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► To cite this version:

Roberto Casati, Achille Varzi. Ballot Ontology. Non-Being: New Essays on the Metaphysics of Nonexistence, Oxford University Press, pp.139-164, 2021, 10.1093/oso/9780198846222.003.0009 . hal-03508163

HAL Id: hal-03508163

<https://hal.science/hal-03508163>

Submitted on 3 Jan 2022

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Ballot Ontology

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[Final version published in Sara Bernstein and Tyron Goldschmidt (eds.), *Non-Being: New Essays on the Metaphysics of Non-Existence*, Oxford, Oxford University Press, 2021, pp. 139–164]

The U.S. presidential election of 2000 was crucially decided in Florida. And, in Florida, the election hinged crucially on a peculiar sort of question: Does this ballot have a hole? “Yes, it does”, so the ballot is valid and ought to be counted. “No it doesn’t”, and the ballot must be discarded. If only one could tell! Where were the hole experts when we needed them? Eventually the matter was thwarted by the Supreme Court and we all gave up. But we did learn something. We learned that even the destiny of a Presidential Election, if not more, might ultimately depend on one’s criteria for identifying holes. And we mean the holes themselves, not their material surroundings. The surroundings were all there and everyone could detect them. But what about the rest, the missing bits, those little chunks of immaterial non-being that even the Votomatic was confused about?

Too Close to Call

Rewind to the facts. Tuesday, November 7, 2000, election day. The 54th presidential election is coming to an end. By the evening, the incumbent Vice President and Democratic nominee, Al Gore, was comfortably ahead in the Northeastern states (except New Hampshire), most of the Upper Midwest, New Mexico, the Pacific Coast, and Hawaii. For his part, the Republican candidate, George W. Bush, was winning the rural Midwest and most Southern states along with Indiana, Ohio, the Rocky Mountain states, Arizona, and Alaska. By Wednesday morning it was clear that Gore had secured 250 electoral votes and Bush 246, with 270 needed to win the election. Three states were still too close to call, but two of them, Oregon and Wisconsin, would only bring 18 votes altogether; the election came down to the third state, Florida, whose 25 electoral votes would be decisive regardless. And then the mess began.

While Oregon and Wisconsin went to Gore, the vote count in Florida turned out to be in favor of Bush, but only by a margin of 1,784.¹ That was well below the margin of error tolerated by the state law, which is set at 0.5 percent of the total votes cast (in this case, 0.5 percent of 5,816,486, hence 29,082), so a statutory machine recount was immediately called in all of Florida's sixty-seven counties.² The recount began on Wednesday afternoon and was reportedly completed on Friday, November 10.³ It confirmed Bush's lead, but the margin dwindled even further: only 327 votes separated the two candidates.⁴ Meanwhile the Democrats requested a third, manual recount—again pursuant to Florida state law⁵—in four counties where Gore had prevailed but the ballots were particularly in dispute: Broward, Miami-Dade, Palm Beach, and Volusia. By the statutory deadline of November 14, Volusia County completed its manual recount and certified the results; Bush's lead decreased by another 98 votes. For the other three counties, the deadline had been upheld and, indeed, permission to proceed with the manual recount was still pending.⁶ It was granted to Broward and Palm Beach on November 16 and to Miami-Dade the next day. On November 21, the Florida Supreme Court allowed the three on-going manual recounts to delay certification until 5 p.m. on Sunday, November 26, "in order to allow maximum time for contests".⁷ In the meantime, the returns of all overseas absentee ballots had been certified and Bush's lead had grown to 930 votes. On November 22, the canvassing board of Miami-Dade determined that the manual recount was "impossible to complete"⁸ and voted unanimously to

¹ For these and related details we rely on Dionne and Kristol (2001), Gillman (2001), Dover (2003), Whitman (2003), and deHaven-Smith (2005) along with the chronicles by the *New York Times* correspondents (2001), the report of the U.S. Commission on Civil Rights (2001), and the essays in Jacobson and Rosenfeld (2002) and Watson (2004).

² "If the returns for any office reflect that a candidate was defeated or eliminated by one-half of a percent or less of the votes cast for such office [...] the board responsible for certifying the results of the vote [...] shall order a recount of the votes cast with respect to such office"; *The 2000 Florida Statutes*, Title IX, Chapter 102, Section 141(4).

³ Reportedly, for it appears that no less than eighteen counties—a quarter of Florida votes—did not rerun their ballots through the machines but simply checked the numbers and the proper functioning of their computer software. See Toobin (2001), p. 66 and Kaplan (2001), p. 51.

⁴ This result was never released officially and corresponds to the Associated Press's tally. According to the Florida secretary of state's office, Bush's lead was higher (960 votes), but with 66 of 67 counties reporting. See 'Cast and Chronology' in Jacobson and Rosenfeld (2002), at p. 26.

⁵ "Any candidate whose name appeared on the ballot, any political committee that supports or opposes an issue which appeared on the ballot, or any political party whose candidates' names appeared on the ballot may file a written request with the county canvassing board for a manual recount"; *The 2000 Florida Statutes*, Title IX, Chapter 102, Section 166(4).

⁶ On the complex issues concerning the November 14 deadline, see Greene (2001), ch. 3.

⁷ *Palm Beach County Canvassing Board v. Harris*, 772 So. 2d 1220, Section X.

⁸ *Miami-Dade County Democratic Party v. Canvassing Board*, 773 So. 2d 1179.

suspend it, resubmitting the election returns previously compiled by machine (with a slight correction of 7 more votes for Gore). Palm Beach County continued its recount and turned in the results on the 26th, but at 7 p.m., two hours after the deadline. Too late. Only the Broward recount (netting Gore 567 votes) was accepted as valid along with Volusia's. Concurrently, Bush had picked up another 181 votes from adjustments to previous calculations.⁹ Final verdict: Bush won by 537 votes, taking Florida to become the forty-third president of the United States with just one electoral vote above the 270 threshold.¹⁰

Too Moot to Count

Why a manual recount? Why the extended deadline? And why did the Palm Beach canvassing board *fail* to meet the deadline, or the Miami-Dade board resolve that it *could not* be met? In the latter case, the board's initial decision was only to halt the recount of all the 654,000 Miami-Dade ballots and limit the manual recount to the "undervotes", a total of 10,750 ballots that did not register presidential preferences in tabulating machines. That would have been understandable, especially because the operation was to take place over Thanksgiving; manually examining 654,000 ballots would have been a grueling task.¹¹ But 10,750? Why did the Miami-Dade board eventually give up on that task, too, halting their recount entirely?¹²

The first question—why a manual recount—is peculiarly interesting. In most countries, votes are *always* counted manually (or so it was in 2000). In the United

⁹ Specifically, 52 additional votes from Nassau County (which decided to use the election night tabulation instead of the machine recount) and an extra 129 votes out of previously disqualified military overseas ballots.

¹⁰ The verdict itself was not immediate. Florida Secretary of State Katherine Harris announced Bush's victory on the evening of the 26th, but Gore sued to contest it and appealed to the Florida Supreme Court on November 29. On December 8 the Florida justices, on a 4 to 3 vote, resolved to request immediate manual recount of all undervotes. The next day the U.S. Supreme Court, on a 5 to 4 decision, halted the recount on Bush's appeal, pending a hearing from both parties. After the hearing, on December 12, the U.S. Court overturned the Florida Court on another 5 to 4 decision (the five conservative justices against the four liberal justices) in the famous *Bush v. Gore* case (531 U.S. 98). It is only at that point and in such terms that Harris's original declaration was confirmed, and the following day Gore appeared on national TV to concede. Needless to say, this administrative coda fueled a huge political and legal debate of its own. For detailed reports and discussion, see Bugliosi (2001), Dershowitz (2001), Gillman (2001), Jarvis *et al.* (2001), Posner (2001), and the essays in Sunstein and Epstein (2001) and Ackerman (2002). For a sense of the extensive scholarly literature that followed soon afterwards, see Weinberg (2002) and the legal works surveyed in Cole (2006). For an extended historical perspective, see Foley (2016).

¹¹ Though not much worse than in Palm Beach (about 463,000 ballots), let alone Broward (588,000). In Volusia, which met the early deadline of November 14, the ballots were 184,000.

¹² The initial decision took place at 6:15 a.m.; the second, four hours later, at 10:14 a.m.

States, however, the vast majority of electoral districts employ mechanical or electronic voting systems of various sorts, and for this reason the initial count (and, when necessary, the first recount) is machine-based. This is a long-standing tradition, whose origins go all the way back to the late nineteenth century. The first voting machine—a lever device known as the “Automatic Booth”—made its official debut in 1892, at a local election in Lockport, New York. By 1930, twenty-four states had passed laws permitting the use of similar devices and by the 1960s voting machines of various types had replaced the traditional paper ballots in most parts of the country.¹³ The general idea has been that a machine-aided voting system carries a number of advantages, both from a practical perspective (fast vote casting, consistent vote tallying, quick returns, etc.) and with regard to a number of concerns about vote fraud that were and continue to be common with paper ballots (rigging, misrecording, spoiling, interpretation biases, etc.). Outdated as they may sound, the opening words of Jacob H. Myers’s patent for the Automatic Booth are telling:

My present invention relates to voting machines, and has for its objects to provide one by the employment of which an honest vote can be had and counted without liability of voters being intimidated, the balloting being secret, or of their voting more than once for the same candidate or different candidates for the same office, and as the votes are counted as fast as the voter indicates his preference the total number cast for each candidate can be ascertained rapidly and accurately at the close of the polls.¹⁴

On the other hand, there remains the fact that few machines work perfectly all the time. In particular, all voting and counting machines have a margin of error. Usually this margin is so small as to be immaterial when it comes to determining the outcome of an election, since the difference in votes among the top candidates is considerably larger. When the difference in votes is smaller than the margin of error, however, we have a problem, and the standard solution is to revert to traditional means. Machines are faster and less passionate than us, but when the need arises we must step in and take up the job ourselves. As election law experts put it:

An attempt on election night to manually count and to record votes in multiple races from thousands of ballots could result in substantial human error. A manual recount of machine-counted ballots, however, generally is limited to only one race and takes place in a strictly regulated process designed to ensure that the interests of all candidates are protected and that the most accurate count possible is achieved.¹⁵

¹³ For a history, see Saltman (2006) and Jones and Simons (2012).

¹⁴ Myers (1889), p. 1.

¹⁵ We are quoting from Bickerstaff (2001), p. 443, but similar remarks may be found across the literature, including texts from the heydays of voting machines. See e.g. Zukerman (1925) and Harris (1934), ch. 7 (the same Harris who later patented the Votomatic used in Florida; see below).

To be sure, U.S. state laws do not *require* a manual recount, and indeed Florida's initial statutory recount was done again by machine. But most state laws, including Florida's, *allow* for a manual recount so long as a written request is submitted containing "a statement of the reason the manual recount is being requested" (by a candidate or political party, if not by the voters).¹⁶ It is this right that the Gore team exercised in the four counties of Broward, Miami-Dade, Palm Beach, and Volusia, and in each case the motivation was precisely that meticulous human examination is the best solution. In Gore's own words:

There is a simple reason that Florida law, and the law in many other states, calls for a careful check by real people of the machine results in elections like this one. The reason? Machines can sometimes misread or fail to detect the way ballots are cast. And when there are serious doubts, checking the machine count with a careful hand count is accepted far and wide as the best way to know the true intentions of the voters.¹⁷

Now, normally humans are of course much slower than machines, so these considerations provide an answer also to the second question raised above—why the extended deadline. One might still wonder how exactly the extension was determined, and on what grounds, but never mind; every deadline is bound to be somewhat arbitrary and manual recounts are no exception. The question that really cries for an answer is the third, concerning Palm Beach's failure and Miami-Dade's refusal to *meet* the deadline. What happened?

Here is where nobody, not even the members of the Supreme Court of Florida, could predict the trouble. To see why, we need to look into the details of the ballots used in those counties. Machine-aided voting systems are widespread in the U.S. but, alas, that doesn't mean they are the same everywhere. Authorized systems may vary from state to state and, indeed, from county to county within a state. During the 2000 election, one of Florida's counties (Union) was still using traditional paper ballots; the other counties used machine-aided systems of four main kinds: optical scan with central tabulation (16 counties), optical scan with precinct tabulation (25 counties), punch cards (24 counties), and machine lever (1 county).¹⁸ This variety of systems showed up also in the four counties involved in the manual recount.

¹⁶ See again *The 2000 Florida Statutes*, Title IX, Chapter 102, Section 166(4).

¹⁷ Televised statement aired on the evening of November 15, here quoted as recorded by *The New York Times*, November 16, p. A28. Cf. Bush's response: "That's why my campaign supported the automatic recount of all the votes in Florida. [...] Manual counting, with individuals making subjective decisions about voter intent, introduces human error and politics into the vote-counting process. Each time these voting cards are handled, the potential for errors multiplies. Additional manual counts of votes that have been counted and recounted will make the process less accurate, not more so." (*Ibid.*)

¹⁸ See U.S. Commission on Civil Rights (2001), ch. 8 and Appendix.

Volusia used a precinct-based optical-scan device called “AccuVote”; Broward, Miami-Dade, and Palm Beach employed instead a punch-cards system, the “Votomatic”. The difference between these systems turned out to be crucial.

The AccuVote (based on a 1988 patent)¹⁹ works much like in a standardized test: ballot cards have the candidates’ names preprinted next to an empty oval, each voter records their choice by filling in the relevant oval with a pencil, and the ballot is fed into a high-speed optical reader and tabulating device. (The system is precinct-based in that the machine is programmed to immediately “kick out” ballots that appear to have been voted incorrectly and voters have the opportunity to correct any errors before they leave the precinct.) As it happened, on the night of the election the AccuVote didn’t work so well,²⁰ and further problems showed up the next day.²¹ When it came to the manual recount, however, the process went smoothly. Counters were instructed to examine each ballot for no more than 15 seconds and any ballot where the voter’s intention was clear—and agreed upon by the Republican and Democratic observers—was counted; questionable ballots were turned over to the canvassing board for a final decision.²² A tedious job, but an easy one, like checking old-fashioned paper ballots. No wonder Volusia County managed to complete it by the early deadline of November 14.

With the Votomatic (from a 1965 patent),²³ voters express their preferences by punching a hole in a prescored ballot on which each candidate’s name corresponds to a numbered tab. Candidate names are not printed on the ballot itself, which is a standard-size IBM data processing card, but rather on the pages of the ballot holder, and the hole is punched by pressing a stylus that will remove a tiny rectangular chad. The perforated card is then fed into a computerized tabulating device. This seems like a foolproof system, and in the event of a manual count it might even claim a significant advantage over the AccuVote: in principle, all Votomatic ballots look the same. Whereas filling an oval with a pencil is bound to involve a great deal of variation (partial filling, check signs, X marks, etc.), perforating a card by removing a rectangular chad with a stylus is in principle a uniform and perfectly standardized

¹⁹ See Webb (1988). The AccuVote was originally marketed as the Unisys ES-2000.

²⁰ In Volusia’s 216th precinct, the machine recorded that 412 out of 585 registered residents had voted, but a faulty memory card translated that number into +2,813 votes for Bush and –16,022 for Gore (and an extra +9,888 votes to the Socialist Workers Party candidate, James Harris.) This caused TV networks to momentarily call the election for Bush, but the error was discovered and corrected a few hours later, assigning 22 votes to Bush and 193 to Gore (and 8 to Harris). See van Natta (2000). For a detailed reconstruction and further details, see Harris (2004), ch. 13.

²¹ At 4 p.m. on Wednesday, an election worker discovered that a bag of about 800 ballots was still in the back seat of his car and had not been delivered to county officials (van Natta 2000).

²² This procedure was openly reported in the news. See e.g. Barabak and Finnegan (2000).

²³ See Harris (1965). The apparatus was first used in 1964 (patent pending) in Georgia.

task and tabulating the results should be utterly straightforward, by machine and by hand alike. Unfortunately, this is only true in principle; in practice it's a gamble.

One problem with this system, absent in the AccuVote, is that the matching between a candidate's name and the corresponding tab depends heavily on the design of the pages of the ballot holder, which is another feature that may vary from county to county. In the 2000 election, this turned out to be especially critical. Broward and Miami-Dade used ballot holders where the names were printed on a single page, with arrows pointing to a corresponding slot on the right. The first candidate (Bush) would correspond to the first slot, the second candidate (Gore) to the second slot, etc. Palm Beach used instead a "butterfly" ballot holder with names printed on facing pages and arrows pointing to a slot located on the right if the name appeared on the left page, and on the left if the name appeared on the right page, the slots themselves alternating between left and right candidates. Thus, the first name on the left page (Bush) would again correspond to the first slot, but the second name (Gore) would correspond to the third slot, the second slot being reserved for the first name on the right page (the Reform candidate Pat Buchanan). This generated a great deal of confusion and the Democratic party complained bitterly that the design prevented a proper conversion of vote intentions into counted votes.²⁴ Indeed, it is very likely that many a voter punched the Buchanan hole while intending to vote for Gore, since in Palm Beach Buchanan received almost 20 percent of his total statewide support (about 3,400 votes, i.e., over 2,000 more than anywhere else in Florida, against the 537 votes of Bush's final margin of victory).²⁵

Figure 1. A Broward County ballot (left) and a Palm Beach County "butterfly" ballot (right).

²⁴ The complaint was eventually dismissed in *Fladell v. Palm Beach County Canvassing Board*, 772 So. 2d 1240 (December 1).

²⁵ Buchanan himself immediately acknowledged the anomaly in an interview on NBC: "It's very easy for me to see how someone could have voted for me in the belief they voted for Al Gore" (*The Today Show*, November 9, 2000). For detailed data and analysis, see Brady *et al.* (2001), Wand *et al.* (2001), and Smith (2002). For background information on the butterfly ballot (with an interview to the designer), see Pleasants (2004). For a recent appraisal of the issues, see Chisnell (2016).

Yet the effect of ballot-holder design was only part of the Florida problem. When it came to the manual recount, the members of the canvassing boards of the three counties of Broward, Miami-Dade, and Palm Beach found themselves facing a different and unexpected complication, and this one concerned the ballot themselves. The Votomatic is designed to treat ballots like standard perforated processing cards. But this presupposes that the cards are properly perforated. When people use the Votomatic this is not always the case. The punched ballot may show all sorts of imperfections, beginning with the fact that the chad may not have fallen out as expected. It may still be attached to the card. And it may be attached in many different ways, which is why during the Florida election there was so much talk of “hanging chads”, “swinging chads”, and so on. A computerized tabulation system will handle all such cases some way or other, accepting a vote or rejecting it according to whatever instructions it had been programmed with. But humans do not come with pre-programmed instructions. Given any ballot, a human observer must decide whether it should be treated as valid, and if the ballots are many, if they are thousands and thousands, this task can turn into a hugely demanding, enervating, frustrating challenge. The images of Judge Robert Rosenberg struggling with the Broward County ballots, which filled the first pages of all newspapers for days, are perhaps the most emblematic testament to the nightmare this must have been for Florida’s canvassing officials when the manual recounts began. No wonder the Votomatic counties needed an extension beyond the original deadline of November 14. Humans are slower than machines, but they are also less prepared to let things go. On what grounds, exactly, should a canvasser determine whether a defective ballot contains a valid vote for a candidate? What criteria should guide the decision?

Figure 2. Judge Robert Rosenberg, of the Broward County canvassing board, struggling with disputed Votomatic ballots in Fort Lauderdale.

The reason why two out of those three counties failed to meet the extended deadline of November 26 lies in the difficulties raised by these questions. And as it turned out, the source of those difficulties was even more difficult to pin down than

the criteria one needed to overcome them. For, on closer look, the problem were not the ballots as such. The problem lied elsewhere, and it soon became clear that it lied where no one had the sort of expertise that might have helped. Around November 22, a canvassing board official (probably Rosenberg himself, though it might also have been Judge Charles Burton of Palm Beach County, we do not recall exactly²⁶) was interviewed on a TV news program. “Why is the manual recount taking so long?”, asked the reporter. “The whole world is waiting, what is the problem?” The canvassing official raised his arms in frustration: “Tell the world that no one here is a hole expert. That is the problem.”

Experts Wanted

Of course, when it comes to holes the real experts are Argle and Bargle, the two characters of David and Stephanie Lewis’s dialogue with that title.²⁷ It is a masterpiece of philosophical acumen and was originally published in 1970; the Florida canvassers had had plenty of time to read it and digest it, and they would have learned a lot. Nevertheless, there is an important sense in which *that* sort of expertise would have been of little help. The Ludovician theory of holes—as put forward through Argle’s pronouncements—is a deflationary theory. It states that holes are material objects. That is not just a way of saying that every hole is always *filled* with matter (air, ballot paper, silver amalgam, luminiferous ether, or whatever it may be). Argle is a nominalist materialist, but even a materialist recognizes that there might be empty holes. So how can something utterly devoid of matter be a material object? Answer:

The lining of a hole, you agree, is a material object. For every hole there is a hole-lining; for every hole-lining there is a hole. I say the hole-lining *is* the hole.²⁸

This may be a good theory of *what* holes are.²⁹ But as a theory of hole individuation—a theory that would help us determine whether something is a hole and, therefore, when something can be said to have a hole—it is altogether useless. The Ludovician theory presupposes that we know *already* how to determine such facts;

²⁶ We distinctly remember watching the event on television, though at this time we are unable to track down any recordings or transcripts of the interview.

²⁷ See Lewis and Lewis (1970). This is arguably the first scholarly work to take holes as a subject worthy of serious inquiry and theorization of its own, though one could make an exception for the short “socio-psychological” treatise of Tucholsky (1931) (published under the pseudonym of Peter Panter). We shall return to Tucholsky below.

²⁸ Lewis and Lewis (1970), p. 207.

²⁹ For the record, we offered some criticisms in Casati and Varzi (1994), ch. 3, returning to the topic in Casati and Varzi (2004).

it just tells us that, whenever we think there is a hole, the hole is not what we think it is (and where we think it is). In other words, the theory is ontologically and conceptually parasitic. It states that holes are hole-linings, but it doesn't provide any independent criteria for identifying hole-linings. It says that holes supervene on the arrangement of matter,³⁰ but it doesn't tell us how a certain portion of matter should be arranged in order for it to count as the appropriate supervenience basis. For all its metaphysical elegance, a canvasser using Argle's theory to manually examine the perforated ballots of the Votomatic would have been stuck in a circle.

What sort of "hole expertise" was needed in Florida? The recount official didn't say, but it's clear that the problem was really one of hole individuation, if not hole definition. Several legal and political commentators stressed this point in the days and weeks that followed. Pasquale Pasquino, for instance, put it thus:

If all goes well, a little square of paper (called a "chad") completely detaches from the rest of the ballot, resulting in a hole that the optical scanning machine counts as a vote. But it is possible that the voter, unskilled in the use of the stylus, inadvertently detaches three, or two, or just one side of the chad. The machine interprets some of these as holes and others not. How do those who recount the ballots, applying Florida law, define a "hole"? Is there a standard, unambiguous, universally accepted definition of what kind of a hole, or vote, is valid in the specific case for every canvassing board charged with the manual recount? And if there is not, and equal holes may be counted differently or different holes may be counted equally, would this be a violation of the principle of equality, understood as granting each citizen an equal vote?³¹

Reference to the principle of equality is important here. The reason why permission to proceed with the manual recounts in Broward, Miami-Dade, and Palm Beach was still pending on November 14 is precisely that Bush's lawyers' had sued for a preliminary injunction on the grounds that similarly punched ballots could be tabulated differently in the three counties, owing to the fact that Florida had no statutory standards for hand-counting votes. The Court of the Southern District of Florida eventually denied the request. According to the district judge, the inherent decentralization involved in state electoral and recount procedures was not "a sign of weakness or constitutional injury" but, rather, "one of the strengths" of the U.S. Constitution's method for selection of the President.³² Later on, however, the U.S. Supreme Court reached exactly the opposite conclusion. The 5 to 4 decision that put a halt to all recounts on December 12, effectively confirming Bush's victory by the 537-vote margin, was based on the assertion that the Florida Court had failed

³⁰ This is the language used in Lewis and Lewis (1996).

³¹ Pasquino (2002), p. 324.

³² See *Siegel v. LePore*, 120 F. Supp. 2d 1041 (December 6).

to provide “a constitutional standard for counting votes”.³³ We leave it to political theorists to determine who was in the right, the district judge or the Supreme Court. What is clear is that in order for the principle of equality to be safe, the standards for hand-counting votes cannot be left in the vague. Whether enforced state-wise or left up to each county, some standards must be clearly defined. And in the case of punch-card ballots, each definition must refer, directly or indirectly, to some criteria for identifying and counting the holes (or hole-linings) in the ballots themselves. It is these criteria that the recount officials were lacking.

Holes and Chads

In the passage quoted above, Pasquino refers to the fact that an unskilled voter may fail to fully detach the chad corresponding to the chosen candidate; the chad may remain attached to the card by one or more sides. It is important that Pasquino did not say the unskilled voter may fail to fully punch a hole; that would have been question-begging. But what is the relationship?

The basic intuition is clear enough. The holes in the ballots are meant to express the voters’ preferences. Now, either holes *are* hole-linings, as Argle would have it, or else they *come with* a hole-lining, which is to say some surrounding matter, a material host. Either way, a hole is always a hole *in* something: as a *part* (Argle) or as a disjoint, immaterial *guest*. As Kurt Tucholsky once put it:

The hole is a permanent companion of the non-hole [...] there is no such thing as a hole by itself.³⁴

In particular, there is no way of *making* a hole by itself; one always makes a hole by acting on something else. And in the case at issue, the something else is the ballot; to see whether and how a voter punched a hole, we have to look at the ballot and see what happened to it. This is where chads enter the picture.

In the ideal case, the ballot will have an easily detectable hole in the sense intended by the Votomatic designers: a little chad fell off. If that were the only legitimate case, hand counting would be an easy job: the valid votes would correspond to all and only those ballots where a chad has been completely removed. Indeed, under such ideal conditions, the canvassers might even consider an alternative: rather than counting ballots with missing chads, count the chads directly. After all, there is a one-one correspondence between those ballots and the chads that fell

³³ *Bush v. Gore*, 531 U.S. 98.

³⁴ Tucholsky (1931), p. 123. This is also the starting point of our account in Casati and Varzi (1994), where holes are characterized as ontologically dependent (or “parasitic”) immaterial entities in the sense just mentioned.

to the ground. Provided we know how to match the chads with the candidates (all chads had a number printed on their back), the two procedures would return the same results. However, no one would accept the ideal case as the only criterion for validity. A partially attached chad may still be evidence of a voter's intention, so that criterion would be too strict. This is not just a philosophical intuition; it's the law, in Florida as elsewhere. (Already in 1981, an Indiana case determined that ballots with partially attached chads should be counted insofar as "the intention of the voter could clearly be discerned".³⁵) Besides, that is not how the initial machine count works. The Votomatic uses an optical-reading device; so long as its laser "eye" can see through a hole in the ballot, the vote is registered as valid, and this may happen even if the chad is still partially attached. The reason this automated procedure may not be fully reliable is that, in such cases, a lot depends on how the chad hangs; it may let the light through or it may accidentally obstruct the hole. The human eye can "see" better, and that is why a manual recount should in principle reduce the margin of error.³⁶ But the rules of the game should be the same. Thus, all things considered, counting the chads on the floor would not do; it really is the ballots that must be examined.³⁷ Vote counting requires hole individuation, and hole individuation depends on the range of admissible chad-ballot relationships.

As the pressure for clear standards grew, the Florida canvassers elaborated a number of distinctions that went exactly in this direction. We briefly mentioned them earlier, but it's worth being precise. Beside the ideal case of a clean punch, where the chad is completely dislodged from the ballot, five configurations of imperfect chads were distinguished:³⁸

- *Hanging chad*: attached to the ballot by only one corner.
- *Swinging chad*: attached to the ballot by two corners.
- *Tri-chad*: attached to the ballot by three corners.
- *Dimpled chad*: attached to the ballot by all four corners, but somewhat bulging, indented, or otherwise marked.
- *Pierced chad*: attached to the ballot by all four corners, but pierced with a hole.

(Dimpled and pierced chads were sometimes lumped together as *pregnant* chads.) The question then became whether ballots featuring any of these configurations

³⁵ *Wright v. Gettinger*, 428 N.E. 2d (Ind. 1981), 1225. Even Texas, where Bush was governor, had a law to this effect (*State Election Code* of 1993, Title VIII, Chapter 127, Section 130(d)(3)).

³⁶ Another problem with the Votomatic machines used in Florida (stressed by Gore's lawyers) is that even a perfectly punched ballot might be rejected because a loose chad from *another* ballot blocked the hole. See Dershowitz (2001), pp. 26 and 34.

³⁷ Interestingly, as Safire (2000) notes, initially "chad" was not even a count noun, like "chaff".

³⁸ Terminology may vary slightly; here we follow Posner (2001), p. xv.

should be treated as expressing a valid vote despite their failure to comply with the voting instructions. It is in this regard that the three counties involved in the manual recount acted autonomously.³⁹ Nevertheless, it is fair to say that they all followed, if not a common official standard, at least the same approach. And the approach was to pay great attention to the distinctions listed above insofar as they would provide the best information for analyzing and classifying controversial ballots on objective grounds. Unfortunately, this sort of “chadology” (as some election officials started calling it⁴⁰) is full of traps and may create more troubles than solutions.

One general problem is the apparent arbitrariness of any way of discriminating valid from invalid ballots in terms of the number of corners by which the chad is attached. During the manual recount in Florida, there was a remarkable convergence of viewpoints among the counting teams of Broward, Miami-Dade, and Palm Beach. By November 21 (the day when the deadline was extended), all teams were following roughly the same protocol, considering as automatically valid all ballots where the chads had at least two corners poked out (i.e., hanging or swinging chads, collected under the rubric of *dangling* chads) and passing any other ballot to the relevant canvassing boards for further review.⁴¹ Why so? Why draw the line at two corners rather than three, or just one? If the idea is that a dangling chad is good enough evidence of a voter’s intention, then any other chad with clear signs of the action of the stylus should be treated equally, including tri-chads and pregnant chads. If the thought is that a voter succeeded in expressing a vote so long as the ballot was perforated, then any chad should be treated equally except for dimpled ones (but including pierced chads). As “objective” evidence, any other criterion would seem utterly arbitrary.

To put it differently, the “objective” evidence offered by a ballot may be *morphological* or it may be *topological*. In the first case, any pronounced modification of the *shape* of the ballot would count, covering all five types of defective chads in addition to fully detached ones. In the second case, what matters is rather the topological *genus* of the ballot and any modification thereof would count, ruling

³⁹ The voting instructions, too, were heterogeneous. For instance, in Palm Beach they read: “After voting, check your ballot card to be sure your voting sections are clearly and cleanly punched and there are no chips left hanging on the back of the card”. In Broward, the instructions read: “To vote, hold the stylus vertically; punch the stylus straight down through the ballot card for the candidates or issues of your choice”. (From *Touchston v. McDermott*, 234 F.3d 1133, note 19.)

⁴⁰ See e.g. Dugger (2000), Brown (2000), and Whitman (2000). The term never made it to the OED, though it was not a neologism and had been used before; see Dugger (1988), p. 54.

⁴¹ Before that date, the guidelines varied. For instance, Palm Beach initially counted all votes where any corner of a chad was punched, whereas Broward originally said its board would not even *consider* votes with anything less than two corners of the chad detached. See e.g. Gold (2000) and Whitman (2003), pp. 75ff.

out only dimpled chads.⁴² Both criteria seem reasonable, and correspond to two different ways of fixing the meaning of ‘hole’.⁴³ It may still be hard to decide between them. But at least the opposition is absolute, whereas any intermediate opposition is up for grabs. Indeed, insofar as the optical-reading device of the Votomatic uses a light beam to check for valid ballots, the topological criterion would seem more appropriate in this context. The morphological criterion is inherently vague and for that reason it would be fair to defer the analysis of dimpled chads (but only those) to the canvassing board.

Moreover, it’s worth noting that all intermediate solutions are dangerously fragile also on the practical side. During a manual recount, the mere handling by an election official may alter the condition of a ballot. A swinging chad may accidentally turn into a hanging chad and, more importantly, a tri-chad may accidentally turn into a swinging chad (hence into a valid vote according to the Florida guidelines). Cases of this sort may be rare, but they are documented and, indeed, in other circumstances they caused trouble. Five years after the Florida events, for instance, during the election for the fourth council seat in the city of Pepper Pike, Ohio, a sequence of counts and recounts resulted in one candidate winning by a single vote. The opponent sued the county’s Board of Elections precisely on the grounds that the status of one ballot was altered during the manual recount.⁴⁴ That such cases may be rare means nothing. Winning an American presidential election by 537 votes is itself an awfully rare event.

So much for the arbitrariness problem. There is, in addition, a second set of problems with the sort of chadology used in Florida, and these problems arise regardless, i.e., even if we go along with the Florida canvassers’ decision to privilege some chad patterns over others. For that decision is based on a certain taxonomy of relevant cases. Yet whence the taxonomy? Surely there is a difference between a clean punch and a hanging chad, and between a hanging chad and a swinging chad, a tri-chad, a dimpled chad, or a pierced chad. But that is Chadology 101. When the election of a U.S. President is at stake, we better make sure we considered all the options thoroughly. Let’s not forget: vote counting requires hole individuation, and hole individuation depends on the range of admissible chad-ballot relationships. It is absolutely crucial that we identify that range to begin with, and that we do so in a language that is up to the task.

⁴² Counting only ballots with a clean punch would also reflect a topological criterion. We start with *one* thing, a whole ballot, and we end with *two* things, a (perforated) ballot and a separate chad.

⁴³ On this we refer to Casati and Varzi (1994), ch. 4: “Hollows, tunnels, cavities, and more”.

⁴⁴ See *Taft v. Cuyahoga Board of Elections*, 854 N.E. 2d 472 (Ohio 2006). For the record, the court ruled in favor of the appellee. This resulted in a perfect tie and the board was enjoined to decide the winner by lot. For a detailed discussion of this and other ticklish cases, see Weinberg (2006).

Chadology Unveiled

Here is one sense in which the basic taxonomy used by the Florida canvassers was defective. The taxonomy classifies chads in terms of the number of *corners* by which the are attached to the ballot. Yet a chad may also be attached to the ballot by one or more *sides*. It may be thought that the two criteria are equivalent. The passage by Pasquino quoted earlier, for instance, has “sides” instead of “corners”, but without any suggestion that the shift is significant. In fact it is, and in several important ways.

To see this, consider the patterns in figure 3. It is natural to think that these patterns, ordered by decreasing number of connecting corners, provide an adequate representation of the different types of chads described by the Florida canvassers, with just a few additional variations of the leftmost pattern to distinguish virgin, untouched chads from pregnant ones. (Let us ignore those variations for the moment.) Indeed, it is safe to assume that these patterns are exactly the ones the canvassers had in mind, for diagrams of this sort, modulo graphic differences, filled the news throughout the days of the Florida manual recount.

Figure 3. The standard way of distinguishing chads based on the number of corners by which they are attached to the ballot (the white background). From left to right: a solid chad, possibly pregnant; a tri-chad; a swinging chad; a hanging chad; and a fully detached, dislodged chad—a clean punch.

On closer inspection, however, this diagram is far from complete. That is, if all that matters is the number of attached corners, then many other patterns are in principle possible and should be properly recognized.

To begin with, the following patterns (figure 4) fit the canvassers’ taxonomy just as well. Here the sequence is again ordered by decreasing number of connecting corners; yet each case corresponds to a chad that is (partly) attached to the ballot along each of its four sides. With regard to the first two patterns of figure 3, this additional feature doesn’t make a difference; in the other three cases it does.

Figure 4. An alternative model of the basic taxonomy: regardless of the number of attached corners, each chad is always (partly) attached to the ballot along each of its four sides.

Note that the difference is not immaterial. On the corner-based definition, the middle chad would be classified as swinging, yet clearly the chad is now more firmly attached to the ballot than the ordinary swinging chad of figure 3. Similarly, the fourth pattern would be classified as a hanging chad even though it is attached just as firmly. And the last case is even more disturbing. The chad is not attached by any corner, yet it obviously violates the idea of a clean punch; far from being fully dislodged, the chad is once again firmly attached to the ballot on each side. Granted, each of these three cases is not likely to occur. Nallot chads are relatively thick, given their tiny size (about 1/8 inch long), and voters are supposed to press the stylus just once. But then, again, who are we to say? Some Votomatic-like systems might use ballots made of thinner paper, or ballots with larger chads, or a stylus that works differently. Some voters may have a hard time with the machinery, fiddling with the stylus and punching two, three, even four times into the same slot in an effort to make sure their vote is properly recorded. The likelihood of the patterns is not the issue; it is their possibility that matters when it comes to figuring out the range of admissible chad-ballot relationships, and the patterns in figure 4 are just as possible as the familiar patterns in figure 3.

There is another important sense in which the two sequences come apart. In figure 3, each pattern besides the first corresponds to a chad that leaves a hole in the ballot—one hole. In figure 4, the number of holes increases inversely with the number of attached corners: from zero holes in the leftmost case, where the chad is attached by all four corners, to four holes in the rightmost pattern, where the number of attached corners is down to zero. This calls for careful assessment. If we adopted a purely topological criterion, as with the optical-reading device of the Votomatic, only the tri-chad corresponding to the second pattern would be registered as a valid vote. The first pattern would be rejected as an undervote and the others as overvotes, since the number of holes is greater than one. Yet there is a clear sense in which this would be a misinterpretation of the data. The several holes may be the result of a voter's fiddling with the stylus in an attempt to cast a single vote.

Perhaps this is a further sign that topological criteria are exceedingly strict, as with dimpled chads. But we may also describe the situation as one in which topological criteria must be supplemented by mereological considerations. The two openings left by the middle chad need not amount to two distinct holes; they may be seen as two disjoint parts of the same, larger hole—a *split* hole. Ditto for the three holes of the fourth chad and the four holes of the fifth chad.⁴⁵ Alternatively, we could describe the situation by saying that in those cases we are dealing with holes that are somewhat *incomplete*. After all, improper ballots are an unfinished

⁴⁵ On the mereology of holes, see Casati and Varzi (1994), ch. 7, and Varzi (1996).

job and the whole point of a manual recount is to try and reconstruct the voter's intentions. The standard sequence of figure 3 captures the fact that the job may be unfinished insofar as the chad is not fully detached *from* the ballot; the alternative sequence of figure 4 shows the job may be unfinished also insofar as the hole *in* the ballot, which is the target of the vote-punching operation, may not be fully formed. These are subtle considerations. But both ways of describing the situation—split holes or incomplete holes—would provide further support to the idea that the human eye (and mind) can see better than the dull laser eye of the Votomatic. And if things are so, then restricting a manual recount to the undervotes is a mistake. The ballots classified as overvotes are worth reviewing just as well.⁴⁶

Chadology Unleashed

All of this is just the beginning. Obviously there are also variants of the sequence in figure 4 where the punched chads are attached to the ballot along only three sides, or along two sides, etc. In particular, the sequence in figure 5 below corresponds to the five cases where the chad is attached along no sides at all (at least, along no separate portions of their sides besides the bits around the corners, since physically speaking a corner connecting two pieces of paper cannot be identified with an unextended point). Again, two of the patterns—in this case, the last two—coincide with the corresponding patterns of figure 3, but the other patterns are genuinely different. And again, the difference shows up in the number of openings involved in the new patterns, which in this case is directly proportional to the number of corners by which the chad is attached to the ballot (save for the last case, where the chad goes and the hole takes over).

Figure 5. Another non-standard model of the basic taxonomy: regardless of the number of attached corners, each chad has no further points of contact with the ballot along any of its sides.

Note that, as with figure 4, the new patterns are hard to squeeze into the standard categories. The middle pattern, where the chad is attached by two corners, would technically be classified as a swinging chad; yet there is no genuine “swinging” when the corners are diagonally opposite. And the first pattern, where the chad is attached by all four corners, does not quite fit the category of a “pregnant” chad.

⁴⁶ This was one moral of Casati and Varzi (2004), though not so explicit.

It clearly is not a dimpled chad, since the topology has been altered; this is not just a chad with an indentation. But neither does it count as a pierced chad in the intended sense: a pierced chad should be perforated somewhere in the middle, not *surrounded* by perforations. Ditto for the second pattern, which appears to go beyond the intended case of a “tri-chad”. All these deviations are once again illustrative of the limits of the intuitive language employed in defining the basic taxonomy, particularly of the ambiguities lurking behind a set of distinctions that is purely corner-based. As standardly formulated, the basic taxonomy is plagued by unintended (perhaps unexpected) models.

Indeed, we see here that the openings themselves call for further distinctions. An opening in the ballot can be a hole properly called, though possibly incomplete or included as a proper part in a larger hole, as in the patterns of figures 3 and 4. But it can also be just the *beginning* of a hole: a mere cut in the ballot, a “slit”. And in the first pattern of figure 5 we have a ballot with no less than *four* slits, four distinct signs that the voter intended to punch a hole right there. Topologically the difference between holes and slits is just one of degree; in both cases, the genus of the ballot has been altered. We may say that, in a ballot, a hole properly called arises when two or more slits join at a corner, and the ideal case of a clean punch corresponds to the limit case where a series of four pairwise conjoined slits forms a closed loop: the cutting process results in a chad being completely separated from the rest of the ballot. But the difference between a closed loop and a partial succession of slits, or a mere bunch of disjoint slits as in the first pattern of figure 5, is not one of degree. It is again a sharp topological distinction. It is the distinction between those cases where no continuous path connects the chad to the rest of the ballot and those cases where, by contrast, a continuous path exists, just as the topological distinction between a ballot with an opening and a ballot without depends on whether no continuous path around the chad can be shrunk into a point inside the chad. Earlier we said the topological criterion of ballot validity matches the criterion implemented by the Votomatic, with its optical-reading device. Now see now that the picture is more complex. There is the topology of the punched ballot, but there is also the topology of the punch itself.

Moreover, the whole picture dualizes. Just as figure 4 features a sequence in which each chad, while ordered by decreasing number of connecting corners, is still attached to the ballot along each of its four sides, we may consider a sequence in which each chad is ordered by decreasing number of connecting sides but is attached to the ballot along each of its four corners. And just as there are variants of figure 4 where the chads are attached to the ballot along fewer than four sides, including the limit case of zero sides depicted in figure 5, we may consider variants where the chads are attached to the ballot along fewer than four corners, including

the limit case where the number of attached corners is zero. In the first case, any opening in the ballot will be a separate slit and their number will increase inversely with the number of attached sides; in the second, the openings will be proper holes and the two numbers will decrease together. These two sequences are depicted in figure 6, top and bottom, respectively.

Figure 6. Further non-standard models. Both sequences are ordered by decreasing number of connecting sides. In the top sequence, the chads are attached to the ballot by each of their corners; in the bottom sequence, they are attached by none of their corners.

Further variations are possible. For instance, there are patterns that differ with respect to the number of attached corners or sides while the number of openings (including slits) is fixed. In figure 7 below, for instance, the openings are always two. In sequence at the top, the patterns are ordered by decreasing number of attached corners (and the number of connecting sides first decreases and then increases again); in the bottom sequence, the patterns are ordered instead by decreasing number of connecting sides (and, correspondingly, the number of attached corners is first decreasing and then increasing).

Figure 7. Non-standard models with two openings, ordered by decreasing number of connecting corners (top) or sides (bottom).

And did we forget what might happen to the chad itself? So far, all patterns differ with respect to the many ways a chad may be connected to the ballot, but the chad itself is always in perfect conditions. This is a simplification. All sorts of

things can happen to a chad as a result of improper punching. The category of a pierced chad recognized by the Florida officials is a case in point: the chad may be punctured in the middle. This is a particularly interesting case, showing that occasionally a ballot can feature a voting hole even if the chad remains fully attached at every corner and along each side. However that is not the only case where a chad may suffer significant structural damage or deformation during the punching process. There are many others, some of which are illustrated in figure 8.

Figure 8. Various ways in which the internal structure of a chad can be damaged by improper punching, generating an opening in the ballot.

We leave it to the reader, at this point, to continue the job. There is still a large variety of additional patterns one may in principle distinguish, but there is no need to engage any further with this sort of conceptual combinatorics. What matters is that the combinatorics turns out to be far more complex than the basic taxonomy envisaged by the Florida canvassers and widely endorsed by legal and political commentators alike. And the bottom line is clear enough. Pasquino said the principle of equality would be at risk if equal holes are counted differently, or different holes counted equally. Now we see that the worry bites deeper. A lot of work appears to be necessary before we can even *start* making comparisons. We want to count *the* holes, but to that end we first need to figure out *which* holes truly count. For Argle, a hole is just a hole-lining, and that takes us nowhere. For most of us, every hole *has* a hole-lining, and while the latter is an ordinary chunk of matter, the hole itself is a chunk of nothing and we feel at loss. We look for help from the ballots. We focus on the chads. Surely enough, a bit of chadology should come in handy. Alas, even that bit turns out to be a nightmare.

Seeing the Light

With all this, we are not suggesting that more advanced taxonomies of the sort outlined above would have helped our canvassers to the point that Miami-Dade County and Palm Beach County would have made the November 26 deadline for the manual recount. On the contrary, if there is a lesson to be drawn, it goes in the opposite direction: it is precisely because the business of “chadology” turns out to be so complex that the canvassing boards of Miami-Dade and Palm Beach ran into insurmountable difficulties. The boards were meant to examine all those ballots that

would not qualify as clearly acceptable under the (arbitrary) criterion that would select only dangling chads. For all its *prima facie* objective precision, evidently that criterion turned out to be less straightforward than it was thought, with the result that many more ballots than expected had to be passed over to the canvassing boards for further inspection. And for all their good will, the members of the canvassing boards found themselves dealing with a variety of cases which, albeit narrower than the rich but abstract typology we have sketched, could hardly be mastered. Congratulations to the board of third county, Broward, which managed to complete the job nonetheless.

Would it have been easier if the recanvassers adopted a purely topological criterion instead? We said more than once that this would have matched the light-beam method implemented by the Votomatic, and indeed Palm Beach County considered it for a while. They called it the “sunlight” (or “sunshine”) test.⁴⁷ Hold up the ballot in front of you and check whether it lets some light go through. Never mind whether a chad is still partially attached. Never mind whether it’s a slit, an incomplete hole, a scattered mix of hole parts, a piercing—the mereology of the opening or the topology of the chad itself. If you see some light, even a sliver of light, the vote is valid and move on. And since you are doing this by hand, chances are that your verdict will be more accurate than the machine’s; you can hold the ballot at different angles to make sure the light is not accidentally blocked owing to the way a chad is still attached. Isn’t this the sort of improvement we expect from a *manual* recount? And wouldn’t that have been much simpler to implement than checking every corner, every side, every opening, every tear in the ballots?

Apparently Palm Beach County thought otherwise. After just a few days, the sunlight test was abandoned on the grounds that “even if one corner was punched, sometimes the sun wouldn’t shine through”.⁴⁸ Fair enough. But that is a practical issue, and it points to the practical limits of the test itself, not the inadequacy of the topological criterion it is meant to capture. The inadequacy of chadology is truly conceptual. Indeed, we may say it is ontological. It yields no definite answer to the fundamental question every vote counting is supposed to answer as we examine each ballot: *is there* a valid vote in it? Ontologically, the topological criterion is fully informative. It answers that question by answering the related question, *is there a hole* in this ballot? (At least, it answers the latter question on the understanding

⁴⁷ As reported e.g. in van Natta and Bragg (2000).

⁴⁸ As reported by the Associated Press on November 12 (Meadows 2000). This move was highly criticized by the Republicans, though not for the reasons we are discussing. Bush’s team complained that it meant changing the recount standards *in media res*, casting doubts on the whole manual recount business. This is why permission to proceed with the recount in Palm Beach was put on hold until November 16. For details, see again Greene (2001), ch. 3 as well as Zelnick (2001).

that a hole introduces a change in the genus of the ballot, an opening of some sort; the morphological criterion would be more inclusive but, as we said, it is inherently vague.⁴⁹) In a punch-card voting system, that would seem just right, so much so that when the Florida canvassing official mentioned earlier made his TV confession, he lamented the absence of a hole expert, not an expert chadologist. When the next morning CNN reached out to one of us (“We understand you are a hole expert...”), national news correspondent Jeanne Moos showed up with a basket of donuts. And when the interview was aired a couple of evenings later, on prime-time national television, she proudly explained that the troubles of the manual recount could be appreciated by performing the sunlight test on a slice of Swiss cheese.

Figure 9. Left: Judge Charles Burton, chairman of the Palm Beach County canvassing board, submits a ballot to the “sunlight test” at the Emergency Operations Center. Right: National news correspondent Jeanne Moos does the same with a slice of Swiss cheese on CNN, November 23, 2000.

Be that as it may, the fact remains that the manual recount in Florida was a truly peculiar flop. It wasn’t just a sign that the human eye, while sharper than a machine’s, can be struck and even overwhelmed by the myriad of minute variations that actual electoral ballots may display. That happens all the times. It’s the cost of stepping into that grey area of uncertainty we call the “margin of error” zone. The Florida flop was a sign of our inability to deal with variations that involve genuine *ontological* conundrums. We are supposed to count, but the very nature of the

⁴⁹ Another problem with the morphological criterion is that dimpled chads provide much less reliable evidence of a voter’s intents, especially when there are good reasons to think the voter may have been confused by the voting procedure. This was noted already in the 1990 *Guidelines on Ballots with Chads Not Completely Removed*, written by Palm Beach County Supervisor of Elections Theresa LePore (the designer of the confusing butterfly ballot holder), where dimpled chads are ruled out as inscrutable insofar as the indentation “may result from a voter placing a stylus in the position, but not punching through” (cited in Whitman 2001, p. 75).

things to be counted defies us. What's worse, in this case it defies us because of its uncanny mix of uncanny elements. The task of counting votes expressed by punching holes takes us straight to the "twilight zone" where each variation hangs suspended between matter and void, between presence and absence, nay, let's say it, between being and non-being. Even Bargle would agree with Tucholsky:

A hole is where something isn't.⁵⁰

Take it chadologically or topologically, or even morphologically, this is the fundamental law of the twilight zone. And the Florida officials didn't quite know what to make of it.

Regrets

We know how it all ended. And we know what happened to the Votomatic. In the aftermath of the presidential election, public outcry, policymakers, and associations from around the country demanded substantive reforms in election procedure. Within a few months, on May 9, 2001, Governor Jeb Bush was already signing into law a lengthy Florida Election Reform Act that included the removal of "apparatus in which ballots are inserted and used in connection with a marking device for the piercing of ballots by the voter" from the list of acceptable voting devices,⁵¹ moving statewide to electronic and optical scan. Soon afterwards, the U.S. House and Senate followed suit, passing by overwhelming majorities a Help America Vote Act that included nationwide measures "to replace punch-card voting systems [...] with a voting system [...] that does not use punch cards".⁵² And on October 29, 2002, the federal Act was signed into law by the President of the United States, George W. Bush.⁵³ Thirty-eight years since its first use in 1964, the public life of the most popular and widely used voting system in the United States came to an end.⁵⁴

Politically, this may well be a step ahead. Of course, no reform is perfect. Close electoral races are bound to happen from time to time and no voting system is faultless. The reader may wish to revisit the many controversial cases that affected U.S. politics even after the 2002 ban of the Votomatic, such as the 2004 Washington

⁵⁰ Tucholsky (1931), p. 123, which Lewis and Lewis (1996), p. 77, evoke sympathetically.

⁵¹ *Florida Laws*, Section 15, ch. 2001-40, codified at *The 2001 Florida Statutes*, Title IX, Chapter 101, Section 5603(8).

⁵² H.R. 3295, Title I, Section 102(a). The Act was originally passed in slightly different versions by the House on December 12, 2001 and by the Senate on April 11, 2002, then reconciled on October 8, 2002 and passed without amendment by both (357-48 and 92-2, respectively).

⁵³ *Public Law* 107-252, 116 Stat. 1666, codified at 42 U.S.C. 15301 to 15545.

⁵⁴ At least as a matter of general policy. Some counties continued to use punch-card systems for a while, occasionally running into new troubles. See again the case mentioned in note 44.

gubernatorial election (count, recount, overturning recount, belated concession), the 2006 House Democratic Primary in Alaska, District 37 (count, recount, wrangling over five disputed ballots, coin toss), the 2008 senate race in Minnesota (count, reversing recount, wrangling and court cases for 238 days), etc.⁵⁵ When it comes to counting votes, we may always be left wondering, does my vote really count?⁵⁶ But even so, getting rid of a counting method that proved disastrous is the least we can do.

Philosophically, however, the end of the Votomatic is a lost opportunity. Let's face it, we finally found ourselves face to face with an important truth. So much in our lives and decisions depends, not only on what there is, but also on what there isn't. Philosophers have been saying this occasionally, though with Being and Non-being so shamelessly capitalized that we may have thought they were joking. Holes are perfectly lower-case. The intrusion of those little chunks of nothingness into our vote-counting practices, their unfathomable presence by way of absence, even partial absence, should have made us realize it isn't a joke at all. No less than the presidency of the United States depended on them. The image of Judge Burton engaging in the sunlight test, not to mention the many photos testifying to judge Rosenberg's painstaking devotion to examining each ballot in minuscule detail, should have gotten us excited. "Is that really a hole?" "Is it perhaps a half hole, or is every hole a whole hole?" "Let's distinguish two cases: there's the hole of the chad, and there's the hole in the chad." "Let's distinguish two questions. There's the General Hole Question, which asks, what is a hole? And there's the Special Hole Question, which asks, under what conditions does something have a hole?" ... So much bread for our philosophical teeth! So much *thaumazein*!

Luckily the end of the Votomatic doesn't mean the wonder is gone. And, luckily, a good number of Votomatic booths survive, if only in museums and art exhibits, to keep the wonder alive. Already on November 7, 2001, one year after the election, the Smithsonian's National Museum of American History acquired a piece from Palm Beach for its Presidential Collections. And by November 2004, no less than forty-seven pieces made their way from a Florida flea market to the "Voting Booth Project" hosted by the Parsons School of Design in New York, revisited by prominent artists and designers. Aptly enough, Christo was among them and did his thing: "That machine had a problem in the 2000 election; I wrapped it and put the seal on it, so that no one can use it any more".⁵⁷ Even so, the machine was there and everybody wondered. What was the problem, exactly?

⁵⁵ On the significance of these and other cases, see e.g. Kropf and Kimball (2011).

⁵⁶ Elsewhere we put it in terms of *bona fide* "electoral uncertainty" (Casati and Varzi 2014).

⁵⁷ Cited in Blair (2004).

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