The

minor parties, which were newer, did not have members entrenched in powerful offices, and so were more vulnerable. Here are some examples:

Terence Powderly, a Pennsylvania Greenbacker and labor leader of the 1870s wrote that he was defeated by local election judges who, without justification, assigned the Democratic candidate enough extra votes to win. Well-known reformer Henry George (see also section 3.11), running for mayor of New York City on a Labor ticket in 1886, complained that ballots cast for him were counted for his Democratic opponent. In 1893, in Kansas, a Republican candidate was awarded an elected office because of the transposition of voting totals with his Populist opponent, a ploy of the Republican county clerk that the State Board acknowledged but refused to correct. In 1897, the Indiana legislature voted on partisan lines to unseat Populists who, all reports conceded, had received the majority of popular votes (Argersinger, 1986, pp. 675, 676, 683).

Another form of blatant disregard of the results is the replacement of real voted ballots by false ones. In Vincennes, Indiana, in 1889 (Zukerman, 1925, p. 11), the entire contents of a box of ballots were removed and burned, and false ballots substituted.

Corrupt elections over county seats were a feature of settlement of the Great Plains. With the expansion of the railroad network, the prairies began to be populated. Between 1870 and 1890, areas such as Kansas and the Dakotas grew in large multiples of population. A governor would declare that a county had been organized, and officials would be named to govern it temporarily. One of the next major steps would be to establish a county seat—a town selected as the place where the county courthouse would be built, the county governing board would meet, and county officials would have their offices. Banks and a newspaper publisher would be desired, and possibly a library. In many newly formed counties, no settlement had any natural reason to be selected over any other. The prices of land in the selected town might rise significantly over prices in the unselected location, and the decision on selection would be made by a vote of the county residents. Thus, land speculation and dreams of riches drove promoters of particular towns to perpetrate the wildest methods for winning the election.

Much of the trouble in the 1880s occurred in Kansas. James R. Chiles, author of an entertaining article on these altercations, presents this quote from a leading Kansas newspaper in 1889: "Every side of every county seat contest in Kansas is charged with fraud and corruption, and in the majority of cases, the charge is true." One of the worst situations occurred in the election in 1887 in Gray County, Kansas (Chiles, 1990, pp. 100-110, 154). The center of Gray County is about 20 miles from Dodge City, renowned for its gun fights of the era.

Daniel Boorstin has described noteworthy situations that occurred in Grant County and Stevens County, both in Kansas. In Grant County, "voters in [the town of] Ulysses were paid off at the rate of ten dollars apiece as they cast their ballots." In Stevens County, "a county seat war between Hugoton and Woodsdale involved kidnapping, assassination, bribery, the use of militia,

old-line Yankee roots, an illustrious father and grandfather, and a degree from Harvard where he excelled in sports. He had helped craft the state's first civil service law in 1883, and also wrote the Australian ballot law, which was enacted in 1888. He began to appreciate the need for the blanket ballot when he observed the tumult at polling stations on election day. A prospective voter was besieged with ticket peddlers each thrusting a separate party's ballot at him. Independent candidates hawked stickers or "pasters." (Pasters were small labels containing the name of an alternate candidate, which could be pasted over the name of the official candidate. Paste pots and brushes were available at some locations to complete the gluing process.) Some of the ballots available were irregular, in that they slyly replaced one or more of a party's candidates with others. Party observers at the polling place could see which ballot the voter had accepted and could follow the voter to the ballot box to assure that he had cast it. Violence at the polling station or nearby was not uncommon. Printing of ballots by the parties and hiring of ticket peddlers resulted in significant campaign costs.

Dana's observations at polling stations were no different than those of thousands of others, but Dana had the will and connections to undertake action. He obtained assistance of friends of civil service reform and of labor organizations. They assisted his crafting of the legislation and managed its progress through the state legislature. When the law was implemented the next year, Dana recalled the new situation:

I went about the polls, especially in the districts that used to be rough and noisy, where I had seen a man's coat torn off his back, crowds pushing voters away and ballots taken out of men's hands and others substituted . . . All was going on very quietly and in a perfectly dignified manner and that was almost worth the whole of our efforts to obtain the law. (Blodgett, 1966, p. 115)

The Massachusetts Act to Provide for Printing and Distributing Ballots and the Public Expense, and to Regulate Voting at State and City Elections (1888) provided for an "office-block" arrangement of candidates (Wigmore, 1889, pp. 58-73). That is, names of all candidates for a single office were presented together in a sequence, in alphabetic order. The voter would record his choice by making an "X" in a box next to his selection. As other states adopted the office-block ballot, the order of the candidates might be determined by a party sequence. In later approvals, the "party column" ballot arrangement, initiated in Indiana, would become popular. In the latter format, all candidates nominated by a particular party were listed in a column under the heading of the party name and party emblem. The latter configuration appeased party leaders who preferred a blanket ballot that looked like the several party tickers in parallel. The party column ballot made it easier for the voter to vote for all candidates of a single party.

In *New York*, the publication of William Mills Ivins's ideas bore fruit. Representatives of reform clubs and the United Labor party of Henry George joined together to draft a bill for submission to the state legislature in

its 1888 session. The bill was introduced by Republican state senator Charles Saxton. Prior to its introduction, *The New York Times* editorialized that

The need of this reform is most seriously felt in this city, where the use of money to secure votes through the necessity of furnishing and distributing ballots has reached vast proportions. (*New York Times*, December 12, 1887, p. 4)

The bill provided for public printing of the party ballots, distribution of the ballots only by neutral clerks at the polls, a ballot for every party that had polled at least 3 percent of the vote, a ballot for new parties with petitions of 1,000 signatures, and a write-in line for most offices. Documented requests by parties for a ballot would have to be accomplished at least fifteen days before the election. Each voter would make his selections in a private booth, he would have five minutes to do so, and it would be a criminal act for the ballot being cast to be displayed to anyone before being deposited in the ballot box. An exception permitted persons who were illiterate, handicapped, or blind to obtain help from the ballot clerk.

Given that Governor David B. Hill started almost all his political speeches with the sentence "I am a Democrat," it was not surprising that he vetoed the Saxton bill after it had been approved by the Republican-dominated legislature. (The veto was not overridden.) As noted by Hill's biographer Herbert Bass, the real objection to the bill was not in the governor's veto message of 15 pages, but in the character of the Democratic urban vote:

A substantial part of this vote came from the organized efforts of the machine, especially among the illiterate. The official ballot would severely hamper the organization's ability to poll its full strength . . . (Bass, 1961, p. 101).

In 1889, Saxton reintroduced his bill. Hill vetoed this bill with a 26-page message, and again the veto could not be overridden. Hill's main objection, as before, was the requirement for public printing of the ballot. He wrote that it discriminated against voters who were illiterate or visually impaired.

Saxton's bill was reintroduced in 1890, and events began to force the governor's hand. First, reports of experiences in Massachusetts with the blanket ballot were very positive. Second, there were mass meetings throughout the state that demanded ballot reform. Third, a delegation of Knights of Labor representatives from 34 state assembly districts came to Albany and urged Hill to approve the Saxton bill. Finally, "a gigantic petition, weighing one-half ton and bearing 77,000 signatures from New York City and Brooklyn alone, was carried by 14 men to the floor of the legislature, there to rest during the debates" (Bass, 1961, p. 149). When Hill requested that the legislature ask the State Court of Appeals for an opinion on constitutionality and the legislature refused to agree, Hill cast his third veto.

Finally, a compromise was agreed to at meetings among interested parties including Hill, Senator Saxton, and a private group, the Ballot Reform League. The compromise provided for officially printed single-party ballot

PREAMBLE

We meet in the midst of a nation brought to the verge of moral, political and material ruin. Corruption dominates the ballot box, the legislatures, the Congress, and touches even the ermine of the bench. The people are demoralized; most of the States have been compelled to isolate the voter at the polling places to prevent universal intimidation and bribery . . .

EXPRESSION OF SENTIMENTS

1 [of 10]. *Resolved*, That we demand a free ballot and a fair count in all elections, and pledge ourselves to secure it to every legal voter without Federal intervention, through the adoption by the States of the unpurported Australian or secret ballot system . . . (Hefner, 1999 (1952), pp. 238, 239)

Through 1896, seven more states adopted the Australian ballot, but there were no more adoptions in the nineteenth century. The overwhelming number of actions by the individual states from 1888 through 1896 demonstrated that the time had come for that particular enhancement to the voting process. The seven recalcitrant jurisdictions failing to adopt at the time were North Carolina, South Carolina, Georgia, Texas, New Mexico territory, New Jersey, and Connecticut. The last listed, as was the case in New Jersey, allowed ballots to be obtained "before election, upon payment of cost" (Wigmore, 1889, pp. 176, 177). In 1897, Missouri regressed and permitted separate party tickets, although officially printed. These eight, except for South Carolina and Georgia, would adopt the blanket ballot statewide by 1930.

3-12 CONSEQUENCES OF ADOPTION

Difficulties for small parties resulted. As ballots were now printed by the government, they could not distribute independent ballots. The major parties created roadblocks for newly formed independent groups by requiring a number of citizen signatures in order to achieve a line or column on the blanket ballot. In some cases, the number of signatures needed was unreasonably large or requirements to be met for acceptable signatures were hard to achieve. In addition, some states passed "anti-fusion" laws. These prevented candidates' names from appearing on the ballot in more than one place. In that case, a small party that wished to endorse a major party candidate could not present that candidate's name on its own ballot row or column. This situation could have contributed to a minor party's inability to poll sufficient votes to automatically qualify for presentation on the next election's ballot.

Several types of ballot frauds could no longer be practiced if the ballots were produced officially by a government agency, included all parties and contests, and were distributed to voters in the polling station immediately before being filled out and cast. For example, bogus ballots, purporting to be official, but presenting nonofficial candidates, could no longer be distributed. The criminal elements, ever resourceful, invented "chain voting" in order to overcome one aspect of the new system.

Many voters at one polling station could be involved in a chain voting fraud. Its purpose was to orchestrate voting a particular way by voters who agreed to be compensated for their actions. To start the fraud, it was necessary to have a single unvoted ballot outside of the polling station. This ballot could be surreptitiously obtained from the election administrators, or it could be obtained by the first voter in the scheme. If necessary, the first voter would enter the polling station, not vote the ballot given, and bring it back outside. That voter would lose the vote. The leader of the scam would mark this unvoted ballot as ordered by higher ups, and hand it to the second voter. The second voter would enter the polling station, pocket the unmarked ballot given out and vote the marked ballot. Again, the unmarked ballot was brought back outside and the process repeated as long as there were voters willing to participate.

A corrective measure in response to chain voting was the production of each blank ballot with a sequentially numbered stub. The purpose was to assure that the ballot cast by the voter was the same ballot initially received. As the voter received a ballot at the polling station, the number of the stub was written down by an election official. After the voter had completed filling out the ballot in a private space and returned to cast the ballot in the ballot box, the number on the stub was matched to the number previously written down. If the number was the same, the stub was torn off and the ballot was cast.

Vote-casting technology would fall off the national agenda for a full century. The adoption of a voting machine not using ballots would be permitted by the Congress in 1899 (see section 4.6) but, after that, there would be no federal legislation concerning vote-casting technology until 2002.

Additionally, the adoption of PPCs, marksense ballots, or direct recording electronic machines for voting in public elections would not be listed as significant events in respected volumes of histories of the United States, *even when specific sections of the books were devoted to science and technology*. It would be as if a new type of voting technology was a mere administrative detail no more important than, say, the purchase of new calculators for office workers at the local city hall. The mind-set of both policymakers and the media would change after the close of polls on November 7, 2000.

THE LATE NINETEENTH AND EARLY TWENTIETH CENTURIES: MECHANIZATION AND POLITICAL REFORMS

Additional developments of the late nineteenth century need elaboration. For one, mechanization would be applied to voting. Second, professional specialization would flower, and this trend would ultimately affect election administration. Third, electricity would be harnessed as a utility, allowing for the development and wide use of devices employing it, such as punch-card-based data processors. In the early twentieth century, additional changes in the voting process would occur, some in response to the corruption of the preceding era.

4.1 GLASS BALLOT BOXES AND BALLOT BOXES THAT COUNT

Before the voting machine was invented, there were devices developed to store and later to count paper ballots. In earlier times, containers for collecting ballots were casually selected; inverted hats were a typical receptacle. In 1828, in a precinct in Tennessee, a large gourd was used. As elections became more formal and participants were concerned about ballot frauds, the need arose for a more intentional and secure repository. Solid wooden boxes with a hinged lid were used in many cases. The lid of a typical ballot box had a slot or a circular hole allowing entry of ballots, and the lid might have been locked so that two keys, held by representatives of two different factions or parties, were required to open it. A description of a required ballot box was included in a law of 1790 in New Jersey, applying to five counties in which voting by ballot was carried out (McCormick, 1953, p. 92).

Persons intent on fraud applied ingenuity in efforts to circumvent the system. One such example was presented in *Frank Leslie's Illustrated Newspaper* of July 19, 1856 in an article entitled "STUFFER'S BALLOT-BOX." The box that was used, according to the text, "in San Francisco and probably some of our northern cities," had a false bottom just inside the outside panels. Extra ballots already filled out for the favored candidate(s) could be secreted between the inside of the external bottom and the false bottom.

of ballot stuffing was significant, as the discussions of the previous chapter have indicated. A ballot box with glass sides was required to be used by all counties in New Jersey in 1887. As each ballot was deposited, it was counted, stamped, and punctured, and a bell was rung (McCormick, 1953, p. 172). If more than one ballot was entered at a time, only one of them would be stamped. Also in 1887, Melvin H. Coffin of Boston received a U.S. patent for his "voting machine." According to Coffin's patent disclosure,

The object of this invention is to furnish an improved ballot box adapted to receive, between two feed-rollers, ballots, one by one, impress upon each by a reciprocating stamp a suitable identifying mark, register accurately the number of ballots cast, and sound an alarm on the deposit of each within the receptacle.

Coffin's machine was operated by turning a crank.

Augustus C. Carey of Boston received a patent for a combination ballot box and ballot counter in 1882, which the U.S. Patent Office classified as a voting machine. Carey's idea was to connect all ballots end-to-end as they were entered into a ballot box. Within the box was a drum on which the ballots were to be wound. A voided ballot was first affixed to the drum and it was wound with a crank until only a half-inch end was outside of the box. Then, the top end of the first voted ballot was attached to it with glue and was wound on the drum, again leaving a half-inch end outside the box. This process of entering ballots was continued while the polls were open. The ballots were entered face down, and if more than one ballot was entered at the same time as a stack, only the one on the bottom would be seen and counted. The number of ballots entered in succession was registered on a counter as the crank was turned. After all the ballots had been entered and the polls closed, a final voided ballot completed the entries. Then, the roll of ballots was removed from the box and placed on a spindle. The ballots were then unrolled and rerolled on a second spindle. As that process was accomplished, the content of each ballot was determined by the election officials (*The New York Times*, June 1, 1883, p. 4).

The use of Carey's machine was supported by U.S. senator George F. Hoar of Massachusetts, who introduced a bill calling for the machine's adoption and purchase throughout all the states and territories at a cost of \$50 each. One machine would be used at each precinct throughout the nation (*The New York Times*, January 14, 1883, p. 1). Carey's machine was demonstrated at the Capitol in January 1883, and was later displayed in New York in June of that year. Hoar's bill did not pass, and nothing more was reported about Carey's invention.

John McTammany of Worcester, Massachusetts, received a U.S. patent in 1892 for a "Pneumatic Registering Ballot-Box." Ballots "formed of cardboard or paper having sufficient stiffness to prevent its wrinkling . . ." were to be used. The ballots were to be perforated near the outer edges to indicate choices. Two columns of candidate names were presented on the ballot. Small boxes near the long edges of the ballot were provided for the perforations.

McTammany used compressed air to operate counters that counted holes. There is no evidence that his balloting machine was ever used, but McTammany would be undaunted. He would go on to obtain many more patents concerned with voting machines.

4.2 EDISON'S LEGISLATIVE VOTING MACHINE

A voting machine designed by Thomas Edison (1847-1931) is often confused in general histories with voting machines used by individual citizens for public elections. One such history has a statement that is plainly incorrect. This "revised and updated" history states that "Thomas A. Edison invented the electric voting machine, although it was not used until 1892 because, as a politician kindly explained, it interfered with the patronage system" [Schlesinger, 1993 (1983), p. 315].

Thomas Edison received his first U.S. patent in 1869. He entitled the device "Electrographic Vote-Recorder and Register." It was intended for use in roll-call voting in a legislative assembly and not for voting by the public. There is an essential difference between these two types of elections. In an assembly of elected representatives, voting is generally intended to be public knowledge; the purpose of Edison's voting machine was to openly record how each member voted. Furthermore, for those deciding to vote, the choice is often either "yes" or "no," and just two summing devices are required. On the other hand, in voting by the public to select candidates for offices, secrecy of the votes cast by any voter is to be assured. The choice is often to select one person from several for an office, and there are usually a number of different offices and questions on the ballot. A summing device for each candidate and each yes/no alternative is required. The machines for accomplishing the two disparate tasks are necessarily widely divergent in design.

Edison's device employed a single electric battery that provided direct current (DC) power. Also, each voting member of the assembly was to be supplied with a three-position switch that could close a circuit through the battery with either a YES connection or a NO connection, or leave the circuit open without a connection. An essential component of the invention was a sheet of paper that was "chemically prepared" to respond to electricity. That was the "electrographic" part of the device and, according to the patent, this recording technology was well-known. Edison had not yet invented the electric light, so that he could not plan to light up a bulb next to the name of each member on a large display board, as is done in many assemblies now.

The device holding the sheet of paper was to sit on the desk of the recording clerk of the assembly. The sheet would serve as the record for only one roll-call vote; then it would need to be replaced by a fresh sheet. In the device, the sheet sat in a bed between two rails and over the names of voting members of the assembly. The names were in metal type, and the entire list of members was presented twice, in two columns. Each name was separately embedded in nonconducting material. The left column was headed by NO and the right column by YES. Each of the rails consisted of conducting

one row if more than one candidate was to be elected to the same office). Each column was displayed with the party name at the top and in a unique color. The latter was used to give illiterate voters a better chance of recording the choices that they had in mind. Each candidate location listed the names of the office and the candidate next to its push-key. It appears that once a voter set a push-key, it could not be reset; the voter had no ability to correct a mistake. The selection of one candidate prevented the selection of all other competing candidates.

The Myers machine was demonstrated in Rochester on November 23, 1889, according to *The New York Times* of the next day. It was reported that Myers and others would petition the state legislature to permit its use. By 1892, the necessary law was passed, and the machine, identified as the "Myers Automatic Ballot-Cabinet" (Ludington, 1911, p. 51) was used in nearby Lockport on April 12 of that year for local elections. In 1893, it was used in a dozen or so small towns in areas surrounding Lockport. According to the report in *The New York Times*, the voters and supervisors seemed "delighted" with the system. The machine was described as having six party columns, with 35 "knobs" in each column. The voter knew that his vote was cast if he pushed the knob in far enough that it could not be pulled out. The machine patented in 1889 was arranged to prevent voting for more candidates than were allowed in each contest, up to two. A later design would expand that number.

Myers obtained two more patents, one in 1890 and another in 1893. Both of these patents made advancements to the non-ballot machine of Myers's second patent. In the 1893 patent, Myers states that the machines' "capabilities are increased and certain alleged objections are overcome." *The New York Times* of May 6, 1894 discussed the revision of the state's "town law" that made it easier for town officials as well as county officials to adopt the Myers machine for elections.

One modification to the Myers machine was to enable voters to write in (or paste in) the name of a candidate not nominated by any party. That was done by providing a roll of writing paper accessible at a slit in the face of the machine. After the name was written or pasted in, the voter pushed in the knob associated with that candidate location. Then, when the voter exited the booth and the knobs were released, the roll of paper was advanced so that the next voter could not know that a write-in candidate had been selected.

Additionally, Myers increased the capability of the machine to allow for "cumulative" voting, that is, "for allowing each voter to cast as many ballots as he may be entitled to, whether for the same or different candidates, and no more . . ." A design allowing a voter to select up to five candidates is given in his 1893 patent, but Myers states that the concept is applicable to a larger number of candidates. Another innovation provided by Myers was a clock that started at zero each time a new voter entered the booth. The clock was to be visible outside of the booth, to indicate the time that the voter had expended. There were rules on the maximum allowable time permitted for

voting. Myers states that

In the event that it is necessary for an officer to enter the booth to eject an unruly or dilatory voter, it is desirable that he [the officer] be prevented from ascertaining what the votes or ballots, if any cast by the voter, are . . .

Therefore, Myers provided a curtain that would fall over the push-keys and hide them from view as such an officer entered the booth. Whether or not the clock and curtain were implemented is not known.

The Myers machine was used in Rochester in the general election of November 3, 1896 and also in that city for the contest for governor in November 1898. It was also used in Syracuse, New York. Connecticut and Michigan approved the use of the Myers machine, but it achieved no success in either state. It was deemed not sufficiently convenient or reliable.

4.4 VOTING MACHINES OF OTHER EARLY INVENTORS

John W. Rhines of St. Paul, Minnesota received a U.S. patent for a "Vote-Recording Machine" in 1890. Rhines' device, which was small compared with Myers's machine, consisted of a keyboard mounted on legs and a cover to that keyboard. The keyboard contained a rectangular array of pushbuttons, like Myers's machine, but there was no surrounding booth.

The Rhines machine employed a strip of paper for each contest to record the total votes. Each strip was divided into columns, one column for the candidate of each party. Numbering wheels served as printing heads to record the total vote for a candidate on the paper strip. The Rhines machine was authorized in Michigan in 1893 but it was unsuccessful in achieving any significant acceptance.

The work of John McTammany, whose Pneumatic Registering Ballot Box was described above, demonstrates that there is no assurance that persistence will pay off. He received eleven U.S. patents on voting machines from 1893 through 1895 and four more in later years. One patent of 1895 provided a counter wheel for each candidate; the voter used a stylus pushed into a hole to activate the turning of the wheel to the next count.

Several of his other patents involved the use of a tally-sheet instead of counters. His next-to-last patent of 1895 provided the design of a "Pneumatic Vote-Counting Machine" whose function was to automatically count holes in a tally-sheet.

A test of McTammany's machine was made in Worcester, Massachusetts, on October 10, 1896. In that test, the holes made by voters to indicate selections were counted by McTammany's pneumatic counting machine and were transmitted by telegraph to the city hall, a short distance away. Certainly, this electrical communication of data was an innovation to be widely used much later.

The voting machine was used again in Worcester in the general election of November 3, 1896. *The Washington Post* editorialized on November 9 that

4.5 CONSOLIDATION OF COMPANIES

Gillespie and his work came to the attention of an office equipment supply company of Rochester, New York. He was persuaded to come to that city and join in the formation of the Standard Voting Machine Company (Standard VMC). Gillespie's patents of 1899 and 1900 identify the inventor as residing in Rochester and assigning his patents to that company. The "Standard Automatic Voting Machine" approved for use in New York state in 1898 is, with high probability, the machine of that company. It was manufactured in Rochester from 1898 to 1900. A particular Standard Voting Machine, no. 983, is in the possession of the Smithsonian Institution, National Museum of American History. (This machine is shown in figure 4.3). The machine records on its surface the dates of patents and some patent numbers used in its design and construction. These patents are those of both Myers and Gillespie. Apparently, Myers's original firm, the Myers Ballot Machine Company, was merged into the Standard VMC.

The Smithsonian is also in possession of U.S. Voting Machine no. 408. That machine records patents of Sylvanus E. Davis and two other individuals, Henry C. H. Cooper and James H. Dean. Cooper resided in Jamestown, New York, and his patent was finalized in 1898. Dean, of St. Paul, Minnesota, obtained his patent in 1899. Dean's patent cites three previous patents of his, obtained earlier the same year. The machine had been manufactured in Jamestown, where it had been used. Both the Standard model and the U.S. Voting Machine model were constructed about 1899 or very soon after, since all the patents listed are from that year or before. Both machines were donated to the Smithsonian by the Automatic Voting Machine Division of Rockwell Manufacturing Company of Jamestown, New York, in 1961.

By 1900, the U.S. VMC had merged with the Standard VMC and all manufacturing was consolidated in Jamestown. The new organization was called U.S. Standard VMC. Production would remain in that city for the next 80 years, until technological change ended the demand for new machines.

4.6 CONFLICT OVER THE "WRITTEN" BALLOT REQUIREMENT

Laws in all states but Kentucky were adopted by 1872 requiring that voting was to be by written or printed ballot. One purpose of these laws was to ensure the elimination of oral voting. The federal government had done the same in 1871. As reported in section 3.7, the federal law required "that all votes for representatives in Congress shall hereafter be by written or printed ballot . . ."

In western New York, a contest for the House of Representatives in 1896 eventually led to a new law of Congress. Henry C. Brewster had defeated William E. Ryan by 25,399 to 17,109, but Ryan complained that 31,354 votes cast in Rochester had been by voting machine. These, said Ryan, were

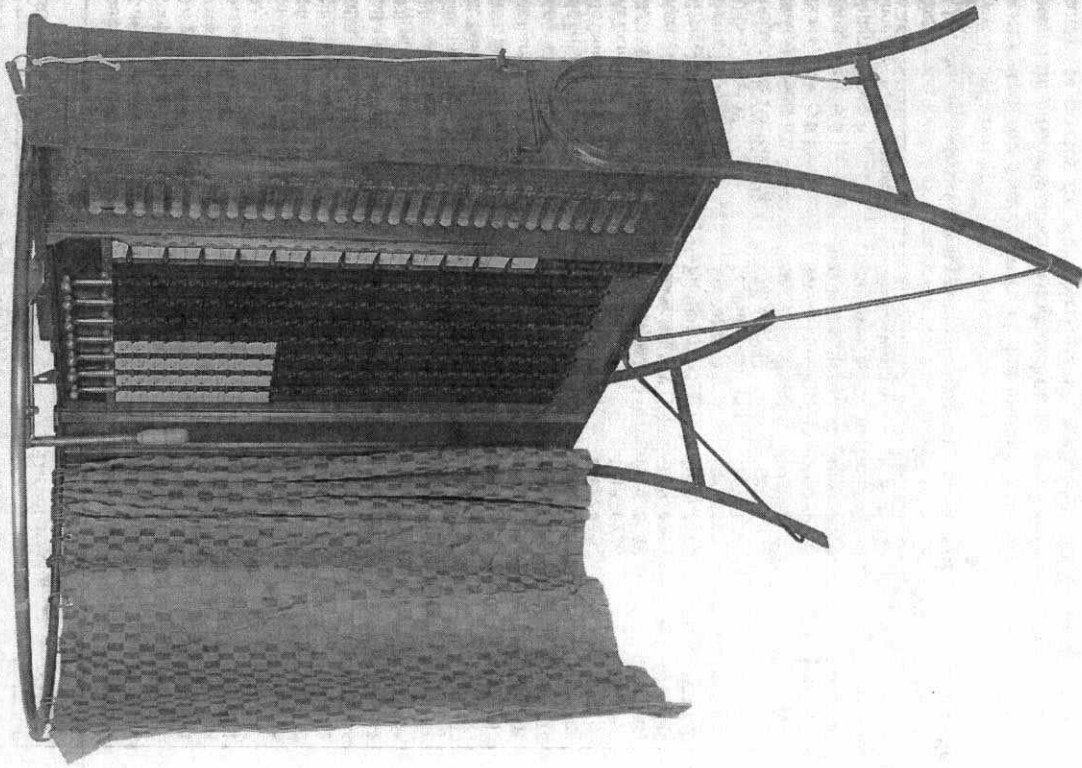


Figure 4.3 Lever voting machine, ca. 1899. Manufactured by the Standard Voting Machine Company of Rochester, NY. Alfred Gillespie invented the procedure in which the large "vote" lever first closes the curtain for privacy and opens it while registering the votes at completion of voting.

investigation of the situation by the state legislature, it was alleged that more than \$200,000 had been spent by the successful vendor to secure the contract. That accusation was denied by others. Chicago did not attempt to again use voting machines for many years (Harris, 1934, pp. 252, 253).

New York City's experiences are similarly interesting. The state of New York, in 1921, required New York City to adopt the machines but, by various means, the city was able to delay. The Tammany organization opposed them. With ballots, control of the election could be exercised in several ways, for example, through the release of false counts of ballots, with the addition of pre-marked extra ballots, and with the fraudulent elimination of properly cast ballots voted for the opposition. The latter could be caused to occur by "losing" or replacing ballots from precincts where the opposition was strong, or with invalidating marks surreptitiously placed on those ballots with concealed leads under the fingernails of a manual counter. Without ballots, these frauds could not be perpetrated. The actual counts would be read off the machines.

An 80-page report to evaluate voting machines and support their adoption was prepared at the request of the Republican County Committee of New York (i.e., Manhattan). The 1925 report by T. David Zukerman, previously cited, was expectedly laudatory. Zukerman's report countered objections raised by opponents of voting machines. Two of these objections are pertinent today, 80 years later. One of these objections was the "lack of voter's assurance that [the] vote will be counted in accordance with [voter's] desires." This objection is understandable with a non-ballot voting device. Zukerman responds with an interesting statement:

Presumably the voting machine does require an act of faith on the part of the voter in a mechanical contrivance whose workings he cannot see. No more so, however, than is required in the case of the automobile in which he drives up to the polls. Indeed, he has even less assurance that the paper ballot on which he has seen the marks beside the names and followed with his eyes as it was deposited in the box will be counted as he intended; for neither does he in this case actually see his vote recorded, nor does anyone else. That is one of the elements of the secret ballot . . . (Zukerman, 1925, p. 63).

The concern expressed and the reasoning of the response will be revisited in the discussion of public confidence in electronic non-ballot voting machines in section 7.6.

A second objection considered by Zukerman is the frequency of breakdowns and the necessity of repairs. This question will always be faced when machines are furnished for public use. The issue of contingency planning was as important in the twentieth century as it will continue to be in the twenty-first. An election administrator ignores or minimizes this concern at his or her peril. Public confidence is closely connected to smoothly run elections, including successfully functioning machines.

The voting machine industry's leader in 1900 was U.S. Standard VMC. With the combination of the inventions of Myers, Gillespie, Davis, Cooper,

and Dean as assets of the merged organization in Jamestown, the design and manufacture of machines that met the needs of a wide variety of state requirements became a reality. National sales became possible and the general diffusion of use began. U.S. Standard retained its lead in manufacturing for as long as the machines were produced. It produced 330 machines in 1911, 500 in 1920, and 1,000 in 1930.

In 1907, Samuel R. Shoup of Wilmington, Delaware, received two U.S. patents for voting machines. One claim made by Shoup in both patents was that he could "reduce the number of operating parts" required to carry out the voting functions. In 1910 and 1914, Shoup obtained two more patents and listed his address as Hoboken, New Jersey. No manufacturing seems to have occurred at that time.

The company involved in the Chicago contract in 1912 was the Empire Voting Machine Company of Rochester, New York. In 1913, Alfred J. Gillespie received another patent and assigned it to that company. It is likely that, about 1910 or so, Gillespie decided to form a new company and compete with his former one. An interesting point is that, in 1914, in a final patent, Gillespie gave his address as Atlantic, Iowa, his original hometown. He had specified his residence as Rochester, New York, for all patents from his second through 1913.

Zukerman mentions four voting machine companies as submitting bids in 1922 to satisfy the requirements of New York state that New York City must use voting machines. One of these companies was Automatic Registering Corporation of Jamestown, New York. This was the new name adopted in 1914 by U.S. Standard after it had absorbed some other companies. In 1925, the name was again changed to Automatic VMC, generally known as AVM (Automatic Voting Machine Corporation, 1958, p. 4). Two other companies submitting bids in 1922 were the Progressive VMC of Dayton, Ohio, whose machine was called the "Yoe," and the Cummings VMC of Knox, Indiana.

The fourth bid submitter was Shoup VMC of Weehawken, New Jersey, formed by Samuel R. Shoup and his relative Ransom F. Shoup. An evaluator of the bids said that the Shoup machine was equal in quality to the machine from Jamestown, still called the U.S. Standard, and superior to the other two. However, the Shoup company had submitted only drawings, indicating that its machine was not yet available. By the 1930s, Shoup was manufacturing machines in Brooklyn. The U.S. Standard machine was chosen by New York in 1922, even though its unit price was the highest. The latter company's reputation for experience and reliability had won out (Zukerman, 1925, pp. 8, 9).

Use of voting machines continued to increase as the twentieth century progressed. In 1928, AVM advertised that 1 of every 6 voters (16.67 per cent) would vote on a machine in the forthcoming presidential election. That would have been roughly 6 million out of 36 million voters. A large majority of the machines were sold or rented by AVM. If a voter required 2 minutes to vote and the polls were open for 13 hours on election day, then a voting

Political science began as a specialization within social science. The American Social Science Association was formed in 1865. Its charter was very inclusive, covering many concerns of ordinary lives, for example, sanitation, employment, education, crime, relief (welfare), mental health, and "numerous matters of statistical and philanthropic interest." The inclusion of "statistical . . . interest" in the charter was a recognition, even at that early date, that the use of that mathematical method of analyzing human societies was essential. In 1879, those interested in charities and social welfare dropped out to form their own society (Trattner, 1989 (1974), pp. 212, 213). During the 1880s, academicians interested in history, economics, and statistics also departed to begin their own groupings. Finally, the American Political Science Association (APSA) and the American Sociological Association were established in 1903 and 1905, respectively. There was already a journal on the subject of interest, *Political Science Quarterly*, begun in 1886.

In the twentieth century, there was some political science research on the voting process. The quantity was small in comparison to the number of studies of the electorate itself, electoral participation, and election issues and outcomes. A subject hardly covered at all was the effect of various types of voting technology on different socioeconomic groups. That omission would be corrected after the Florida debacle of 2000.

Public and election administration started as outgrowths of activities concerned with the governance of cities. During the early years of the twentieth century, nonprofit organizations called "bureaus of municipal research," as well as other citizen-based good government organizations contributed to efforts to improve city management. Among their concerns were the administration of elections. Their activities were based on the belief that more honest elections might reduce the corruption that was a significant attribute of "boss" rule. In the decade 1925 through 1934, Joseph P. Harris (1896-1985), who in 1962 invented the PPC ballot system, undertook detailed studies of voter registration and election administration. He carried out research with the aid of a fellowship from the Social Science Research Council in the 1920s. He also served as secretary of the Committee on Election Administration of the National Municipal League. (The league was one of the good government groups that were derisively called "goo-goos" by some supporters of machine politics.)

Harris had received his doctorate in political science at the University of Chicago, where he was a student of Charles Merriam. According to a recent article on the "Chicago School of Political Science," "Merriam joined the progressive call for good government and the creation of public agencies administered by trained experts, not political hacks" (Monroe, 2004, p. 95). Clearly, Harris' work demonstrates that he learned that lesson well. An associated article on the same subject mentions that "The scholars trained in the Chicago department, and their students, have enriched the entire corpus of political science—in American politics . . . [and] public administration . . ." (Almond, 2004, p. 91). Many well-known academic scholars are mentioned in that paper, but not Harris.

Harris authored *Registration of Voters in the United States* in 1929. The book described the results of his work in planning a comprehensive system of voter registration for local governments. There was, in many election offices at that time, a requirement for equal division of employees between the two major political parties. Nonpartisan civil service hiring was not in effect in many election offices before World War II and employees were not hired because of competence:

In most cities the office force is recruited from the ranks of professional politicians with little attention to clerical ability. . . . No private organization would attempt to get along with the type of employee usually found in election offices (Harris, 1929, pp. 136, 137).

Harris quotes from a letter sent to him by an election official reminiscing about the situation before administrative changes were made:

It would be difficult to imagine a more incompetent and drunken lot of loafers anywhere than the nondescript outfit that was put on registration and election work, with a few exceptions (Harris, 1929, p. 137).

With regard to professionalization, election administration, a special type of public administration, would not be considered by academicians of the time as a suitable candidate for that type of improvement. No significant effort to provide academic training for those engaged in the field would occur until well after World War II. Harris would attempt to start the process of improving the field with his book *Election Administration in the United States* in 1934. He would begin the text with the following:

There is probably no other phase of public administration in the United States which is so badly managed as the conduct of elections (Harris, 1934, p. 1).

His work had been recognized soon after his books were published. He had been appointed in 1936 as a member of the newly formed President's Committee on Administrative Management; the president in this case being Franklin D. Roosevelt. The committee was headed by Merriam and two other outstanding practitioners Louis Brownlow and Luther Gulick (Pugh, 1988, p. 14). A recommendation of the committee which was implemented was the establishment of the Bureau of the Budget (later renamed Office of Management and Budget) in the Executive Office of the President.

In more recent times, Harris' early work seems to have been forgotten or ignored. His books have never been updated with new data to demonstrate how the situations that he discussed have changed or not changed. Harris' concerns were not considered to be important issues for the academic aspects of political science or public administration. The milieu of his interests was the real world and down-to-earth practicality in a government function that provided the essential machinery of democracy. Some academicians would refer to these issues as "housekeeping," as there was no connection shown with theories of the governmental process.

redesigned to use electricity and was made more automatic. He invented the plugboard to more easily change connections in the sorter and tabulator.

Later, Hollerith sold his equipment to health departments of other cities and states, to other nations for their censuses, and to private corporations. The Prudential Life Insurance Company was his first private customer and he sold equipment also to railroads. In about 1896, he incorporated as the Tabulating Machine Company. In 1911, he sold out in a merger of several organizations, including his own, that formed the Computing-Tabulating-Recording Company. In 1914, the new company hired Thomas J. Watson (1874-1956) as its general manager. In 1924, Watson, as president of the firm, changed its name to International Business Machines, known in brief as IBM.

4.10 MORE DEVELOPMENTS USING ELECTRICITY

A *patent for the telephone* was obtained by Alexander Graham Bell (1847-1922) in 1876. By 1880, there were already 54,000 telephones in use in the United States. New inventions soon improved voice quality, but an essential breakthrough was the invention of telephone switchboards. The first was installed in New Haven, Connecticut, in 1878. These provided the facility for one of a large number of subscribers to select another for a one-to-one conversation that was bidirectional. The number of telephones grew rapidly; in 1890, there were 228,000. In 1896, presidential candidate William McKinley was able to call his state campaign chairmen from his own home. In 1900, there were over 1.3 million telephones in use and, in 1915, there were over 10 million (Fischer, 1997, p. 274).

The use of electric power as a utility was foreseen by Thomas Edison as he worked on the development of the electric light bulb in the 1870s. The bulb's use in homes required a power source in a form that did not yet exist. DC current was available from batteries and was used with the first telephones. It was not yet supplied as a utility from a central generating station.

Edison received a patent in 1880 for his light bulb that could be used indoors. With the backing of financier J. P. Morgan (1837-1913), he built an electric power station generating DC at Pearl Street in New York City in 1882. Generating stations were soon installed in other cities. At the value of voltage needed for the lights, DC could be efficiently transmitted over short distances. It was not, however, the final word. Edison had backed the wrong horse in this race.

The first practical alternating current (AC) motor was patented by Nikola Tesla (1856-1943) in 1888. Tesla was an immigrant, educated in the Austro-Hungarian empire. He came to the United States to find backing for implementing his ideas about the use of AC and obtained financial aid from George Westinghouse (1846-1914), inventor of the air brake.

AC has significant advantages. It could be used (and is used today) to transmit power at very high voltages but low levels of current over long distances in its three-phase form invented by Tesla. The low current level

minimizes the losses in the transmission process. At application points, the voltage is stepped down, as it was stepped up for transmission. The change in voltage levels is accomplished with a "transformer." Tesla was one of the developers of these devices.

AC began to be widely available as the basic power source for almost all home and business uses. It was used to power the Chicago World's Fair in 1893. In the same year, contracts were awarded to Westinghouse to provide AC as the electricity generated from the force of flowing water at Niagara Falls (Hanson, 1982, p. 21). If DC was needed locally, it could be obtained from AC through a simple process called "rectification."

4.11 VOTING PROCESS CHANGES IN THE EARLY TWENTIETH CENTURY

During the first decades of the new century, there were several strong efforts made to obtain changes in the voting process. Reformers, many of who supported Theodore Roosevelt in his unsuccessful Progressive Party challenge of 1912, were certain that additional and altered voting procedures would make governmental bodies more responsive to the citizenry. They believed, as a result of their understanding of conditions in the late nineteenth century, that elected governmental officials were far too often the tools of big business or political bosses.

Selection of U.S. senators by state legislatures had been, in many cases, the result of private deals that ignored the public at-large. Recognition of this fact created a demand for their direct election. This was achieved through a modification in the Constitution (17th Amendment, ratified 1913). Implementing legislation required that elections for senators would occur on the same day as elections for members of the House of Representatives and Electors for president and vice president.

The direct primary for nomination of candidates was another subject for reformers. They campaigned to implement, in the states, individual citizen voting for candidates instead of conventions or caucuses of insiders. There had been attempts in the nineteenth century through state legislation to control primaries, but the laws were limited in effect. In 1903, Wisconsin enacted the first comprehensive direct-primary law. Oregon passed such a law in 1904 and nearly all states (except in the South) adopted similar requirements by 1920. These laws further regulated political parties and made any claim that they were private clubs not subject to open enrollment impossible to sustain. In the South, only Supreme Court decisions would open primaries to all citizens.

The processes of citizen ballot initiatives and recall of elected officials were promoted in states and cities. Success in these latter endeavors varied from place to place. California adopted these measures, and the recall was successfully used to replace its governor in 2004.

Women were given the right to vote in all federal and state elections under another Constitutional alteration in this period (19th Amendment, ratified

law. The elimination of Electors' names significantly reduced the size of ballots, particularly in the larger states that adopted the procedure. These included Illinois, Michigan, and Ohio. By the 1940 presidential election, 17 states had done so (Albright, 1942, pp. 99-113).

Under the 20th Amendment of 1933, terms of senators and representatives end and new terms begin on January 3 at noon; terms of president and vice president end and new terms begin on January 20 at noon. Now, the count of electoral votes would be carried out by the new Congress, not the old one. The last time that Congress had visited this issue was in 1872 (see section 3.7).

In 1934, as noted in section 3.9, Congress changed the dates for the Electors to give their votes in each state and for Congress to receive and count them.

4.12 ELECTION FRAUD IN THE EARLY TWENTIETH CENTURY

Rural areas were subject to frauds, as were urban areas. In some Southern states, precinct registration officials had wide discretion to disqualify prospective voters. An applicant's failure to give "a reasonable interpretation" of the Constitution to the satisfaction of the precinct official could result in denial of registration. African Americans were routinely denied registration in this manner. Additionally:

In Pennsylvania, the formidable Republican state machine built by Matthew Stanley Quay gained its victories in part through multiple voting and illegal registration in small upstate cities and rural townships. Vote buying and stealing were also common in the rural areas of southern Ohio and southern Indiana. . . . Various sources have reported general acceptance of election fraud in Kentucky and West Virginia. In Texas, V. O. Key found evidence in the 1940s that party workers in many parts of the state continued a long tradition of manipulating ballot box results. (Goldberg, 1987, p. 183).

V. O. Key's research in Texas would seem to be validated by Ronnie Dugger's review of conditions resulting in Lyndon Johnson's U.S. senate primary victory in 1948 (Dugger, 1982, pp. 322-341).

The far West was not immune. A fraudulent election in 1914 associated with a prolonged coal miners' strike in Huerfano County, Colorado, is reported by Keyssar (Keyssar, 2000, p. 160). In that case, seven precincts were totally on coal company land; company guards refused admittance to the polling stations to anyone that they thought would vote against candidates supporting the company. Furthermore, illiterate scabs were assisted by precinct officials to vote the company way. The election was voided by the Colorado Supreme Court following a protest.

In larger cities, significant parts were, at that time, controlled by a ward boss. These wards were typically those in the transient part of the city, where certain kinds of crimes might be tolerated. Bipartisan representation on

election boards, as a practical matter, might be nonexistent in these wards. As noted by Joseph P. Harris,

The graft, corruption, and protection of vice and crime in many cities can be traced directly to the influence exercised by the corrupt and unscrupulous politicians who control these wards (Harris, 1929, p. 9).

Harris has given examples of election fraud during Prohibition, that is, following passage of the 18th Amendment in 1919 and prior to ratification of the 21st Amendment in 1933 (Harris, 1929, pp. 362-377, 1934, pp. 340-369).

In Philadelphia, returns from a transient ward in 1923 showed a highly unlikely 91.5 percent turnout while a typical stable ward had a 65.5 percent turnout.

In Louisville, a municipal election in 1925 was set aside by the Kentucky Court of Appeals. The local Republican party had paid volunteers to vote while impersonating dead or moved individuals.

In Chicago, the Republican primary in 1926 was cited as possibly one of the most corrupt elections ever held. Violence, intimidation, kidnapping, repeating, ballot stuffing, and other felonies occurred.

In Pittsburgh, following the 1927 election, a number of precinct officials were found guilty of ballot stuffing and changing the selections on ballots properly cast.

In Cleveland, an investigation of elections in 1928 resulted in indictments of precinct officials for votes cast in the names of persons who were dead or out-of-town and for deliberate miscounts of ballots.

4.13 PROGRESS IN SYSTEMS OF VOTER REGISTRATION

The concern here is not the set of requirements for suffrage, but the establishment of administrative systems. Lists of qualified voters were originally generated through the use of landholder and taxpayer records, when there were these types of requirements for voting. After such requirements were eliminated, there was no record system easily adapted for registration purposes. In Massachusetts, in 1800, a law was adopted requiring assessors of each town or plantation to prepare lists of qualified voters. These lists were then given to the selectmen, that is, each town's political leaders, posted, and revised for each election. Citizens not on the list could not vote. Those not listed but who believed that they were qualified could approach the selectmen on the day of election to request their addition to the list. The constitutionality of compulsory registration in Massachusetts was challenged and upheld in 1832 in a case called *Capen v. Foster*. Other New England states adopted similar laws in the early nineteenth century.

In Pennsylvania, the first registration law was enacted in 1836, but it applied only to Philadelphia. As in Massachusetts, assessors were assigned to

THE MIDDLE AND LATE TWENTIETH CENTURY: MOVEMENTS FOR EQUALITY, ENFRANCHISEMENT, AND VOTING FACILITATION

5.1 THE EFFORT TO END RACIAL DISCRIMINATION

It is not possible in this presentation to graphically detail the events of the 1950s and 1960s that led to the passage of the Civil Rights Act of 1964 (Public Law 88-352, July 2, 1964) and the Voting Rights Act of 1965 (Public Law 89-110, August 6, 1965). The high level of public emotion can be cited, but not explicitly described with the literary flavor that it deserves. An initiating factor was the heightened demand on the part of the black community of the South that their second-class citizenship be brought to an end. The sympathetic response by many whites throughout the nation, except in the South, made it possible. The problem of African Americans in the South was not only their inability to vote; it was the pervasive segregation that resulted in inferior treatment in almost every aspect of life. Despite the Supreme Court ruling in *Brown v. Board of Education of Topeka* in 1954 that school segregation was inherently unequal, little had changed in the years immediately afterward. The Birmingham, Alabama, bus boycott, triggered by Rosa Parks's refusal to give up her seat to a white man, had occurred in 1955. The following years were filled with demonstrations—"sit-ins" that attempted to desegregate restaurants and restrooms, demands for "try-on" privileges in clothing stores, and violent reactions by some whites. Some blacks who had attempted to register to vote were summarily dismissed, others were shot down, and little was done by local white authorities to pursue justice. While the Civil Rights and Voting Rights Acts were intended to end the unconscionable discrimination against African Americans, the elimination of voting restrictions due to race would apply also to American Indians, Alaskan Natives, and Asian Americans.

amendment by the necessary two-third majority in each House, which would give the District two seats in the U.S. Senate, as well as a voting seat in the House of Representatives. That proposal would not be ratified by a sufficient number of states (38 were needed) in the allotted time of seven years and would not go into effect. It is very possible that if Congress had adopted a limited measure only assigning a seat in the House for DC, it would have been ratified.

The imposition of a poll tax, common in states in the South, had the function of preventing the poor from voting. Many of them were black, but certainly not all. Thus, the 24th Amendment was proposed by Congress on August 27, 1962 and ratified by the states on January 23, 1964. It eliminated poll taxes in elections for president and vice president, for presidential Electors, and for members of Congress. The law did not prevent the imposition of a poll tax in state or local government elections. That would come soon after.

Later, during the Vietnam War, it was realized that American soldiers could die fighting at age 18 but could not, in most states, vote at that age. The result was the proposal by Congress on March 23, 1971, to require states to lower the voting age to 18, if they had not done so already. The 26th Amendment with this requirement was quickly ratified on June 30, 1971.

5.4 EVENTS LEADING UP TO THE VOTING RIGHTS ACT

Activism and violence marked the struggle for civil rights in the 1960s. On August 28, 1963, Dr. Martin Luther King, Jr. delivered his famous "I have a dream" speech from the steps of the Lincoln Memorial in Washington before an estimated crowd of 200,000. However, 1963 would see several murders in response to civil rights demands. (King himself would be murdered in 1968.) Among those assassinated were Medgar Evers, a black community organizer on June 12, 1963, in front of his home in Mississippi. Four young girls were killed on September 15, 1963 in a bombing at the Sixteenth Street Baptist Church in Birmingham, Alabama. On November 22, 1963, President John F. Kennedy was shot and killed in Dallas, but no connection with black civil rights was ever demonstrated. Vice President Lyndon Johnson of Texas was sworn in as president later the same day; his support for voting rights legislation would be important and effective. Another long-term result was the recapture of the South by the Republican party.

Three civil rights workers, James Chaney, Andrew Goodman, and Michael Schwerner, were slain on June 21, 1964 in Mississippi. On March 7, 1965, peaceful marchers were set upon by state police with fire hoses and vicious dogs in Selma, Alabama, a scene widely seen throughout the country through photos and films. The Rev. James Reeb was attacked on March 8 in the same place, which resulted in his death two days later, and Viola Liuzzo, a mother of five from Detroit, was deliberately shot and killed while lawfully driving in Alabama on March 25.

There were legal assaults on the denial of voting rights prior to 1965. In 1915, in *Grimm v. United States*, the Supreme Court invalidated voter registration requirements containing "grandfather clauses." These made voter registration in part dependent upon whether the applicant was descended from men enfranchised before enactment of the 15th Amendment. The court found that the Oklahoma law at issue had been adopted to give illiterate whites, but not blacks, a way to avoid taking the state's literacy test for voting. In 1944, the Supreme Court held, in *Smith v. Allwright*, that the Texas "white primary" violated the 15th Amendment. This decision began the elimination of enforcement of Southern laws, which held that political parties were private clubs and therefore exempt from equal protection provisions.

Congress passed civil rights legislation in 1957 and 1960. The first of these (September 9, 1957) created the U.S. Commission on Civil Rights as well as the Civil Rights Division within the U.S. Department of Justice (DOJ). The attorney general was given authority to intervene in and institute lawsuits seeking injunctive relief against violations of the 15th Amendment. The 1960 Act (Public Law 86-449, May 6, 1960) permitted federal courts to appoint voting referees to conduct voter registration following a judicial finding of voting discrimination. The 1960 Act, in its Title III, required retention of all documentation of federal elections for 22 months, a provision that would prove to be important in auditing of registration rolls and of vote-casting and vote-counting records.

The 1964 Civil Rights Act concerned elimination of discrimination in places of public accommodation, in public education, and in employment. It concerned voting rights, also, but most of those provisions were superseded by the Voting Rights Act of 1965. It specifically identified religion and national origin, as well as race and color, as categories that required nondiscrimination.

The strategy of litigation on a case-by-case basis would prove to be of very limited success in the jurisdictions that had been sued. It did not prompt voluntary compliance among jurisdictions that had not been sued. Literacy tests, poll taxes, and other formal and informal practices combined to keep black registration rates minimal in Alabama, Louisiana, and Mississippi, and well below white registration rates in other Southern states.

5.5 PROVISIONS OF THE 1965 VOTING RIGHTS ACT AND AMENDMENTS OF 1970

The original act of 1965 was prefaced with the explanation that it was "An Act to enforce the 15th Amendment to the Constitution of the United States, and for other purposes." An important function was to end the use of "tests or devices" as mechanisms for disfranchisement. This phrase meant:

any requirement that a person as a prerequisite for voting or registration for voting (1) demonstrate the ability to read, write, understand, or interpret any

5.6 AMENDMENTS OF 1975: BILINGUAL ELECTIONS

In the *amendments of 1975* (Public Law 94-73, August 6, 1975), provisions of Section 4 (a), in which the time of "five years" had been replaced by "ten years" in 1970, would contain a new replacement of "seventeen years." References to the 1968 election were replaced by references to the 1972 election.

A new section, "*Bilingual Election Requirements*," was added to the Voting Rights Act in 1975. The Act defined new terms:

The term 'language minorities' or 'language minority group' means persons who are American Indian, Asian American, Alaskan Native or of Spanish heritage.

As a result of this enactment, whenever any political subdivision of a state provides:

any registration or voting notices, forms, instructions, assistance, or other materials or information relating to the electoral process, including ballots, it shall provide them in the language of the applicable minority group as well as in the English language: *Provided*, that where the language of the applicable minority group is oral or unwritten . . . the . . . political subdivision is only required to furnish oral instructions, assistance, or other assistance relating to registration and voting.

This requirement for ballots and other materials in the other language would pertain only if:

- (1) more than 5 percent of the citizens of voting age of such subdivision are members of a single language minority and (2) that the illiteracy rate of such persons as a group is higher than the national illiteracy rate . . . Illiteracy means the failure to complete the fifth primary grade.

The impact on larger political subdivisions with several different language minorities, such as Los Angeles (LA) County, could have been severe. LA County, the nation's largest local jurisdiction, was using the Votomatic PPC system when the law was passed, and continued to use it through 2000. (By 2004, the county needed to be concerned with five Asian languages as well as Spanish: Chinese, Japanese, Korean, Tagalog, and Vietnamese.) Conny B. McCormack, registrar-recorder of LA County, has said that, by agreement with the U.S. Department of Justice, the county did not have to implement all precincts with ballots in all languages. County officials, using data from the U.S. Bureau of the Census, determined particular precincts where significant numbers of minority-language speakers were present. Voting materials and sample ballots in those languages were distributed to residents. Minority-language speakers who were not in a targeted precinct could call the office of the registrar-recorder (later, use its website) and ask to be put on a list to

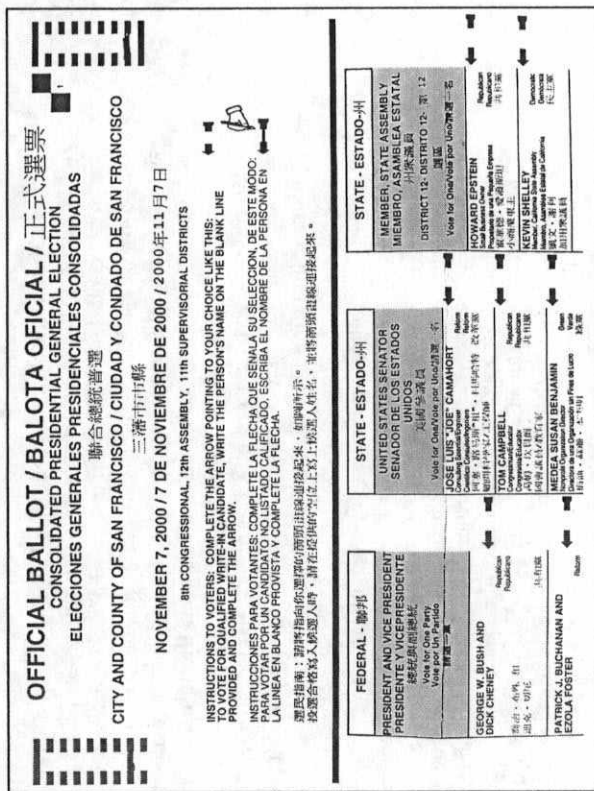


Figure 5.1 Top of a 9½-inch-by-18-inch optical-scan ballot using three languages, San Francisco, CA, 2000.

permanently receive voting materials in their language. Minority-language speakers could take the sample ballots in their language into the voting booth, where they could match the sample ballot against the Votomatic vote-recorder pages. The latter were only in English.

If LA County had wished to change its voting system from Votomatic PPCs to marksense ballots, it might have had to provide ballots in all of the other languages. The county could not easily change its voting system at reasonable cost until it could do so by providing ballots in other languages on demand. The latter could occur only with a direct-recording electronic (DRE) voting system.

San Francisco (City and County) accepted the challenge of multilingual marksense (optical scan) ballots, even though it made them larger and much heavier to transport in bulk. (See figure 5.1 for the top part of the city's three-language ballot.)

5.7 AMENDMENTS OF 1982: MINORITY PARTICIPATION

Minority participation in the election process was a primary subject of voting-rights amendments of 1982. In 1973, in *White v. Regester*, the Supreme Court had decided that at-large election arrangements were unconstitutional

In North Carolina, the state's first plan following the 1990 census included one MMD in the eastern lowland part of the state. It was primarily a poor, rural district. The DOJ rejected the plan and demanded a second MMD. The second such district approved by the state legislature was a bizarre shape that violated any reasonable definition of geographic compactness. This second MMD was appropriately described as "a long snake that winds its way through central North Carolina for 190 miles, scooping up isolated precincts with nothing in common save a large number of minority voters" (Yarbrough, 2002, p. 21, quoting the *Wall Street Journal*). There were several locations at which parts of the district were connected by a single point; that is, the district continued on opposite sides of an X. This was necessary, for example, because District 12, the second MMD district, split District 6 (not an MMD) in two parts. At the crossing point of the X, if District 12's two parts met the federal requirement to be "contiguous," then District 6's two parts were also contiguous.

The district was challenged in federal court as an unconstitutional racial gerrymander. The Supreme Court reviewed the situation twice. In the first review, in *Shaw v. Reno* (1993), the Court was attempting to determine if a valid Constitutional issue had been raised. They agreed that it had. A full trial was scheduled. After the trial of *Shaw v. Hunt* (1996), Justice William Rehnquist's majority opinion agreed that since no compelling state interest had been shown other than race-based districting, the second MMD was unconstitutional and violated the 14th Amendment's requirement of equal protection.

In *Miller v. Johnson* (1995), the Supreme Court turned down a similar scheme in Georgia, where an MMD had been designed that ran from Atlanta to the ocean, 260 miles away. Again, it had been the redesign urged by the DOJ that prompted opponents to file a lawsuit.

There have been other cases of this type that have come before the Court, and the Court has not been of one mind. According to Tinsley E. Yarbrough, "only Justices Antonin Scalia and Clarence Thomas were on record as considering every intentionally created MMD a forbidden racial gerrymander." Generally, Justices David Souter, Stephen Breyer, and Ruth Bader Ginsburg were on the other side. Furthermore, Justice Sandra Day O'Connor in a separate concurrence in *Bush v. Vera* (1996), a similar case from Texas, concluded "that a state's attempts to avoid a Section 2 vote dilution suit constituted a compelling governmental interest that justified MMDs" (Yarbrough, 2002, pp. 162, 163). In *Easley v. Cromartie* (2001), Justice O'Connor would join the more liberal justices in a majority ruling that North Carolina's redrawn 12th district might have been created to assure a safe Democratic seat, an allowable constitutional ploy, rather than for the unconstitutional purpose of racial gerrymandering.

In this continuing saga, let Justice Anthony Kennedy, at this time considered to be in the middle of the Court's political spectrum, have the last word, from his opinion in *Miller v. Johnson*:

The essence of the equal protection claim, recognized in *Shaw*, is that the State has used race for separating voters into districts. Just as the State may not,

absent extra-ordinary justification, segregate citizens on the basis of race in public [facilities] . . . so did we recognize in *Shaw* that it may not separate its citizens into different voting districts on the basis of race . . . Race-based assignments embody stereotypes that treat individuals as the product of their race, evaluating their thoughts and efforts—their very worth as citizens—according to a criterion barred to the Government by history and the Constitution. . . . They also cause society serious harm . . . Racial gerrymandering, even for remedial purposes, may balkanize us into competing racial factions; it threatens to carry us further from the goal of a political system in which race no longer matters—a goal that the Fourteenth and Fifteenth Amendments embody, and to which the Nation continues to aspire.

5.9 VOTING ACCESSIBILITY FOR THE ELDERLY AND HANDICAPPED

Concerns for another group with voting issues would arise in the 1980s. The Voting Accessibility for the Elderly and Handicapped Act (VAEHA) (Public Law 98-435, September 28, 1984) would be adopted. Section 2 of the Act stated that "it is the intention of Congress . . . to promote the fundamental right to vote by improving access for handicapped and elderly individuals to registration facilities and polling places for federal elections." Section 3 of the Act required that each political subdivision responsible for conducting elections assure that all polling places for federal elections are accessible to handicapped and elderly voters. There were allowances in case no accessible place was available. An advance request by such a voter could result in reassignment to an accessible place or provision for an alternate means of casting a ballot on election day.

According to the Act, each state or political subdivision responsible for federal elections "shall provide a reasonable number of accessible registration facilities" or provide an opportunity for registration by mail. Instructions printed in large type, conspicuously displayed, are to be posted for the benefit of handicapped individuals in each registration and polling location, and telecommunications devices for the deaf are to be made available for the reception of information by individuals so handicapped. As with the Voting Rights Act, no funding was provided to assist in the process of assuring the presence of the required facilities or implementation of the administrative needs.

In 1990, the Americans with Disabilities Act was adopted (Public Law 101-336, July 26, 1990). This law was very comprehensive, but did not specifically mention any application in registration and voting, although requirements for places of public accommodation were described in detail.

5.10 OVERSEAS ABSENTEE VOTERS

Concern over assurance that this group could easily vote was considered in "The Federal Voting Assistance Act of 1955" (Public Law 84-296, August 9, 1955). The law provided a number of recommendations to the states on this

people could be purged for missing a single election . . ." (Piven and Cloward, 1989, p. 221). The idea for voter registration at public service agencies other than for motor vehicles was being promoted by HumanSERVE.

NVRA applied only to elections for federal offices. The federal government has no administrative jurisdiction over state elections unless, as with the Voting Rights Act, a provision of the Constitution can be cited. None could be identified with NVRA. Nevertheless, states, even Southern ones, have adopted requirements for state and local elections that were originally imposed for federal elections. The administrative difficulties that would result from the maintenance of two separate election systems were not acceptable. States not covered by the NVRA were only those that required no voter registration whatsoever for federal elections (North Dakota) or permitted election-day registration at a polling place under laws enacted before March 11, 1993 (Minnesota, New Hampshire, Wisconsin, and Wyoming).

Under the law, each state driver's license application, including any renewal application, is to serve as an application for voter registration, unless the registrant declines to permit it. The voter registration application may include information that serves to prevent duplicate voter registrations and enables election administrators to assess voter eligibility, including citizenship. The application must include the signature of the voter attesting, under penalty of perjury, the truthfulness of the information provided. Once a registration application is accepted at a motor vehicle office, it must be transmitted to an appropriate election official within 10 days, or within 5 days if the close of registration is less than 10 days away. The incomplete implementation of this data interchange requirement was demonstrated by the example of Florida in 2000.

States may utilize mail registration under the law. They may require a first-time voter to vote in person, that is, not by absentee ballot, if he or she has registered to vote in a jurisdiction by mail and has not previously voted in that jurisdiction. This provision may not apply to persons entitled to vote by absentee ballot under UOCAVA or under VAEHA.

In addition to motor vehicle bureaus, state agencies that *must* provide voter registration materials are to include "all offices in the state that provide public assistance" and offices that provide services to persons with disabilities. Other offices that "may" be designated to serve as voter registration agencies include public libraries, fishing and hunting license bureaus, and unemployment compensation offices; other possibilities are listed. A recruitment office of the Armed Forces of the United States must serve as a voter registration agency.

A most important provision of NVRA is that:

Any state program . . . to protect the integrity of the electoral process . . . shall not result in the removal of the name of any person from the official list of voters . . . by reason of the person's failure to vote.

This alteration in rules for purging registration lists was a priority of the proposers. Under NVRA, a registrant's name may be removed from the official list of registered voters upon request of the registrant directly, or because the registrant has reported a new address that is outside of the registrant's current jurisdiction. This new address may have been reported to a motor vehicle agency or to any other official voter-registering agency. Thus, these other agencies must develop procedures for data transmission of change-of-address to an appropriate election administration agency. The latter may use the National Change Of Address process of the U.S. Postal Service as a tool to help identify registrants who may have moved. A registrant may be removed from the official list for mental incapacity or criminal conviction, as provided under state law, or because it has been determined that the registrant has died.

The process for removal from the official voters' list of a living registrant may follow from the return of any correspondence to the registrant as "undeliverable" by the Postal Service. Then, the election administrator may send a forwardable confirmation notice with an enclosed postage-paid reply card. If no reply is received, and the voter does not attempt to vote in the jurisdiction in two successive federal general elections, the registrant's name may be removed from the official list of registered voters (Sims, 2001, pp. 1, 2).

Continuing monitoring of the operation of the legislation was provided for in the NVRA but no plans were put into place for corrective legislation if defects were uncovered. The states were to be informed as to their duties and Congress was to be sent a report every two years on the effectiveness of the Act. A paper form for mail-in voter registration was to be designed by the FEC.

The requirement of assurance that the registrant really and truly no longer lives at the address previously given, which depends in part on the effectiveness of the U.S. Postal Service, has added administrative steps to the process of maintaining a correct list of registrants. In many cases, election officials do not possess the diligence, the necessary administrative systems, or the resources to fully carry out these procedures. The NVRA provided no authorization of funding with its imposed requirements.

Human usability turned out to be a distinguishing factor between the machines. Possibly, that was the reason that the Shoup machines had been purchased initially. The 1946 MIT report had stated:

We feel that the vertical arrangement of the ballot on the Shoup machine is of considerable advantage because confusion on the part of the voter is less probable. With the horizontal ballots [of the AVM machine], it is conceivable that the voter may not be clear as to whether he should move the lever above or below the strip on which the candidate's name is printed . . .

We prefer the Shoup machine, mainly because (a) there appears to be less chance of confusion and incorrect balloting on the part of the voter and (b) less chance of error on the part of the persons delegated to read the machine count and report vote counts.

In the 1950 competition, AVM's sales manager Frank P. Stone, admitted that there was some loss in the vote due to the horizontal ballot arrangement, but nowhere near 15 percent, as had been charged by competitor Ransom F. Shoup. Stone claimed also that in voting for slates of candidates, the Shoup machine was less capable, in that

the names run close to the floor and people have to stoop over to read them, and short persons have difficulty reading the names on the top.

Despite its criticality in this situation, human usability in design of voting equipment was considered hardly at all by social scientists or other investigators in the next half-century. In a professional article published in 1998, Susan King Roth, an associate professor of industrial design, wrote:

The human use of voting equipment and voters' perceptions of the voting experience have largely been overlooked. (Roth, 1998, p. 29)

In the same article, Roth described an experiment concerning usability of voting machines in Franklin County (Columbus), Ohio. It was noted that average American female eye height is 60.3 inches, but that the top of the printing of the "issues" section of the machine (running horizontally) was 67 inches off the floor. In the experiment, "several subjects who were observed to stand well below the top of the ballot interface did not vote at all on this section. One subject stated that she did not see any issues on the ballot" (Roth, 1998, p. 33).

In 1956, an important issue was not human factors, but the financial health of the two manufacturers. AVM's sales in the early years of the century "were bolstered by campaigning reform groups who wanted to do away with the easily corruptible paper ballots" (*Wall Street Journal*, May 1, 1956, p. 1). Production had slowly climbed from 1,000 machines in 1930 to 1,750 in 1940, 3,100 in 1950, and 4,000 in 1955. AVM had outsold Shoup by two-to-one each year in the past ten.

In an article later that year, it was predicted that 50 percent of the national total of 62 million voters would use voting machines in the forthcoming presidential election (*New York Times*, November 1, 1956, p. 39). They

would be used in some places in 41 states, up from 32 states in which they were used in 1952. It was expected that between 90,000 and 100,000 machines would be used, indicating that between 310 and 344 voters would use each machine. By the time the article was published, Shoup VMC was a division of Republic Steel Corporation, located in Canton, Ohio.

AVM did not remain independent for long. In 1958, it became a division of Rockwell Manufacturing Company. In the 1960 general election, voting machines were used in all or some parts of 44 states. In Connecticut, Delaware, Kentucky, Louisiana, Maryland, New York, and Rhode Island, they were used in every precinct. Among large cities, only Los Angeles and Milwaukee were cited as not using them (*New York Times*, November 1, 1960, p. 58). Newer users included Cleveland, Kansas City, Minneapolis, Oklahoma City, St. Louis, and Toledo. Voting machine use was expected by 55-60 percent of all voters (*Wall Street Journal*, November 8, 1960, p. 4).

Use of lever machines increased to 65 percent of all voters in 1964. All other voters (except the very small number pioneering in use of the PPC system) were still using hand-counted paper ballots. Machine sales increased partly in response to disputes over "intent of the voter" that is, the interpretation of ambiguous ballots filled out by hand. "Rhubarbs over recounts" delayed the naming of the governor of Minnesota for 4-and-a-half months in 1962, it was reported.

By the 1960s, AVM could include an optional printer with its machines. The printing facility would be enabled after the close of polls and would provide, in quintuplicate, the number of votes cast for each candidate or issue alternative on the machine. This did not prevent the replacement of its aging machines in New York City with Shoup machines in 1962. Shoup was now a subsidiary of General Battery & Ceramic Corp. Frank P. Stone, the former AVM sales manager, was now its president (*Wall Street Journal*, July 20, 1964, p. 1).

After 1964, the percentage use of lever machines would begin to decrease as the deployment of the new computer-based balloting devices became significant. In 1978, Shoup would end production of the machines and, in 1982, AVM would do the same. Nevertheless, some 43 percent of all voters used them in 1980. AVM would soon be purchased by Sequoia Pacific. After production stopped, older machines, which were being replaced, were scavenged for parts when needed. Small companies arose, functioning to refurbish and maintain machines still in use. New York City would continue to service the machines as a municipal function. In 1988, lever machines were still being used by one-third of all voters (Saltman, 1988, p. 49) and in 1996 by about 23 percent (Brace, 2004, Attach. 6). In the 2004 general election, New York City continued to use its lever machines.

6.2 DEVELOPMENT OF COMPUTERS THROUGH THE MID-1970S

Digital computers differ from calculators in that they can perform a sequence of mathematical and logical operations based on a "program" developed by

support the function of "multi-programming." The development of OS/360 began in the spring of 1964 and the program was not released until the middle of 1967. Some 5,000 staff-years had gone into its development and its cost was three times the original budget. The difficulty began a movement to professionalize the writing of programs with the techniques of "software engineering."

The issue of software correctness began to become known to the general public as computers started to be used to control machinery. Errors in software could result in human injury or death, or could cause the destruction of the devices the computer was controlling. In some cases, machinery, for example, a missile being launched, would have to be deliberately destroyed if it ran amok and threatened lives or property. An extensive written discussion of the issue as part of the more general problem of the failures of modern technology has been undertaken by Peter G. Neumann. He has made a speciality of identifying "risks" and proposing methods of assuring reduction in the incidence of dangerous or costly errors due to technological failures. Examples presented by Neumann concerning software errors are "The 1990 AT&T system runaway," the "DOI = 1.10 bug in Mercury software," and the "Therac-25" computer-based radiation therapy system (Neumann, 1995, pp. 14, 15, 27, 68-70). He also discussed software engineering and computer-based voting systems (Neumann, 1995, pp. 231-255). The problem has not gone away; software engineering techniques and software testing may not be effectively applied. An example, in 2003, of a software error not caught before a chip-using device was sold to customers is indicated by the following statement on a circular contained in a purchased package of diabetic test strips to be employed with a blood-glucose testing meter:

[The manufacturer] has identified a situation that can occur no more than once every seven days, during a ten-minute time period, which can cause an individual test result to be stored incorrectly in the memory of the [name of test meter].

6.4 INCREASING USE OF COMPUTERIZED VOTING, 1960-2000

It is an interesting commentary on changing tastes, along with changing technology, that county after county adopted computer-readable ballots in the 1960s and 1970s, given that earlier in the century the public was eager to eliminate hand-counted ballots by replacement with lever machines. Local governments were responsible for system implementation and, for computer-based voting, it would be found that some were not up to the task. The unit costs of the mechanical lever devices and their storage and transportation costs were contributing factors in the drive to replace them, as well as the desire to be up-to-date. While the use of lever machines significantly reduced the time for determining results over hand-counted ballots, and also reduced the number of citizens needed for hand counting, there were not equivalent reductions with use of computer-readable ballots.

It was not realized that the issue of intent of the voter, eliminated with the adoption of lever machines, would return with a vengeance when computer-readable ballots were adopted. Similarly, overvotes, which were eliminated with lever machines, would reappear again. Ignored also was the difficulty in implementing electronic ballot-sensing and vote-tallying technologies. Reductions in labor costs of human ballot counters, which had loomed large in the minds of decision makers as lever machines were adopted, were replaced with costs of equipment maintenance and repair by much more highly paid technicians. Furthermore, while it is true that the gross fraud possible in ballot counting by hand was nearly eliminated, it was replaced with card-reader malfunctions, voters' difficulties in using punch-card ballots, and the floating fear that unseen software manipulation, not possible to be detected, was responsible for lost elections.

Markense ballots and machines for reading them and summarizing the result appeared concurrently with developments with punched cards. Los Angeles County had never adopted lever machines because the number of contests and issues on its ballot were greater than could be serviced by one unit of that type of machine. In addition, for the approximately 5,000 precincts in the nation's largest local election jurisdiction after New York City in 1960, the cost would be about \$14 million for two machines per precinct. The machines weighed about 800 pounds each, and the large number needed would be reflected in the storage space required (with floors able to support the load) as well as in the difficulty in transporting them back and forth in the county's large area. Without machines, it took about two weeks for the county to manually count all of its 2.8 million ballots.

Los Angeles County funded one of the very first attempts to develop a computer-readable ballot system. According to a newspaper article (*Wall Street Journal*, November 8, 1960, p. 4), the county spent \$900,000 for development of the device by Norden Data System Division of United Aircraft, located in Gardena, a city in the county. The Norden system was not adopted, although a "test election" was held on November 16, 1960.

Coleman Engineering Company of Los Angeles produced the first markense system that was actually adopted and used in the 1960s and early 1970s. It was later marketed by the Gyrex Corporation, also of California. The Coleman/Gyrex machine was similar to the Norden device proposed for Los Angeles County. Voters inked squares on paper ballots with a stamper that formed a fluorescent mark that could be sensed by ultraviolet light. Operation was based on central counting of ballots by a single computer unit. The system was used in Hamilton County (Cincinnati), Ohio, in 1964. It was also deployed in Orange County (Anaheim), California, in the same year, and later in Kern (Bakersfield) and Contra Costa (Concord) counties in the same state, as well as in Multnomah County (Portland), Oregon.

Cubic Corporation of San Diego also produced a markense system deployed in the early 1960s. Its "Votronic" vote counter was used in several counties in California: Alameda (Oakland), Santa Clara (San Jose), Riverside, and San Diego. With the Cubic system, the voter marked squares with

The Datavote system provided a much easier arrangement for write-in candidates and for absentee voting than Votomatic. On the Datavote ballot, a blank line could be made available for a write-in, but the hole next to that line would need to be punched in order to inform the computer. A prescored Datavote ballot card with candidate names on the card could be sent to an absentee voter, who could easily punch out the chad.

Marksense systems became important again when precinct-located reading and counting equipment started to be sold in 1976 and later. Percentage use by voters continually increased through 2004 (see figure 6.1). Most of the systems sold are precinct-count, requiring a reader and computer at each polling station. Operation with central counting is possible and less expensive. Poorer, rural counties used central-count in Florida in 2000. To indicate a vote, an ordinary pencil may be used by a voter to fill in a small oval or square or to connect the head and tail of an arrow. Optical scanning is the most widely used sensing method. The fact that ballot size is not constrained to a standard punch card is advantageous. By 1980, use was about 2 percent of all voters. In 1988, use had risen to 7 percent, in 1992 to 15 percent, and in 1996 to 24 percent. In the latter year, marksense use would exceed the use of lever machines. In 2000, more voters used marksense systems than PPCs (Brace, 2004, Attach. 6). An advantage of precinct-count systems is that they can be programmed to return the ballot to the voter if an overvote has been cast. The process may or may not specify which contest has been overvoted.

DREs were a natural replacement for lever machines. An initial and unusual example of DREs was the Video-Voter, built by the Frank Thornbur Company of Chicago, introduced in Illinois experimentally in 1975. In 1988, less than 3 percent of voters used DREs. By 1992, use was up to nearly 5 percent of voters, and in 1996, they were used by more than 7 percent. In 2000, about 13 percent of voters used them, although none was used in Florida. The continuation of use of non-ballot systems seemed advantageous to some election administrators and elected officials of local jurisdictions. The cost and transportation of paper ballots were eliminated, overvotes were prevented, and there was never a problem of intent of the voter. Elimination of the latter prevented contentious recounts. Some DREs may be easily implemented for operation with headphones providing voiced instructions, allowing vision-challenged individuals to vote independently.

Full-face DREs are similar in appearance to lever machines but much lighter in weight. The full face is covered by a translucent, flexible, coated-paper material serving as a ballot. Under the coated-paper surface are micro-switches. When a voter pushes a small blank square with his or her finger next to the name or description of a selected alternative, the micro-switch is activated and its associated light shines through the ballot. A very recent development is the replacement of the paper surface with a large flat electronic screen developed for TVs. The screen may use plasma or liquid crystal display (LCD) technology, and may be operated as a touchscreen or with a cursor or mouse.

Multiple-screen DREs, based on electronic displays but not touchscreens, began to be introduced around the late 1980s. These present the voter with

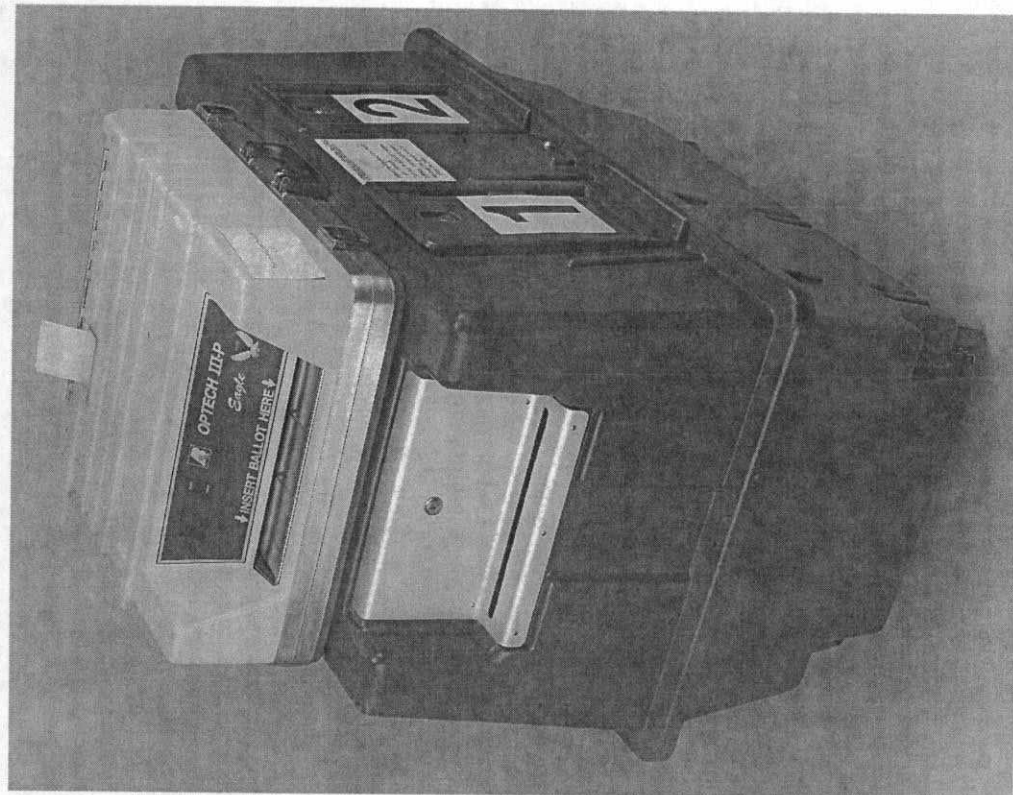


Figure 6.1 Optrech III-P Eagle optical scan voting machine and ballot box, in use ca. 2000. Manufactured by Sequoia Voting Systems, Oakland, CA.

a succession of screens on a single terminal, each displaying only part of the ballot. An early type provided buttons around the edge of the screen that could be used to make or change selections. A more recent machine provides the voter with a cursor operated with knobs, which can successively select choices on each screen.

Multiple-screen DREs, using touchscreens, become widely available in the late 1990s. These allow selections to be made directly on the screen with the

by the voter would separate from the ballot completely" (American University and National Scientific Corp., 1973, pp. VI-27).

In *Los Angeles County, after the June 1970 primary*, a Los Angeles newspaper headline read "New Computer Snafu: Final Vote Unknown." Due to the large number of incorporated areas within the county, the myriad boundaries of various special districts and the requirement for ballot rotation, over 1,600 different ballot types were required. Chad continued to be a problem, despite the fix following the June 1968 election:

Approximately one-half of one percent of all ballots had failed to read in the card readers on initial processing. Observers noted that when the ballot inspectors would fan a two-inch deck of ballot cards after receiving them, clouds of chad would fall out. Investigation of this phenomenon showed that it was due to the voters failing to completely remove the chad in the voting process. Many of the card reader jams were due to chad. (Saltman, 1975, p. 17)

In *Fresno County, California, in June 1970*, the notable difficulty was that the computer program needed to count the punch-card ballots was not completed before the election. In fact, it was not completed until several days after the election and counting could not begin until 87 hours after the polls closed.

The primary election in Detroit in August 1970 saw the first use of punch-card voting in this city. The elapsed time from the close of polls to the completion of the final count was 73 hours.

A study by the local chapter of the Association for Computing Machinery stated that poor construction of the devices promoted extra punctures in the ballot cards and hanging chad. Furthermore, said the study,

since the ballot labeling was always on the left side of the ballot card, it was natural for a left-handed voter to position his hand above rather than to the left of the ballot card. In this position, the temptation to angle the stylus is strong . . .

Angling of the stylus might have been responsible for some of the failures to fully punch out chad. City clerk George Edwards was quoted as saying:

We had far too many card jams in the computer. Experience has shown us that the ballot cards used are too frail. First, they are susceptible to changes in the weather in that they absorb moisture and thereby cause computer jams. Secondly, we have found that running a given precinct four, five, or six times through the computer, there may be a tendency for one or more chads to "pop out." This, of course, would change the vote total in that precinct. (Saltman, 1975, pp. 18-20)

The election process in Hamilton County, Ohio, broke down completely on the night of November 2, 1971. A hand recount of a precinct already tabulated revealed that the Coleman/Gyrex electronic vote-counting equipment was crediting votes to the wrong candidates.

It was determined that the program tapes that controlled the Coleman/Gyrex device had been incorrectly prepared. Dedicated staff members working day and night were able to reprogram the tapes in five days. The count was completed at 11:00 p.m. on November 7. Although in prior elections with the system, results had not been obtained until 4:00 a.m., the next day, too late for the morning newspapers, the current situation was unacceptable. A congressman opined that "what's really at stake is the public's confidence."

6.7 FEDERAL OFFICES ESTABLISHED TO RESPOND TO NEW TECHNOLOGY

With increasing use of computers in the federal government, the need for management of their use seemed clear to Congressman Jack Brooks (D-TX), chairman of the House of Representatives Committee on Administration in 1965. His concern resulted in the passage of amendments to the Federal Property and Administrative Services Act of 1949. The 1965 amendments would be known as "The Brooks Act" (Public Law 89-306, October 30, 1965). This law established three agencies for controlling the use of computers. The agency later called the Office of Management and Budget would set policy; the General Services Administration would procure the equipment and the National Bureau of Standards (NBS) would set standards for their use. NBS was tasked also to assist other federal agencies in the application of computer technology.

The need for standards was demonstrated by the inability of some early computers to connect to peripheral equipment, for example, a printer or tape drive, made by a different company. Coding and electrical interface standards were needed. Additionally, standards for high-level programming languages needed to be made available within the government to enable programmers to work with more than one computer without having to be retrained. Communications and security standards were needed also. NBS established the Center for Computer Sciences, later given other names, in the late 1960s.

The Clearinghouse on Election Administration (CEA) was established in 1972 as a result of difficulties in elections using computers. In late 1971, the Congress was considering legislation that would become the Federal Election Campaign Act (FECA) (Public Law 92-225, February 7, 1972). That law would set limits on expenditures for election campaigns for the office of president. Responsibility for administering the act would be given to the comptroller general, head of the General Accounting Office (GAO), the auditing arm of the Congress. (In 2004, the name of the GAO would be changed to the Government Accountability Office.) In the course of debate in the House of Representatives, Congressman William J. Keating (R-OH), from the Cincinnati area (Hamilton County!), introduced an amendment that was included in the adopted legislation in Section 308 (c). The relevant part of the act is as follows:

It shall be the duty of the Comptroller General to serve as a national clearinghouse for information in respect to the administration of elections. In carrying

A National Election Systems Standards Laboratory would serve a valuable function for all states if established to set national minimum standards for federal election procedures assuring accuracy and security, and similar standards for election equipment and systems performance . . . (Saltman, 1975, p. 9)

While the two reports discussed here were widely disseminated to election administrators, they had little impact in causing change. There was no force of law behind them. The total disaggregation of the U.S. election system to thousands of counties, cities, and townships would, in any event, prevent any unified response.

6.9 THE CLEARINGHOUSE IS RETAINED IN THE FEC

By 1974, there appeared to be general dissatisfaction with the FECA as originally written. Additionally, it was said that Elmer Staats, the comptroller general, was uncomfortable with having been assigned campaign finance oversight responsibilities. That was an issue too politically charged for a supposedly nonpartisan agency. The House Administration Committee was busy rewriting the FECA legislation and, as drafted, the CEA was eliminated. However, Congressman William E. ("Bill") Frenzel (R-MN) objected. He had supported Congressman Keating's amendment of 1971 and he wanted the CEA continued. In debate in the House on July 2, 1974 (Congressional Record, p. 22143), Frenzel is recorded as stating:

The bill, by abolishing the elections clearinghouse in the General Accounting Office, eliminates the only good thing the federal government does to help the state and local governments run their election administration systems.

Frenzel got his way in the House version, and the Senate version had not abolished the CEA. Thus, the CEA was retained in the FECA Amendments of 1974 (Public Law 93-443, October 15, 1974). This act established the FEC and located the CEA within it. There were additional amendments to the FECA in 1976 and 1979. Although the wording of the Clearinghouse's responsibilities was altered in 1979 to eliminate specific enumeration of subject matter, its duties were not substantially changed.

The CEA, now called the National Clearinghouse on Election Administration (NCEA) within the FEC, continued to contract for studies. It began to publish reports on innovations in election administration, on election statistics and the administrative structure of state and local election offices, and other useful documents. Through fiscal year 1979, the NCEA's budget was more than 10 percent of the FEC's appropriation. This may only indicate the minimal funding of the FEC.

The NCEA under Gary Greenhalgh, still having a personnel count of just five, proposed that national standards for election equipment be developed as a follow-on to Saltman's recommendation. It was supported in this effort by

the Advisory Panel that it had created. The panel, consisting of election officials from state and local governments, represented a wide range of jurisdictional types and sizes, and both major political parties. During its June 1977 meeting, the panel recommended unanimously that the Clearinghouse immediately undertake a program leading to the development of voluntary engineering and procedural performance standards. These could be used by state and local governments in procuring, testing, operating, and retesting voting systems and all associated support hardware and software. Members of the panel stated that while they appreciated the potential difficulties arising from federal entry into the voting equipment field, the problems were serious enough to warrant federal action.

In their discussion of this recommendation, the panel members noted the lack of technical expertise in most state and local governments, which would prevent those jurisdictions from individually testing sophisticated voting systems and support equipment. They stated, also, that the lack of adequate financial resources to hire technically trained individuals required government officials to rely on the vendors for technical information and support. In such situations, a problem of conflict-of-interest could arise. Assigning responsibilities for problems and assuring that they were identified and fixed could be difficult and confusing. Another issue brought out was that vendors often specified the reliability of their equipment for ideal laboratory conditions and did not appreciate the variety of environments in which the equipment would be placed during use.

Finally, panel members stated that there was a need to look at related human engineering standards. It was asserted that neither the manufacturer of voting systems nor most state and local election offices paid much attention to how the voter interacts with the various voting devices. Evidence was cited suggesting that not only ballot design, but the equipment itself, can have a great impact on minorities, minority language, handicapped, and visually impaired voters (National Clearinghouse on Election Administration, 1983, pp. 20-22).

6.10 THE FEASIBILITY STUDY AND STANDARDS DEVELOPMENT

NCEA efforts eventually succeeded. In the 1979 amendments to the FECA (Public Law 96-187, January 8, 1980), Section 302 stated that:

The Federal Election Commission, with the cooperation and assistance of the National Bureau of Standards, shall conduct a preliminary study with respect to the future development of voluntary engineering and procedural performance standards for voting systems used in the United States. The Commission shall report to the Congress the results of the study, and such report shall include recommendations, if any, for the implementation of a program of such standards (including estimates of the costs and time requirements of implementing such a program). The cost of the study shall be paid out of any funds otherwise available to defray the expenses of the commission.

helping to rig elections. The computer program has been challenged in Florida, but so far experts have not been permitted to examine the program in connection with the challenge . . .

Two computer experts were cited in the article who were quoted as supporting the possibilities of easy manipulation. One was Howard Jay Strauss, associate director of the Princeton University Computing Center. Their full statements, not reported in the article, significantly qualified the ease of fraudulent changes by indicating that there were methods with which such malicious activities could be prevented. Furthermore, said one, there was no evidence that such criminality had actually occurred (Saltman, 1988, pp. 12-15). None of the challenged election results identified in the article were overturned, but the effect of the article was to increase public unease about computerized voting. Foundation funds for additional studies of the question would be made available.

The John and Mary R. Markle Foundation, headquartered in New York City, would fund a number of projects as a result of the 1985 articles in *The New York Times*. The foundation had an interest in the field of public communications and decided that the accusations made in the first article, as well as the general concerns reported in subsequent articles about the lack of knowledge of election administrators, deserved additional review.

A *workshop on Captiva Island, Florida*, for 26 invited experts, was sponsored by the Markle Foundation in February 1987. The attendees included election administrators, election equipment vendors, computer security experts, journalists concentrating on election reporting, lawyers who had engaged in election litigation, and researchers. Presentations were given by Marie Garber, head of the Maryland State Administrative Board of Election Laws, Richard H. McKay, president of the Election Services Division of Business Records Corporation (formerly CES), Robert J. Naegele, president of Granite Creek Technology, Richard G. Smolka, publisher of *Election Administration Reports*, and Willis H. Ware, senior scientist at The Rand Corporation. A report of the meeting was written by Prof. Lance Hoffman of George Washington University (Hoffman, 1988, pp. 1-93).

A *guide to computerized voting systems* was also supported. The project was carried out by ECRI, a scientific testing laboratory of Plymouth Meeting, Pennsylvania. The guide was intended for election administrators. The 50-page document, authored by project leader Malin Van Antwerp and staff, included a description of various equipment then available as well as useful trade-off information for considerations in the selection process. Among its statements was:

we recommend strongly that jurisdictions not purchase new vote recorders that require prescored cards. (ECRI, 1988, p. 4)

Roy G. Saltman's report of 1988 was paid for by the foundation. In early 1986, foundation program officer Larry Slesinger approached NBS and

asked the agency to accept enough money for Saltman to undertake a two-year study of the current problems of computerized vote tallying. As the need for external funding was vital to NBS and the proposed project was consistent with the agency's mission, Saltman was made available for the work.

The administration of some 12 elections in 11 states, which had encountered difficulties between 1980 and 1986 were analyzed. Additional information was provided in a report that had been undertaken by the Illinois State Division of Voting Systems, directed at the time by Michael L. Harty. Administrative problems were categorized as follows:

1. insufficient preelection testing;
2. failure to implement an adequate audit trail;
3. failure to provide a partial manual recount of ballots;
4. ballot reader malfunctions;
5. non-reproducible results due to the use of PPC ballots;
6. loss of management control, due to the use of borrowed equipment and computer operations by outsiders;
7. inadequate contingency planning; and
8. inadequate systems acceptance procedures.

Examples of elections demonstrating non-reproducible results due to use of PPC ballots were Palm Beach County, Florida, November 1984; Dallas, Texas, April 1985; Stark County, Ohio, May 1986; and Gwinnett County, Georgia, November 1986 (Saltman, 1988, pp. 58-80). These examples, demonstrating the inability of PPC systems to reproduce counts, suggested to Saltman an inherent condition in the voting method that could not be easily repaired. An essential tenet of the scientific method is that experiments can be replicated to demonstrate the correctness of the deduced results. Although elections are not experiments, the importance of reproducible results (through retention of original documents) to verify the original assertions pertains also. As a result, Saltman proposed that:

The use of pre-scored punch cards contributes to the inaccuracy and to the lack of confidence. It is generally not possible to exactly duplicate a count obtained on pre-scored punch cards, given the inherent physical characteristics of these ballots and the variability in the ballot-punching performance of real voters. It is recommended that the use of pre-scored punch card ballots be ended. (Saltman, 1988, p. 5)

As with other recommendations, this proposal had no immediate impact. After the 2000 Florida brouhaha, it was remembered by the media (e.g., Whoriskey, 2000, *Miami Herald*).

The vulnerabilities of non-ballot voting systems have been extensively discussed by Saltman (Saltman, 1988, pp. 26-29, 39-42).

The essential problem of mechanical lever machines is that there is not, nor can there be, an audit trail of each voter's choices. The correct recording of

In 1989, a highly useful organization had been formed. It was called the National Association of State Election Directors (NASED). It was a voluntary professional association of senior election officials in each state, the District of Columbia and American territories. Some of the officials involved in its formation were Tom Harrison of Texas, Constance Slaughter Harvey of Mississippi, Hoyt Clifton of New Mexico, Dot Joyce of Florida, Donnetta Davidson of Colorado, Anita Tatum of Alabama, Tom Wilkey of New York, and Chris Thomas of Michigan. All of these election directors had served as presidents of the organization between 1990 and 1997. Their respective states most likely paid their travel and meeting costs.

In 1989 and 1990, as the FEC standards were nearing completion, NASED agreed to serve as the certifying agency for the VSTLs. It established an Accreditation Board for this purpose. The Election Center agreed to serve as the secretariat for that function. That organization had been established in 1984 by Gary Greenhalgh after he left the FEC. The center trains election administrators with courses and conferences. It appears to be unique in that regard. Beginning in 1987, the center was led by Carol Garner and then from 1994 to the present by R. Doug Lewis. While the center received foundation money for its initial start, it now runs primarily on tuition and fees from administrators being trained. The center has an arrangement with the public administration program of Auburn University to provide in-service courses. Election officials may earn the status of Certified Elections/Registration Administrator (CERA) through this process.

Robert J. Naegele served as NASED's technical advisor and produced the handbook for accreditation (NASED, 2001 (1992)). The laboratories that were accredited had carried out similar work for federal agencies or their contractors. The first lab to be accredited for hardware testing was Wyle Laboratories of Huntsville, Alabama, in 1994. Soon after, Nichols Research of Huntsville was accepted to certify voting equipment software. Nichols, through mergers, became Giber in 1997. More recently, SysTest Labs of Denver has been accredited to certify both hardware and software. The certification process is financed through fees assessed against equipment vendors.

The issue of escrow of software arose and continues to be a problem, since the equipment vendors treat their software as proprietary under trade secret protection. However, there is a need for the software to be available in case a question of its correctness arises. The VSTL that has tested the software will have signed a nondisclosure agreement with the vendor. A state may require that the software be deposited with it, with no public disclosure permitted except in the case of an official inquiry. If a state does not wish to serve as a repository, it may ask the vendor to deposit the software with an organization specifically established to serve for escrow purposes.

6.13 THE FEC STANDARDS FAIL IN FLORIDA

In January 1990, the first edition of the FEC's Voting System Standards were issued. The standards applied to "punchcard, marksense, and direct

recording electronic voting systems." There were no performance standards for human factors in use of the machine, despite that recommendation by NCEA's Advisory Committee in 1977. Within a few years, some two-thirds of the states had incorporated the standards into their laws and/or regulations. In these states, only election equipment that had been tested and certified could be used in any of the state's jurisdictions. In 1996, the name of the NCEA was changed to the Office of Election Administration (OEA).

With regard to PPC ballots, the standards made clear that their use was acceptable. Section 3.2.4.1.2 Punching Devices stated:

Punching devices shall be suitable for the type of ballot card used. When pre-scored ballot cards are used, the punching device shall consist of a suitable frame for holding the ballot card, and a stylus which the voter uses to remove a scored area of the card to cast a vote. The stylus shall be designed and constructed so as to facilitate its use by the voter, and to minimize damage to other parts with which it comes in contact. It shall incorporate features to ameliorate the effect of skewed insertion, and to ensure that the chad (debris) is completely removed. (Federal Election Commission, 1990, p. 27)

To the best of this author's knowledge, no stylus without spring loading has been able at any time "to ensure that the chad (debris) is completely removed." Furthermore, no Votomatic or equivalent system was ever tested prior to use and rejected for its inability to completely remove chad. The tendency of the Votomatic system to produce "hanging" or "bulging" chad or to have human factor difficulties did not result in attempts to end its use before the 2000 election in California, Florida, Georgia, Illinois, Ohio, or other states that were users of PPC ballots. While many administrators knew of the problems of the Votomatic system, they did nothing except express the pious hope that elections in their jurisdictions would not be close. In close elections, all of the sloppy procedures and equipment malfunctions that were bound to happen with poorly functioning systems run on a minimal budget would be brought to light.

The availability of a spring-loaded stylus, which would remove chad without the necessity for prescoring the ballot card, was discussed by Saltman (Saltman, 1988, p. 5). It was believed at that time that such a stylus would be widely adopted, but that was not the case. The product did not appear to catch on, and there is no record of its use in 2000. The standards, adopted in Florida in the 1990s, were totally useless in preventing the debacle of 2000 in that state due to the use of PPC ballots.

6.14 OMENS FORETELLING A DISASTER ARE IGNORED

Three situations that occurred in the 1990s are reported here. One was a simulation but two were the outcomes of real elections. There is no evidence that the obvious lesson was taken into account by anyone with any responsibility for election administration.

using optical scanners, lever machines, and paper ballots. Additionally, in recounts of election results where punch cards have been used, review of such ballots has shown that often the paper tab, which must be cleanly severed to indicate a vote, has not been so severed and remains partially attached to the ballot. Such recounts have also demonstrated that often a ballot that does not appear to be marked will actually show an indentation on the tab, which is still fully attached to the ballot. These systemic flaws have changed the outcome of a number of elections, as ballots read by the computer as blank have actually found to contain voters' identifiable choices. (Galvin, 1997, p. 1)

6.15 LACK OF RESOURCES APPLIED

The failure of the federal government to commit resources devoted to election technology and administration is an important factor that facilitated the Florida fiasco. The states complained about the "unfunded mandates" of federal requirements such as the NVRA, but they failed to pick up the slack. The states failed to adequately fund the function about which they are so protective. The result was poor implementation of voting systems in many states.

The problems in preparing new voting technologies for public use were not understood to be significant. There were failures to appreciate the technical complexities of implementation, lack of technical expertise, and funding in local administrations, as well as lack of recognition by the states and federal government that it was a field worthy of important investment. After Representatives Keating and Frenzel were instrumental in the early 1970s in pointing out problems and assuring the establishment and continuation of the Clearinghouse, no priority whatsoever was given to that organization's function.

Comparisons may be made with federal involvement in other areas of civic endeavor, such as agriculture, education, health, and ground transportation. In these other areas, the federal government does not carry out the operational activities (similar to its mission in elections), but recognizes that effective functioning in these fields is essential to public well being. Often, the argument for federal involvement involves concern for "public health" or "public safety" (as was noted in sections 2.11 and 2.12). A strong indication of the federal government's commitment is demonstrated by the establishment of Cabinet posts and fully staffed agencies. Each of these federal departments includes an office that collects data and develops statistics about the status of its assigned field of concern. Other agencies in the department undertake significant research, issue grants, set standards (some mandatory), and sometimes set funding incentives. Data from research and analyses are published that enable state and local governments, and individual citizens, for example, farmers, educators, physicians, and truck manufacturers, to make decisions that are better informed. The mutually supporting arrangements of these departments with their constituencies demonstrate how successful federalism is carried out.

For voting technology and systems, even if limited to federal elections, there was neither a Cabinet position nor an independent office; that is, there

was no Democracy Protection Agency. The five-person Clearinghouse/Office of Election Administration did not constitute a meaningful federal program, stuck as it was in a commission regulating campaign financing. Its minuscule funding prevented any quantitative research, for example, on the effectiveness of different types of voting equipment or on the human factors connected with their use. Obviously, no data on these subjects could be disseminated. When the Clinton administration wanted a study undertaken on voting over the Internet (begun with a workshop in October 2000), it had to turn to the National Science Foundation for the funding (Internet Policy Institute, 2001, pp. 1-52). The result of the lack of data and direction was the disaster in Florida four weeks later. In effect, *failed federalism fueled the Florida fiasco*.

with policy and legislative recommendations. Two were by the (privately funded) National Commission on Federal Election Reform and by the California Institute of Technology (Caltech) and MIT (see the References section). Many bills mandating reforms were submitted in the Congress and significant legislation was adopted. The date of November 7, 2000 was to election administration as September 11, 2001 would become to homeland security.

7.1 COMPARISON OF RESIDUAL RATES WITH USE OF DIFFERENT TECHNOLOGIES

The "residual rate" has begun to be widely used as a measure of human performance in using voting systems (Caltech/MIT, March 2001, p. 6). The term means the percentage of ballots cast for the first contest in a consolidated election for which no legitimate choice has been made. The first contest is believed to be the one least likely to be deliberately undervoted by a voter, implying that it gives the best available measure of human error in failing to vote. A study has estimated that about 0.25 to 0.75 percent of voters deliberately omit voting for the top contest (Knack and Kropf, 2001, p. 4), but the residual rate is typically larger than that. Rates may vary strongly by circumstance. "Fall-off" is a term used to describe reductions in total votes cast for contests down the ballot, and the residual rate could be called "top-contest fall-off." Fall-off generally rises consistently for lower level contests, but there are cases where that does not happen.

While the criterion of residual rate has gained considerable credence since the 2000 election, there is a much earlier example of its use. During research in 1934, Joseph P. Harris compared votes failed to be cast in 1925 on paper ballots in New York City with the votes cast on lever machines in 1929 for the same offices. The term that he used was "wasted votes" rather than residual rate. In 1925, the first contest on the ballot, for the office of mayor, had 1.9 percent wasted votes, whereas the 1929 figure was 2.3 percent (Harris, 1934, p. 275).

Results from the following studies support the conclusion that the PPC system was the worst of all commonly used systems in the ability of voters to successfully use it.

The Caltech/MIT Voting Technology Project reported:

Punch cards . . . lose at least 50 percent more votes than optically scanned paper ballots. Punch cards have averaged a residual vote rate of 2.5 percent in presidential elections and 4.7 percent down the ballot. Over thirty million voters used punch cards in the 2000 election . . . (Caltech/MIT, July 2001, p. 21)

Researchers at the University of California at Berkeley, led by Henry E. Brady, director of the Survey Research Center, have provided a comparison of residual rate by technology employed for the 2000 election. According to their report, "we invested heavily in collecting and cleaning these data" (for

Table 7.1 Residual rates for 2,219 counties—averages over all ballots

System type	Average residual rate (%)
Punchcard	2.64
Paper ballots	1.99
Lever machines	1.72
DREs	1.68
Marksense	1.37
National average	1.94

Note: Adapted from Brady et al., 2001, p. 29.

2,219 U.S. counties, about 70 percent of all of them). Their data over all ballots is shown in table 7.1 (results for PPC and Datavote systems are combined).

Voters in the City of Detroit used a PPC system in 1996 to cast their ballots. In 1998, the city replaced all its PPC systems with a precinct-counted marksense system, which provided ballot return for overvotes. A report of their results stated:

The percentage of uncouncted ballots in Detroit decreased significantly in the 2000 election . . . In the 1996 election, 3.1% of ballots cast in Detroit were not counted in the Presidential race. In 2000, only 1.1% of ballots were not counted . . .

The decrease was across-the-board . . . The reduction in the undercount was especially large in precincts with high rates of uncouncted votes in 1996. Precincts that had over 7% uncouncted votes for President in 1996 had less than 1% uncouncted votes in 2000. (Minority Staff, April 2001, p. 1)

The State of Georgia used four voting technologies in 1998: punch card, marksense, lever machines, and paper ballots. Georgia adopted a statewide uniform DRE system soon after the 2000 election. In 1998 and 2002, the contest for U.S. Senate was at the top of the ticket. In 1998, the undervote for the Senate contest was 4.8 percent of ballots cast, but in 2002, with the new system, the undervote was 0.88 percent. (Only undervotes were compared since the new system does not allow overvotes.) In 2002, of 29 of Georgia's 159 counties that each had an undervote of at least 15 percent, 26 had undervotes of less than 3 percent. In DeKalb county, the first county in the country to adopt a PPC system in 1964, the undervote dropped from 3.7 percent in 2000 to 0.52 percent in 2002, and in adjacent Fulton County, the 2000 undervote was 6.3 percent while in 2002, it was 0.67 percent (Office of Secretary of State Cathy Cox, 2003, pp. 1, 2).

In Maryland, John T. Willis, secretary of state in 2001, compared residual votes longitudinally in three counties. His data showed that when marksense systems were used in 1996 and 2000, residual rates were considerably lower in each of these counties than when PPC systems were used in 1984, 1988, and 1992. Inspection of the numbers easily shows the differences (table 7.2).

minorities in the tracts. The nine counties retaining the PPC voting system had similar plots of their residual rates in both 1996 and 2000, clearly showing an upturn associated with higher percentages of minorities in the census tracts. In 2000, these nine counties had about a 1.8 percent residual rate with 0 percent minorities per tract, increasing to about 4 percent for tracts with 100 percent minorities.

The three counties that eliminated PPC systems in 2000 showed a much lower average rise with increasing percentage of minorities in the tracts. For 1996 data, the line of average residual rates begins at 1 percent with 0 percent minorities and ends at 5 percent with 100 percent minorities per tract. For 2000, the line of average residual rates begins at 0.3 percent with 0 percent minorities per tract and ends at about 1.5 percent for 100 percent minorities per tract. Thus, the change from PPC systems to precinct-count markense systems was significant in reducing minority residual vote (Buchler et al., 2004, table 1 and figures 2, 3a, and 3b).

7.3 CAUSES OF HIGHER RESIDUAL RATES AMONG BLACKS

Judge Richard Posner reported the results of regression analyses that he undertook on the Florida vote in 2000. He experimented with a number of regression equations and candidly discussed their separate determinations of significant variables (Posner, 2001, pp. 67–82). His overall conclusion was:

The equations . . . taken as a whole, indicate that the punchcard ballot and county counting [instead of precinct counting], together with the correlated factors of low literacy, low income, and being black, had a significant effect in increasing the frequency of spoiled votes . . . (pp. 81, 82)

The U.S. Commission on Civil Rights (USCCR) undertook hearings in 2001 and released an extensive report. It appears that the intent of the commission, with Mary Frances Berry as chair, was to provide evidence of violations of the 1982 amendments to the Voting Rights Act. The commission used the term “disenfranchisement” to refer to the high residual rate:

This disenfranchisement of Florida voters fell most harshly on the shoulders of African Americans. Statewide, based on county-level statistical estimates, African American voters were nearly 10 times more likely than white voters to have their ballots rejected in the November 2000 election. (USCCR, 2001, p. 100)

The use of the term disenfranchisement in this context was vigorously contested by two of the eight commissioners in their dissent included in the separate Appendix to the main report. Calling the majority’s report “prejudicial, divisive, and injurious to the cause of true democracy and justice in our society,” they wrote that “disenfranchisement is not the same thing as voter error” (Thernstrom and Redenbaugh, 2001, Appendix IX, pp. 1, 3).

Allan J. Lichtman, professor of history at American University, Washington, DC, was the statistical expert hired by the USCCR. His work for the commission appears in the Appendix volume of the USCCR report (Lichtman, 2001, Appendix VII). The first point made by Professor Lichtman in his report was that:

When we look at the variation in the ballot rejection rates for each county in Florida, one-quarter of that variation can be explained solely by knowing the percentage of blacks who were registered to vote in that county.

Prof. Lichtman does not state what variables contributed to the other three-quarters of the variation in residual rates. He does state, however, that:

A multiple regression analysis that controlled for the percentage of high school graduates and the percentage of adults in the lowest literacy category failed to diminish the relationship between race and ballot rejection or to reduce the statistical significance of the relationship. (p. 4)

The U.S. Department of Justice investigated the situation in Florida and did not file any suits based on the 1982 amendments. The department, in a letter to Congress signed by Assistant Attorney General Ralph F. Boyd, Jr., noted that it had investigated voting irregularities in three Florida counties: Miami-Dade, Orange, and Osceola. Boyd wrote:

While the Civil Rights Division discovered evidence of significant confusion and delay in the three counties, there were relatively few voters who actually did not vote because of these problems . . . [This small number of voters] doesn’t reasonably cast any doubt on President Bush’s several hundred vote margin of victory in Florida . . . The Civil Rights Division found no credible evidence in our investigations that Floridians were intentionally denied their right to vote . . . (The Washington Post, May 30, 2001, p. 2)

It seems clear from the letter’s wording that the Department of Justice, under its new Republican leadership, would not find a violation of the Voting Rights Act unless it could be shown that a significant number of persons were actually denied the right to vote. Apparently, the department did not view the high residual rates among blacks as a violation.

7.4 REEVALUATIONS IN THE STATES, AND LAWSUITS AGAINST PUNCH-CARD VOTING

At the start of 2001, a number of states, for example, Florida (Governor’s Select, 2001, pp. 1–78) and Maryland (Special Committee, 2001, pp. 1–124), established studies to evaluate the voting equipment being employed and to review the relationships between the state and local governments in election administration. In Georgia and Maryland, selection of voting equipment by individual counties was ended. Both states adopted the Diebold

In January 2005, Secretary of State Blackwell ordered counties to adopt precinct-count marksense voting systems. Daniel P. Tokaji, speaking for the ACLU, has stated that the organization will appeal: "The state's been promising for years that it would get rid of its machines and has failed to deliver. The state's saying it will do something and it happening are two different things," he has said.

7.5 THE HELP AMERICA VOTE ACT

This groundbreaking Act of Congress (Public Law 107-252, October 29, 2002) was adopted almost two years after the 2000 general election. The Act has been called "an anemic piece of legislation" in an editorial (*The New York Times*, October 24, 2004) but, considering the situation beforehand, it was a giant step forward. Many would not consider a \$3 billion appropriation for a function never previously funded to be anemic. There was a strong desire in Congress to adopt some relevant legislation before the next general election, which would occur just a week later. The intervention of the September 11, 2001 attack and the necessity of responding to it was a partial reason for the delay. While there was much negotiation during crafting of the legislation about respective roles of the states and the federal government, a most contentious subject concerned requirements for voter registration by mail. A failure of agreement on that single point would have derailed passage; that nearly happened.

Establishment of the Election Assistance Commission (EAC) was a core decision of the act. The EAC enables the function of election administration to have visibility and provides a forum for interest groups. The four members of the commission are appointed by the president with the advice and consent of the Senate. Commissioners, two from each major party, serve a term of four years with the possibility of reappointment for one additional term; they are to have experience with or expertise in election administration.

The first four commissioners were not confirmed until December 2003, effectively delaying the start of the commission's work until the beginning of 2004. Two were given two-year terms and two others four-year terms. After that, two commissioners are to be appointed every two years. With each set of appointments, not more than one commissioner is to be from the same political party. The chair and vice chair are selected by the members themselves and they serve for a term of one year; they may not be from the same political party.

The commission has no federal regulatory authority. Any action by the commission can only be carried out with the approval of at least three members. The first revision of the 1990 voting system standards, adopted in 2002 by the FEC (Federal Election Commission, 2002, Vols. I and II), were specified to serve as the initial "Voluntary Voting System Guidelines" (VVSG).

The functions of the commission include:

- holding hearings;
- serving as a clearinghouse;

- adopting new and updated VVSG;
- implementing a national testing and certification program for hardware and software of voting systems;
- funding studies on many issues related to elections;
- taking over from the FEC responsibilities related to the NVRA (see section 5.11).

Directly reporting to the commission is an executive director. In May 2005, Tom Wilkey, former New York state director of elections, was competitively selected. All the functions of the OEA and its four professional staff members were transferred to the EAC.

The Standards Board and Board of Advisors were created to include many stakeholders in the official process. The boards may hold hearings, take testimony, and receive evidence to carry out their responsibilities, but they have no power of subpoena. They receive no compensation for their work, except that they receive expenses for travel. They must meet at least once a year in order to vote on the VVSG.

The Standards Board is to be made up of 110 officials, 55 state and 55 local election officials (for this purpose, American Samoa, District of Columbia, Guam, Puerto Rico, and U.S. Virgin Islands are defined as states). The members of the Standards Board must meet at least once every two years to select an Executive Board of nine members.

The Board of Advisors is composed of 37 members, 25 from state and local government organizations and from federal agencies concerned with civil rights, access for disabled persons, and military and overseas voters. Election-focused organizations that are members include NASED, Election Center, National Association of Records, Election Administrators, and Clerks (NACRC), and International Association of County Records, Election Officials and Treasures (IACREOT). Four other members are to be professionals in the field of science and technology appointed by the majority and minority leaders of the two Houses of Congress. Eight members are to "represent voter interests," appointed by the chair and ranking minority members of the appropriate committees of the House and Senate.

The Technical Guidelines Development Committee (TGDC) was created under the act to develop the VVSG and recommend VSTLs. The chair of the TGDC is the director of NIST and the committee includes 14 additional individuals. Members of the TGDC receive no compensation, but are reimbursed for travel expenses. NIST is to provide technical support to the TGDC. The support is to include research and development in several identified areas.

Certification and testing of voting systems is given official status in the act, replacing NASED's function. Now, the director of NIST is to submit to the commission a recommended list of laboratories to be accredited to carry out the testing, certification, decertification, and recertification of voting systems. The director of NIST is to continually monitor and review the performance of accredited laboratories. Only the commission can accredit or

identification or a copy of a current utility bill, bank statement, government check, paycheck, or other government document that shows his or her name and address. If the voter votes by mail after having registered by mail, he or she must submit with the ballot the same identification that would have been required if he or she had voted in person. None of the provisions mentioned earlier apply to voters entitled to vote an absentee ballot under VAEHA or UOCAVA (see sections 5.9 and 5.10).

This requirement was strongly opposed by Senators Hillary Clinton (D-NY) and Charles Schumer (D-NY). They said that it would disadvantage the poor. They attempted to eliminate this provision and, failing that, voted against final passage of HAVA. They were the only senators recorded as opposed.

Payments and grants to the states for different purposes are provided for in several sections of the new law. In FY 2004, the commission was able to disburse a total of approximately \$1.3 billion of appropriated funds to 42 states, American Samoa and District of Columbia (U.S. Election Assistance Commission, 2005). There are specified payments for efforts to improve election administration and for replacement of punch-card and lever voting machines.

In addition, the commission must make "requirements payments" each year for several years to each state that meets the funding conditions. The money can be used to meet the federal standards for voting systems and for voter registration. It may also be used as reimbursement for new voting equipment that meets all federal requirements. States do not have to implement the VVSG as a condition for receiving payment.

Grants are specified to be made for accessibility for disabled persons. These grants are to be administered by the secretary of the U.S. Department of Health and Human Services.

To improve military and overseas voting, additional resources are to be given to voting assistance officers of the Armed Forces. Measures are to be implemented by the secretary of defense that ensure that a postmark or official proof or mailing date is provided on each absentee ballot collected at any overseas location or vessel at sea for which the U.S. Department of Defense is responsible. Each state is to designate a single office to be responsible for providing information regarding voter registration and absentee ballot procedures to be used by military and overseas voters.

7.6 FEAR OF SOFTWARE FRAUD—ROUND III (2001–2004)

Concern over the correctness of results produced by touchscreen DREs increased significantly following the 2000 general election, but active opposition started to become highly vocal in 2003. DREs had been used in rising quantities since mid-1980s. In 2000, they were used by 13 percent of the voting population, apparently without much opposition. Adding the use of lever machines by 18 percent to that total, nearly one-third of the public voted on

a non-ballot system in 2000. In 2004, more than 31 percent voted on DREs and about 15 percent voted on lever machines.

The problem in determining the final result in Florida was translated into a loss of confidence in touchscreen DREs by some portion of voters, even though there were no charges of software fraud in that election and DREs were not used there. Those who backed Gore in 2000 appear to be far more concerned about touchscreen DREs than those who backed Bush. It may be a sense of loss—that something precious was wrongly taken away—that continues to drive the demand by Gore partisans for more assurance of voting system correctness. For example, Representative Robert Wexler (D-FL) filed a lawsuit in his state challenging the use of DREs, but was unsuccessful in court. Serious failures of Internet-connected systems due to hackers has contributed to the unease, even though touchscreen DREs are not connected to it.

By comparison with touchscreen DREs, concern over the results produced by lever machines and full-face DREs has been negligible. Lever machines have produced results without paper ballots since their first use in 1892 and continue to be required throughout the State of New York as of mid-2005. A series of editorials in *The New York Times* has championed paper records, for example, "Voting Machines for New York," May 18, 2004:

the Legislature should require that all electronic voting machines in the state produce a voter-verifiable paper trail.

These editorials were written in a city that used lever machines in every precinct in the 2004 election and has used them for over 75 years. Not one of the *Times* 40-or-so editorials and op-ed columns on current issues in voting in 2004 compared the likelihood of incorrect results between the two types of machines. As indicated in section 6.11, lever machines cannot have an audit trail, whereas DREs have their EBIs. Apparently, a significant percentage of the public is unaware of the retained ballot images. This retention should make the public less apprehensive about DREs than about lever machines, but that has not been the case.

The lack of concern about lever machines seems to carry over to the public's perception of full-face DREs. This type of device was introduced into Baltimore city, replacing lever machines, in the 1990s without any articulation of concern for software fraud from any quarter in Maryland. The question of possible software fraud would not become a serious issue for Maryland's elected officials until 2003, after some computer scientists at Johns Hopkins University in Baltimore released a report, discussed later. The Hopkins researchers had paid no attention to the full-face DREs used for voting in the very city where their ivory tower was located. It was the use of touchscreen DREs that piqued their interest in discovering security flaws.

Johns Hopkins computer scientists released a report in July 2003, made possible by a download from an unsecured website of Diebold Election Systems (Keiger, 2004, pp. 50–56). Included in the data downloaded was a computer

of Maryland Security Policy . . . This assessment of the current security controls . . . is dependent upon the system being isolated from any network connections. . . .

The valuable result of a risk assessment is that the failings uncovered are often easily rectified. The SAIC technical recommendations were of that type, but the Democrat-controlled legislature was not satisfied. The SAIC report was sponsored by the state's Executive Branch headed by Governor Robert L. Ehrlich Jr., a Republican, and some conflict-of-interest by SAIC was claimed by the Democrats. A new effort was instituted by the Department of Legislative Services on order of the Maryland General Assembly. A contract was issued to RABA Technologies LLC of Columbia, MD. The company reviewed system arrangements again and conducted a "red team" exercise. This procedure permits "teams . . . to experiment with attack scenarios without penalty."

The RABA report, released in January 2004 (Maryland Department of Legislative . . . , 2004, pp. 1-25), identified risks that could cause disruptions if the flaws were exploited. The report said,

each of these vulnerabilities has a mitigating recommendation that can be implemented in time for the March 2004 primary. *With all these near-term recommendations in place, we feel, for this primary, that the system will accurately render an election that is worthy of voter trust.*

In addition, the report provided an unusually even-handed discussion of the pros and cons of implementing voter-verifiable paper audit trails (VVPATs). It noted the resources required to assure a secure system, but stated that systems using paper ballots have serious accuracy problems. In conclusion, the RABA report stated that if the computer software is digitally signed, "reconciling the results of a single, randomly selected terminal with its paper receipts is sufficient . . ."

During 2004, a lawsuit filed by TrueVoteMD.org to force the state to use VVPATs was rebuffed by a Circuit Court judge.

In Ohio, Secretary of State Blackwell contracted with Compuware Corporation to undertake a study similar to the SAIC review carried out in Maryland. Compuware investigated the DREs from four vendors whose equipment was certified for use in Ohio. The equipment analyzed was:

- AccuVote-TS from Diebold Election systems,
- iVotronic from ES&S,
- eSlate 3000 from Hart InterCivic, and
- AVC Edge from Sequoia Voting Systems.

The Compuware report, issued in November 2003, identified risks for each system and provided risk mitigation strategies for each. The administrative recommendations made were very similar to the SAIC recommendations presented earlier (Ohio Secretary of State, 2003, pp. 17-20).

As a result of the Compuware study and the concerns elsewhere about voter-verifiable paper audit trails, the secretary of state reversed course from a requirement he imposed on counties to adopt either DREs or marksense systems. As of January 2005, only marksense systems could be used. It was reported in February 2005 that Ohio attorney general Jim Petro stated that "the secretary does not have the authority to dictate how independent boards conduct their elections" (*Cleveland Plain Dealer*, February 9, 2005). In this confusing situation, it may be that the ACLU will have to appeal, after all, to get Ohio to eliminate PPC voting systems.

In Nevada, Secretary of State Dean Heller decreed in 2003 that DREs, used throughout the state, must have printouts that each voter would have to approve before leaving the voting booth. It is interesting to compare the Nevada solution with the proposal by computer scientist Rebecca Mercuri, a well-known and long-time advocate for VVPATs. In Mercuri's view, each DRE should be required to print out the set of each voter's final choices as well as display them on its screen. The process, as she had described it recently, is as follows:

The voter confirms that the printout concurs with their [*sic*] choices (if not, an election worker is notified in order to initiate a corrective process) and then deposits the printout into a sealed ballot box. At the end of the election session, electronic tallies produced by the machine provide unofficial results and are subsequently confirmed by the paper counts. If these totals differ, the printouts are used to produce the final result. Since the printed versions were prepared by a computer, in a human-readable format, they can be optically scanned or hand-tabulated. (Mercuri and Neumann, 2003, p. 40)

By the primary election of September 7, 2004, the capability to generate printouts had been implemented in Nevada. The procedure used was that the printout was provided to the voter under transparent plastic. Before the voter was able to complete the voting process, he or she had to press a button that indicated the printout had been accepted. Then the printout would be filed. However, as noted by Richard Smolka, the editor and publisher of the newsletter *Election Administration Reports*, who observed the election:

Some voters checked the printed 'receipt' against their marked sample ballots but most seemed to ignore this verification feature (*Election Administration Reports*, September 13, 2004, p. 2).

Here is seen the essential problem with the Nevada solution. If the hard copy is to serve as a genuine audit trail, every voter must review and approve it. If only a few voters examine them, the printouts *not* examined are just pieces of paper produced by a computer program that was suspect at the start. It might be an incorrect record of the choices of any voter failing to examine it to assure correctness.

Consider the difference between Rebecca Mercuri's description of the process and the Nevada solution. Mercuri requires that the voter confirm the printout's agreement with his or her choices *before* depositing the printout in

know in advance which storage register will be used to accumulate votes for a particular candidate. The most a Trojan Horse could be designed to do would be to look for a particular political party. To foil this type of attack, Williams said, the political party names are embedded in data fields. Then, the Trojan Horse program would have to parse the data fields (examine them in detail) to identify the party by its name or abbreviation, and that this type of programming would be easily noticed.

Williams said, also, that voting machine results and precinct results are posted on the wall of the precinct after the polls are closed. Any manipulation of the memory cards on the way to the central summarizing station would be at variance with the posted results.

The thrust of Williams and Rogers's presentation to the House committee was that Georgia's system of certification of election equipment and implementations of security techniques are sufficient to the extent that paper audit trails are unnecessary and possibly counterproductive. They testified that

the conjecture, that using current technology, we are unable to make such a simple system [as a voting machine] secure and accurate is contradicted by the facts of our daily existence.

They noted that modern life involves the use of computer programs that must be correct, for example, in chips that fly airplanes and in controls for an artificial heart and lung machine during open heart surgery. Their statement responded to Dill's claim, made at the NIST symposium, that a failure resulting in serious injury or death would have to occur before software would be reviewed to correct the errors.

Georgia created the Center for Election Systems at KSU in 2002 to provide support and independent testing for all of its 159 counties. The Center tested every touchscreen unit, encoder, optical scan ballot reader, and server used in the 2002 general election. Tens of thousands of voting terminals and related components were tested, and its staff continues to travel to each of Georgia's counties to independently test and validate all new equipment purchases. The Center now offers support to counties and their staff in areas of poll worker training and courses for new election officials on election management. State legislation enacted in 2003 requires that all chief local election officials successfully complete 64 hours of training. The training program includes election law, ethics, and election procedures.

The process used by Georgia to assure system integrity starts when the VSTL complete the qualification tests on the product that the state is planning to use. The system to be tested for the state is not obtained from the vendor but is transported to the KSU Center for Election Systems directly from a VSTL. The software is digitally signed, which means that any subsequent alteration would be identified by a changed value of the checking polynomial associated with it. The Center then conducts tests to certify the system for use in the state. One test is designed to detect fraudulent or malicious code that might be hidden in the system. In all tests, a known pattern of votes is cast and compared with the output of the system.

7.7 REMOTE INTERNET VOTING: AND NOW FOR SOMETHING COMPLETELY DIFFERENT

The increasing popularity of the Internet in the late 1990s suggested its extension to public voting. The idea was promoted by several software companies that had developed Internet voting programs for use by private corporations for proxy voting. Certain individuals were interested, also, because they believed that Internet voting had the potential for increasing turnout.

Remote Internet Voting (RIV) is similar to a central-count voting system or a vote-by-mail voting system. The latter, including voting absentee, allows voters to fill out ballots at home and cast them through the postal system ("snail mail," in the vernacular of Internet buffs). There seems to be little concern about a loss or alteration of ballots because of use of the public mail system. That system is familiar to everyone and has a very long history of success, but occasionally mail does not get delivered. A few miscreants could destroy mail or delay it beyond the required date for final receipt.

Opposite requirements, compared with precinct-count voting systems, are a hallmark of RIV. Network technology must be used for the votes to reach their intended destinations. The possibility of software manipulation is a significantly larger problem with RIV than with precinct-count voting. There are many methods that a malicious "hacker" could use to hijack a set of votes and get them lost in cyberspace.

Privacy is a serious concern with RIV. A non-ballot voting machine may be considered to be designed in two parts: a vote-entry section and a vote-summarizing section (Saltman, 2003, pp. 132-136). In a precinct-count voting machine, the two sections of the machine are in the same physical location, often in the same box. In voting over the Internet, the vote-entry section and the vote-summarizing section are not co-located. When the voter indicates to the vote-entry section, probably a downloaded program in a personal computer, that voting is complete, the choices are communicated, hopefully, to a vote-summarizing section. The latter may be located in another continent. It may not be possible to prevent the voter from printing or transmitting his or her selections and distributing them to a briber, a supervisor, or an employer. If the machine is not owned by the voter, the owner may have the right to review any activities that have taken place on the machine.

Voting by mail has a similar privacy problem. The casting of absentee ballots in nursing homes or other locations where voters may be subject to the pressures of aggressive activists has been a source of concern. Oregon has abolished polling stations and has used all-mail ballots since December 1995. The process was made permanent under a statewide referendum in 1998. A benefit to the state and its local governments is that polling stations do not need to be commandeered or rented and then outfitted with election equipment. Poll workers do not have to be hired and trained, and no concern need be evidenced that disabled voters have access to nonexistent polling stations. In a survey of Oregon voters taken after an all-mail-ballot in 1996, 1.4 percent stated that because another person was present when they filled out their ballots, they felt "under pressure to vote a certain way." Furthermore,

while being transported. A number of different methods were proposed by officials in North Carolina to resolve the problem, all of them rejected by the courts. The issue was ultimately concluded when one of the statewide candidates voluntarily conceded.

The State of Ohio was a major battleground in the 2004 presidential election. Both the state's executive and legislative branches were in the hands of Republicans, as well as both seats in the U.S. Senate and 12 of the 18 seats in the House of Representatives. Democrats would have an uphill battle.

Immediately after the election, a statewide recount was undertaken on the request of the two minor parties that also had participated in the election. The final popular vote of over 5.6 million votes resulted in a slight majority for Bush. The advantage of about 119,000 votes was, on a percentage basis, 51-49 percent, a credible but losing effort by Kerry.

There were charges of vote manipulation and fraud in certain places such as Hocking County, but these allegations evaporated under scrutiny. This view was confirmed by the Election Science Institute (formerly called VoteWatch), a nonpartisan, nonprofit organization. The group had undertaken an extensive review of results.

At the Congressional meeting on January 6, 2005, to review and certify the Electoral votes of each state, Representative Stephanie Tubbs Jones (D-OH), with the agreement of Senator Barbara Boxer (D-CA), raised an objection to the count of the Ohio Electoral votes. Under the Electoral Count Act, this resulted in separate but simultaneous debates by each House to discuss and resolve the question of the state's Electoral votes. Two hours were allotted for this process to proceed to its obvious conclusion.

Democrats knew that they would be outvoted; their purpose was to raise the issue of certain administrative failures by Ohio's Republican secretary of state. Not shamed by Florida in 2000, J. Kenneth Blackwell served in 2004 as the cochair of the Republican state campaign to reelect President Bush. In addition, Democrats wanted to raise issues of poor election administration in Ohio's counties, which included improper denial of provisional ballots and other actions that they implied were tinged with racial discrimination. They used these to suggest revisions and strengthening of HAVA. Two of the Democrats speaking in the House debate, besides Tubbs Jones, were Representatives Sherrod Brown (D-OH) and Marcy Kaptur (D-OH). Brown had served previously as Ohio secretary of state. With regard to Blackwell, the most substantive comment was by Kaptur. She stated:

Our secretary of state repeatedly took actions to make it more difficult for as many Ohioans as possible to have their votes fairly cast and accurately recorded. . . . Just prior to the election, the secretary of state continued to frustrate the enfranchisement of Ohioans with actions ranging from specifying paper weight standards for voter registration forms that even his own office couldn't meet, and then fighting the availability of provisional ballots right up to 3 p.m. on election day. In fact, people who had requested absentee ballots and had not received them were denied provisional ballots until a Federal Court ruling issued at 3 p.m. on Election Day.

Democrats' other issues were that voters had to wait in line to vote for as long as six hours, and they said that this was particularly the case in urban areas and not so in suburban areas. Franklin County (Columbus) and Cuyahoga County (Cleveland) were noted in particular.

Republican speakers included Majority Whip Roy Blunt of Missouri and Bob Ney of Ohio, chairman of the House Administration Committee, responsible for HAVA. Blunt's point was that people have to have confidence that the process works in the proper way but they don't need to believe that it is absolutely perfect. (That is a comfortable view if your candidate wins. See later for Washington State where the Republican candidate lost.) Ney quoted from an article in a Columbus, Ohio, newspaper:

Franklin County Board of Elections Chairman William A. Anthony, Jr. said that long lines were not caused by the allocations of machines, a process controlled by a Democratic supervisor, but by the high voter turnout, the overall lack of machines and the one hundred choices that voters had to make. . . . Anthony is also chairman of the Franklin County Democratic Party. . . . Anthony was quoted, saying that "I am a black man. Why would I sit here and disenfranchise voters in my own community? I feel like they're accusing me of suppressing the black vote. I fought all of my life for people's right to vote."

At the end of the debates, the certificates from Ohio were accepted and the Congress finished the process of electing George W. Bush to serve as president for the next four years.

In the contest for governor of Washington State, about 60 percent of Washington voters had mailed in their ballots in this election, a percentage that has steadily increased over the past decade. After all counties reported their totals and an automatic recount was triggered, Republican Dino Rossi led Democrat Christine Gregoire by 42 votes on November 30. On December 2, Democrats requested a hand recount of the 2.9 million ballots cast in the governor's race. They solicited funds from Democrats nationwide to pay for it. Included in the hand recount were several hundred ballots that had been mistakenly thrown out in King County (Seattle). As a result of the final recount, Gregoire was certified as the winner by 129 votes on December 30 by Secretary of State Sam Reed. The Democrats' recount money was returned to them, since the previous outcome was reversed in their favor.

In this state, ballots may be "enhanced" or "duplicated" by officials to assure correct machine counting. Washington State has an "intent of the voter" standard and, unlike Florida in 2000, no one attempted to subvert its meaning. Signature-matching software is used with some mailed-in and absentee ballots.

The state Republican Party did not give up the fight easily. They argued for a new election. Among other charges, they claimed that, statewide, some felons voted without having their rights restored, some persons voted for their dead relatives, and there were other invalid votes. "We think it's sufficient to show there are more illegal votes than the margin of votes," said a Republican lawyer. On June 6, 2005, a Republican lawsuit, filed in a supposedly favorable county, was dismissed. The judge said that state law did not

In an appendix, the report provided information from the Maryland State Board of Elections about its use of digital signatures for its statewide voting system software. (The process is the same as that used in Georgia and recommended by Maryland's RABA report.) The state computes a "digital fingerprint" from the software received from the VSTL, using the same mathematical function computed by NIST when its National Software Reference Library received the same software from its vendor. The computed value is unique to the particular software. Values from the NIST copy and the VSTL copy should be identical to each other if the software has not been modified.

A hearing held on June 21, 2005 by the U.S. Senate Committee on Rules and Administration delineated opposing views of VVPATs. Senator John Ensign (R-NV) said that a separate paper record would give voters "confidence that their votes have been cast and recorded accurately." Also predictably favoring VVPATs was Professor David L. Dill of Stanford University. He said that a poll of members of the Association for Computing Machinery, the largest professional association of computer technologists, heavily favored a paper trail. Of course, computer technologists don't run elections.

Speakers on the other side included Conny B. McCormack, who officially manages elections for Los Angeles (LA) County, now the nation's largest local jurisdiction. She stated that:

The fact is that existing DRE systems without VVPAT have the proven track record of doing the best job of all available voting systems. . . . The suppositions and theories espoused by critics contending that DRE systems are more susceptible to tampering are completely false. . . . By contrast, there is ample documented evidence that fraud has been perpetrated with paper-based voting systems. . . . A video [of Nevada voters] confirms that . . . very few voters even glanced at the paper printout. . . . Printing the paper record adds more time to the voting experience. Everyone is in agreement that it is anathema to voters to add waiting time. . . . The principal authors of HAVA . . . expressed their concerns that pending federal legislative proposals mandating VVPAT would "undermine essential HAVA provisions, such as the disability and language minority access requirements, and could result in more, rather than less, voter disenfranchisement and error." (U.S. Senate Committee on Rules and Administration, Hearing on Voter Verification in the Federal Electoral Process, June 21, 2005)

It may be reasonably inferred that Ms. McCormack would have wanted DREs without receipts for LA County, but that cannot be allowed because of California's legislated requirement. Instead, LA County is using the "InkaVote" system at polling stations. This equipment is similar in design to a pre-scored punch card (PPC) system, but employs a pen to darken voting locations instead of a stylus to remove chad. The newer system has some of the same human factor problems as PPCs, in that the names of the candidates are not on the ballot card.

Jim Dickson of the American Association of People with Disabilities told the committee that "the disability and civil rights communities oppose

opening up HAVA for any amendments." Senator Chris Dodd (D-CT), ranking member of the committee, stated "strong opposition to any requirement (such as the use of paper) that would make it more difficult for blind and disabled voters to vote in the same manner as others" (*Election Administration Reports*, June 27, 2005, pp. 2, 3).

In July 2005, it was reported that Georgia had adopted legislation that would require voters to show a photo ID in order to vote. Considerable opposition has been expressed, on the basis that many older and poorer citizens do not have photo IDs because they do not drive and do not travel out of the country. Apparently, in Georgia, a photo ID in lieu of a driver's license may be obtained at a cost of \$20 and the new law does not change this situation. A requirement to purchase a photo ID in order to vote in a federal election may be a violation of the Voting Rights Act. If the cost of a photo ID is seen equivalent to a poll tax, then the requirement would be unconstitutional under the 24th Amendment and the U.S. Supreme Court's decision in *Harper vs. Virginia State Board of Elections* (see sections 5.3-5.5).

7.10 RECOMMENDATIONS FOR ADMINISTRATIVE ACTIONS

The software testing process should be open to review. An editorial in *The New York Times*, May 30, 2004, entitled "Who Tests Voting Machines?" reported that one of the currently accredited VSTLs "refused to tell us anything about how it tests, or about its testers' credentials." Certainly, the VSTL had no obligation to do so under the procedures in place before HAVA. Now that federal government agencies, that is, NIST and the EAC, are handling the accreditation, a greater openness based on "freedom of information" regulations should result. Independent experts serving in an auditing capacity should be able to determine the criteria used to accredit VSTLs as well as the procedures used by the VSTLs to determine software correctness and presence and absence of malicious code. An accredited VSTL has an obligation to the voting public that it does not have to its private clients. "Trade secret" should not be able to prevent the citizenry from assuring that the software that counts their votes has been tested with the most thorough means available by competent laboratories that have no conflicts of interest.

Testing of all software used in precinct-count voting equipment should be required. Under current standards in place, so-called Commercial Off-The-Shelf (COTS) software need not be tested. Such software may include complex operating systems. These are unnecessary because of the simplicity of what the voting equipment is doing. Nevertheless, some manufacturers base their software on them. This arrangement raises that possibility that, first, all software claimed to be COTS is sometimes not really so (there is reason to believe that this is the case) and, second, that malicious code may be located in such untested software.

A reduction in complexity of software is essential to make it possible for full testing of correctness to be achieved. Individuals asserting that correctness is

and approve the VVSG, NIST would be unlikely to be allowed to carry out its HAVA responsibilities. NASS's concern may be driven by attempts by liberals, such as the signers of the letter of March 17, 2005 to turn the EAC into a regulatory agency.

The work of the EAC is essential and all its current responsibilities should be funded for the foreseeable future.

Restoration of felons' voting rights was a recommendation made by one of the national studies of 2001 and the Election Center's report discussed in section 7.9. It seems reasonable that persons under restraint should not be permitted to vote, but it seems reasonable also that ex-felons' rights should be restored. This may be accomplished by each state, but it also could be accomplished uniformly for federal elections by a single federal law. Federal requirements are typically extended by the states to registrations for all elections, as maintenance of separate systems is too costly.

Revision of the NVRA has been important for Senator Christopher "Kit" Bond (R-MO) and certain other Republicans. The senator made his views clear in an op-ed column in a major newspaper (Bond, 2001, p. A25). In that column, he discussed the situation in the city of St. Louis. He wrote:

The number of registered voters threatens to outnumber of voting age population. A total of 247,135 persons are registered to vote compared with the city's voting age population of 258,532 . . . Almost 70,000 St. Louis city residents . . . cannot be located by the US Postal Service . . . More than 23,000 people on St. Louis' voting rolls are also registered elsewhere in Missouri . . . Though dead for 10 years, St. Louis Alderman Albert "Red" Villa actually registered to vote this spring in the city's mayoralty primary. Ritzy Mekler, a mixed breed dog, was also registered to vote . . . hundreds of city voters apparently are mailing in absentee ballots from abandoned buildings and vacant lots . . . The legacy of the motor voter bill [NVRA] is that it boosted voter participation while reducing the integrity of and confidence in our elections . . .

The concerns about the inaccuracies of voter registration rolls need to be addressed by Congress. In 2001, the OEA (see section 6.12) released a report stating that in 18 states, departments of motor vehicles (DMVs) had trouble getting registration information to election officials expeditiously for the 2000 general election. The OEA received hundreds of calls from voters who submitted applications through a DMV but found on election day that they were not on the rolls (*Los Angeles Times*, June 23, 2001). In 2004, voter roll inaccuracies may have been responsible for the large volume of provisional ballots that have been experienced; more accurate voter registration lists could reduce the need for such ballots. Secretary of State Rebecca Vigil-Giron of New Mexico recently pointed out this connection. A national analysis of voter rolls in six states found more than 181,000 registered dead people. Thousands more voters were registered to vote in two places (*Chicago Tribune*, December 4, 2004).

The assurance of accurate and up-to-date statewide voter registration lists is a very large data systems problem. Data must enter the system from many

different sources. The failure of the promoters of the NVRA to include in the act a specific systems design project along with funding to carry it out was a serious error. The legislated elimination of purging, even after five years of nonvoting, prevented the use of the major tool to clean the rolls. Its replacement, using the mails to identify movers, has not been totally satisfactory, as the studies mentioned earlier demonstrate.

Now is an appropriate time to provide funding to undertake projects to improve the accuracy and integrity of voter registration rolls. The current concern about terrorists who may be hiding among us with false identification has increased the number and variety of decision-makers interested in an accurate list of persons in this country. Voters entitled to register are a subset of that list. Very recently adopted is "The Real ID Act" (Public Law 109-13, Division B, May 11, 2005). This law, in its Title II, concerns "Improved Security for Drivers' Licenses and Personal Identification Cards."

Legislation aimed more specifically at voter registration was introduced in early 2005 by Senators Bond and Mitch McConnell (R-KY). The proposed act, S.414, would allow use of Social Security Numbers in voter registration files, require the use of photo ID at the polls, and require each HAVA-mandated statewide registration file to include a common format to facilitate data communication with the files of other states. As previously mentioned, there is considerable opposition to the requirement for photo IDs at the polls, but if there were no cost to voters to obtain such identification, opposition might be considerably reduced.

Activities of partisan registration drives, in which registration applications not consistent with the sponsor's partisanship are torn up (as alleged in Nevada), should be a federal felony, if they are not already.

A Constitutional amendment should provide the District of Columbia with voting rights in Congress. The District, as presently constituted, is entitled to a voting seat in the House of Representatives. It should be able to obtain that, provided that it maintains a reasonably sized population, for example, in excess of one-half the population of the least populated state.

Representation in the U.S. Senate is more problematical. A proposed Constitutional amendment to provide DC with two seats in the Senate failed (see section 5.3). A more likely possibility is one seat in the U.S. Senate, as long as the District maintains a reasonably sized population. Another possibility is the division of DC into districts in which voters are assigned to vote in Senate contests in (say) the five most populous states.

The process of Congressional redistricting has been significantly altered by the availability of computer software. The use of computer programs with census data on very small areas has made possible the most cynical designs of Congressional districts as well as districts for state legislatures. The tortured designs of districts now possible make a mockery of the idea that districts represent citizens living in a limited area. Gerrymandering is too mild a word to describe the forms looking like multiheaded worms. In Maryland, as a result of the 2000 census, the state's eight districts, which had resulted in the election of four Republicans and four Democrats, were altered to elect two

- Methods of recruiting, training, and improving the performance of poll workers (also mentioned in the Election Center's report). Note that if election day were a holiday, or if financial incentives were given to employers for employees' time off, a much greater number of potential poll workers might be available.
- Additional uniformity among the states for federal elections in treatment of intent of the voter, casting of provisional ballots, and recount procedures. (Intent of the voter is not specifically included, but it deserves to be added.)

Another possible subject is:

- A change in the current method of electing the president through the Election College system. A thorough in-depth analysis of alternatives needs to be undertaken, specifying the likelihood of adoption of each. The possibility of incremental change as opposed to a complete change to a plurality of the popular vote needs to be considered. An example of an incremental change would be the elimination of the persons called Electors and their replacement with the numerical values that they represent. At least, this would eliminate the problem of the "faithless Elector."

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