



A Heartland Policy Study

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PARTISAN GERRYMANDERING: HARMS AND A NEW SOLUTION

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With decennial census-taking behind us, reapportionment (redistricting) is taking its turn as topic of the hour in state legislatures nationwide. Taking into account population shifts accumulated over the past ten years, state legislatures will draw new legislative district boundaries to conform to the constitutional mandate that districts have equal populations.

Redistricting, at least as it is practiced today, inevitably involves gerrymandering. Broadly defined, "gerrymandering" refers to any manipulation of district lines for partisan purposes. <1> The term is derived from the name of former Massachusetts governor Elbridge Gerry, whose party in 1812 was responsible for the salamander-shaped district depicted on the following page.

There are different varieties of gerrymandering, including racial gerrymandering, <2> remedial racial gerrymandering, <3> collusive bipartisan gerrymandering, <4> and probably others. But the most common kind, the subject of this paper, is gerrymandering undertaken by the political party in control of a state legislature in order to help itself and injure its competitor.

The techniques for gerrymandering are conceptually simple. In single-member district elections, only one legislator can win in a district. Any support beyond 50 percent-plus-one is therefore superfluous, or, from the party's point of view, "wasted." The partisan map-maker seeks to draw lines that concentrate the opposition's electoral support in just a few districts (called "packing" or "stacking"), while at the same time creating many more districts where his own party commands a small, but still safe, majority ("cracking"). <5>

FIGURE 1

THE "GERRYMANDER" THAT STARTED IT ALL



The net result is that the opposition party's votes are squandered by being thrown into carefully constructed landslides. The gerrymandering party thus can win more seats in proportion to its overall electoral support than it would if the district lines were drawn by someone oblivious to partisan considerations.

The problem of gerrymandering can be stated so luridly that it cannot possibly be ignored. Imagine a state whose voters were evenly divided between the two major parties. <6> Given perfect information about voting habits, provided that districts were required to have equal populations and comprise contiguous territories, and assuming no constraints whatsoever on gerrymandering, a party in control of districting could at least in theory construct a majority in every district but one, no matter how many districts there were and no matter how voters were dispersed throughout the state. If there were 20 districts, it could assure itself majorities in 19; or in 49 districts of 50; or in 499 districts of 500.

If a party commands the allegiance of one-half the voters, yet receives just one out of 500 seats in the legislature, something is amiss. Current gerrymanderers have not yet attained this level of effectiveness. But a party need not attain game-theoretical extremes to subvert democratic practices substantially. Moreover, gerrymanders will only get worse -- that is, more effective -- as computer software and hardware grows in power and sophistication. <7>

In Part I of this *Heartland Policy Study*, the authors describe gerrymandering as a real, not illusory, danger to democratic practice -- the moral equivalent of stealing elections. The phenomenon can, as the authors shall argue, be readily identified and effectively remedied. The constitutional framework for so doing already exists and is discussed in Part II below.

The remaining sections of the paper describe procedural norms for safeguarding the constitutional rights that are now violated by gerrymandering. In Part III, three such safeguards are described in some detail: equinumerosity (the requirement that districts have approximately equal populations), contiguity (the requirement that districts consist of contiguous territory), and compactness (the requirement that district boundaries be drawn without uncalled-for spikes, indentations, or silly meanderings). The compactness standard -- one district map-makers are currently not required to meet -- is shown to be essential to the effectiveness of the other two, more commonly accepted, standards. The potency of the compactness standard in combatting gerrymandering is described in Part IV.

In Part V, the authors present a simple, but powerful, mathematical technique for the measurement of the "compactness" of any district map. The authors strongly encourage its adoption as a legal standard against which claims of gerrymandering may be evaluated. A summary and concluding remarks constitute Part VI.

I. GERRYMANDERING AND DEMOCRACY

Gerrymandering endangers democratic institutions. This danger, unfortunately, is easier to characterize than to prove.

One might say that *gerrymandering lowers the quality of representation*. Constituents cannot be accurately represented -- their attitudes and values accurately mirrored <8> -- by a gerrymandered legislature. And non-representative legislatures are mischief-makers. In the late 1980s, events in China and East Germany -- extreme cases of what Americans would call non-representative government -- place this point beyond doubt.

We do not, however, wish to rest our argument upon some grand theory of representation nor upon the lessons of political economy that emerge from twentieth century history. However compelling these arguments may be otherwise, they are not *legal* arguments. The legal argument against gerrymandering is that it *violates American constitutional tradition by conceding to legislatures a power of unchecked self-selection*.

The concept of a legislature that creates itself makes little sense under a Constitution whose most striking innovation was the dispersion of power. Legislatures are legislatures not because *they* say they are, but because a *constitution* says they are. To be sure, there is nothing specific in the Constitution that forbids gerrymandering, any more than there is specific language that forbids the excessive, unfair, or abusive exercise of any delegated power. But the very idea of democracy that is embedded in the Constitution certainly forbids legislatures from immunizing themselves against the popular will. <9>

If a legislature has the power of self-constitution, its members depend upon one another, rather than upon their constituents, for their tenure in office. Gerrymandering introduces a chronic, self-perpetuating skew into the business of popular representation. Thus Martin Shapiro aptly describes gerrymandering as a "pathology of democracy." <10>

Being a perversion of democratic procedure, the problem of gerrymandering resists correction by democratic procedures; <11> those in control of the districting process can gerrymander their victims into electoral irrelevance. Shapiro notes, "In the final analysis, the pathology of democracy problem is so overwhelming that -- for most Americans of good will, including those who happen to be judges -- it overcomes judicial role and capacity problems. Gerrymandering is a bad, bad thing." <12>

Some scholars have disagreed with Shapiro. Peter Schuck, for example, has suggested that gerrymandering could actually be the *friend* of democratic practice. Gerrymandering, he says, "reinforces the majority party's capacity to govern alone,

making it easier to attribute responsibility for political acts," in that way furthering the goal of "party accountability." <13> But such an argument would justify ballot-box stuffing or enlisting squads of goons to intimidate voters. It is hard to accept decisive outcomes as a defense of rigged elections. In a constitutional democracy, *how* power is obtained is even more important than what is done with it once it is obtained.

As irrelevant as Schuck's "party accountability" argument is the argument that "everyone does it" and thus, at least decade to decade, the effects of gerrymandering will wash. <14> Again, no one would be indifferent to ballot-box stuffing or hiring goon squads just because it turns out that both major parties do it in precisely offsetting degrees. Democrat ballot-box stuffing in one jurisdiction is not "cured" in any sense by Republican ballot-box stuffing elsewhere. Ballot-box stuffing is a practice that is contrary to democracy, whether or not it affects the outcome of any given election. If gerrymandering is similarly corrosive of democratic institutions, then the cure for gerrymandering could hardly be more gerrymandering.

Other commentators have attempted to minimize or even deny the impact of the practice of gerrymandering on American politics. Unfortunately, although claims are sometimes slung around on editorial pages, data to resolve the question do not appear to exist. Indeed, as has been rightly noticed, <15> it is probably impossible to quantify the partisan effectiveness of a given gerrymander. One cannot segregate its impact from the pull of countless other common factors -- personalities, local issues, current events, incumbency effects, media leanings -- that sway, or supposedly sway, elections.

Gerrymanders may well be less effective than some people think they are. They also may be more effective. For example, an effective gerrymander may discourage more of the minority-party voters from going to the polls next election. In fact, it may discourage such voters chronically. Further, a majority party, its power swollen by effective gerrymandering, controls legislative committee agendas, which can be manipulated to amplify electoral dominance. A candidate who wins his first election because of gerrymandering will thereafter enjoy the "non-gerrymander" benefits of incumbency and enhanced name recognition. <16> Some gerrymanders, by forcing opposition incumbents to run against one another in a newly merged district, may set off intra-party dissension, further debilitating the minority party at the polls.

At the risk of concluding this point by shifting the burden of persuasion, we suggest that those who claim that effective gerrymandering is, as a practical matter, impossible should have convincing reasons why the inefficacy of gerrymandering is more probable than its efficacy. Moreover, if gerrymandering is indeed a pathology of democracy, it is simply beside the point that nobody can prove how effective it is.

II. THE LEGAL TEST FOR GERRYMANDERING

A. *Davis v. Bandemer* -- a landmark gerrymandering decision

In 1986 the Supreme Court held in *Davis v. Bandemer* that claims of partisan gerrymandering are justiciable (that is, they are properly the subject of a lawsuit) as violations of the Equal Protection Clause of the Constitution. <17> However, regarding the specific claim that Indiana's House of Representatives had been gerrymandered, the Court held that the Indiana Democrats failed to make the required showing of discriminatory vote dilution. <18> The Court reached its conclusion despite some fairly incriminating evidence, both circumstantial and direct, pointing at discriminatory intrigues. <19>

The *Davis* decision is problematic for the precedent it sets with respect to how gerrymandering claims are to be evaluated. The Court chose to emphasize *impact* over *intent*, <20> requiring that a gerrymander case be evaluated on the basis of harm to an excluded group's "opportunity to participate" in the political process as a whole. <21> According to the *Davis* Court, "[A] finding of unconstitutionality must be supported by evidence of continued frustration of the will of a majority of the voters or effective denial to a minority of a fair chance to influence the political process." <22>

The plurality in *Davis* analogized political gerrymandering claims to those concerning racial vote dilution. The analogy, however, is weak. In racial discrimination cases brought under the Fourteenth Amendment, the problem has always been how to prove that discrimination has occurred. To make proof of discrimination realistically possible, the Court has permitted second-best evidence -- evidence of "impact" -- to suffice where direct evidence may be impossible to obtain. Thus, an inference of race-discriminatory *intent* can be based on a showing of race-discriminatory *effect*. <23>

In the case of gerrymandering, however, there often is direct evidence of intent, or at least evidence more indicative of intent than simply the "impact" of what has been done. <24> Thus, if non-compactness or other reliable measures of gerrymandering are available (and in Part III below we describe such measures), there ought to be no need to emphasize "impact." Making a showing of impact paramount, while ignoring other evidence more relevant to intent, amounts to insisting on second-best evidence where first-best is available.

The *Davis* Court insists that the gerrymandering complainant show a "pattern" or "history" of exclusion from the political process. <25> The Court's standard requires that the successful plaintiff show that the political party to which he belongs has been

denied the opportunity to *participate in or influence* the political process. Inasmuch as conditions this extreme probably do not exist anywhere in the United States, such a standard is tantamount to the proposition that gerrymandering does not exist.

If one assumes (as we do) that gerrymandering is an act rather than an outcome, it makes no sense to say that no violation occurs unless one or the other major party has been altogether excluded from influencing the political process. Ballot-box stuffing is not made legally innocuous just because it is not taken to such an extreme that it completely excludes one or the other major party from influencing electoral outcomes.

It is an indictment of the *Davis* test that it provides no incentive whatsoever for a would-be gerrymanderer to do anything differently. So long as the standard is "denial of the opportunity to participate" -- and so long as such notorious gerrymanders as those in Indiana and California are held to be legally inoffensive -- the right strategy for a would-be gerrymanderer is to go right ahead and gerrymander as much as he possibly can. At worst, he will have a free pass for a couple of elections.

B. Reynolds v. Sims -- a better prototype for gerrymandering decisions

A better means for the evaluation of gerrymandering claims was readily available to the *Davis* Court. In a series of *malapportionment* cases, <26> most prominent among them *Reynolds v. Sims*,

REAPPORTIONMENT IN MICHIGAN: A CASE STUDY

The 1963 state constitution established that apportionment for state House and Senate elections was to be carried out by an Apportionment Commission, with four members from each of the two political parties whose gubernatorial candidates received the most votes in the most recent election, and with four from any other party whose gubernatorial candidate received more than 25 percent of the vote in that election.

In 1982, Republican and Democrat commission members were unable to arrive at a plan that could command a majority vote of the Commission. Both parties took their plans to the state Supreme Court, which was empowered by the constitution to choose the best plan and order its adoption.

The court decided the problem wasn't with the inability of the commission members to agree, but with the idea of the commission itself, which the court ruled unconstitutional. The court also struck down everything in the constitution that had to do with state House and Senate districting -- except, it appears, its own original jurisdiction over reapportionment disputes. The court set new guidelines for apportionment, among them requirements that districts be compact and contiguous, and that city, township, and county line breaks be as few as possible.

The court instructed the legislature to draw up new districts in accordance with the guidelines and instructed the head of the State Election Bureau, Bernard Apol, to do likewise. The legislature failed to submit a plan, and Apol's map was accepted by the court and approved with minor modifications. Elections were held in 1982 using the Apol plan.

(continued on the following page)

<27> the Court established that "the judicial focus must be concentrated upon ascertaining whether there has been any discrimination against certain of the State's citizens which constitutes an impermissible impairment of their constitutionally protected right to vote."

<28> In the malapportionment cases, the Court found such an impairment where voter districts were constructed with vastly unequal populations, resulting in the intentional "dilution" of the votes of persons living in overpopulated districts. The Court strongly implied that malapportionment resulted in a rather straightforward disenfranchisement, citing cases where the denial of the right to vote was complete. <29>

The dissenters in the malapportionment cases energetically argue that it is difficult to equate "denial" with "dilution."

<30> Words like "dilution" make sense only if we have some notion of how "strong" each person's vote should be. Such a notion would have to involve an inherently political assessment. The *Reynolds* majority sought to avoid the argument by concentrating on the actions of the state rather than on the systemic principles of equality. A vote need not have a certain intrinsic "weight"; but the state is required to accord a vote *equal* weight relative to the votes of others. <31>

The primary harm found by the *Reynolds* Court was the discriminatory action of the state. It is in this analysis that the Court makes its most compelling arguments:

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In December 1983, the state legislature passed PA 256, which drew a new set of districts. The map drawn by PA 256 had 46 county line breaks and 40 city and township breaks; the Apol plan had 10 and 13, respectively. In June 1984, the Oakland County Circuit Court declared PA 256 unconstitutional on technical grounds, and later that month the state Supreme Court upheld the decision.

In 1990, the state's Republican Party asked the Michigan Supreme Court to re-open the 1982 case that had established the Apol plan. The Republicans asked the Court to rule on whether the guidelines it had established were to serve as a basis for future reapportionment.

The Court refused to hear the case, but Justice Levin, who had taken part in the 1982 decision, wrote that the court did not want the last word on reapportionment, but rather sought only to establish ground rules until a constitutional amendment was initiated and approved by the people. He noted, however, that the court felt its 1982 guidelines were rooted in Michigan's constitutional history.

Republicans and Democrats alike seem to feel that this decade's reapportionment will end up in court. The legislature is nevertheless forming committees to deal with the issue, and a prolonged series of negotiations is expected.

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It would appear extraordinary to suggest that a State could be constitutionally permitted to enact a law providing that certain of the State's voters could vote two, five, or 10 times. . . . And it is inconceivable that a state law to the effect that . . . the votes of citizens in one part of the State would be multiplied by two, five, or 10 . . . could be constitutionally sustainable. Of course, the effect of state legislative districting schemes which give the same number of representatives to unequal numbers of constituents is identical. <32>

In sum, malapportionment is not a denial of the right to vote; it is a dilution of that right. What the two concepts have in common is the *state's act of discriminatory classification*. That same critical element is also present in gerrymandering claims. Both gerrymandering and malapportionment involve state-sponsored discrimination against voters.

Viewed in this light, *gerrymandering is a violation of an individual right*. It violates the very same right recognized in the malapportionment cases -- the right to be free of governmental diminishment of the potential efficacy of one's vote. Contrast this perspective on gerrymandering with that emphasized by the *Davis* Court, which argues that the "group level . . . must be our focus in this type of claim." <33> In other words, the injury to a plaintiff must be framed as injury to him in his capacity as a Democrat (or as a Republican, etc.). <34>

Vote dilution, whether effected by malapportionment or gerrymandering, harms individuals. The real value of a person's vote, already small by statistical measures, is further demeaned by gerrymandering. His vote becomes even less likely to decide an election, and he loses a small measure of his power to induce legislators to modify their behavior to conform to his wishes. The voter's stake in democracy is actually diminished, and he is deprived of an important act of power. The only "group" element involved is that the individuals whose votes were debased were chosen because of their party affiliation. By the same token, we may as well characterize the equal population criterion as a "group" right, since malapportionment was historically directed against an identifiable group composed of urban voters. <35>

In *Reynolds* the Court did not confuse the goal of "fair and effective representation" with the method by which it was to be attained. Even though it recognized that malapportionment tended to advance the interests of rural areas at the expense of urban areas, <36> the Court's attention remained fixed on the individual right that malapportionment violated. It should have made no difference to the outcome in *Reynolds* had the Court been persuaded that legislators from malapportioned districts were properly sensitive to urban concerns, or that they passed legislation that was fair to everyone.

The Court's emphasis, in *Reynolds* and the other malapportionment cases, on *procedure*, as distinct from outcomes, is often found in the law. As Professor Steven Lubet points out, courts regularly prefer "fair process" standards over "significant prejudice" standards. For example, the Sixth Amendment right to a trial by an "impartial jury" may be violated where members of a certain racial group have been deliberately excluded from the jury selection lists, <37> even though the chosen jurors were concededly fair judges of the facts. The constitutional right is violated, not by an unfair outcome, but by an unfair process.

III. EQUINUMEROSITY, CONTIGUITY, AND COMPACTNESS

One may take it as given that those currently in control of the government would prefer to control who got elected to office if they could manage it somehow. They could manage it, infallibly, if they were entitled to say, on an ad hoc basis, whose vote would count and whose would not. "Democracy," as the term is commonly understood, precludes this sort of ad hoc choosing.

At least in its as-practiced form, the idea of "democracy" implies the existence of values that control and constrain the way in which such choices can be made. These values cannot remain secure unless some rules constrain political manipulations. Such rules might specify, for example, that:

- (1) there must be a number of districts, specified beforehand;
- (2) a voter may vote only once;
- (3) a voter may vote only in the district to which he is assigned;
- (4) whoever gets the most votes in each given district is elected.

The foregoing criteria constitute the basic requirements necessary to allow the idea of "democratic election" to operate at all. The question is whether and how far these criteria could prevent those currently in power from determining who "wins" each election. And key to the operation of these criteria is a substantive idea of what is meant by a "district."

We have an ingrained notion that an electoral district is a place, like a state or city. It is not necessarily so. The "district" could be defined as the members of the Academy of Motion Pictures Arts and Sciences, or as the members of the legal profession or the pipefitters' union. Indeed, a "district" could be a purely theoretical construct describing that set of voters, wherever they reside, whom we designate as a district. Under the four rules we mention above, for example, assuming no others are applied, it would be easy for those in power to rig favorable electoral outcomes.

Imagine a hypothetical state with ten million inhabitants, each of whom belonged to one of two parties. The state has twenty districts, and is now to hold an election for Representative in each. Someone with absolute control over the districting process can afford to be practically indifferent to how much popular support his party enjoys; if he can identify only 19 "friendlies" in the entire state, he will be able to win the election in 19 districts. The technique: After finding his 19 loyal partisans, he designates each of them as a "district." Each such district would then elect its Representative by a majority vote of 1 to 0. The mammoth twentieth district would include everyone else in the state. The vote in that district would depend on how popular the "friendlies" were in the population as a whole. In principle, they could lose by the inglorious total of 9,999,981 to zero. The state's delegation would then be 19 "friendlies" and one (very popular) "unfriendly."

The fourth rule mentioned above (whoever gets the most votes in each district wins) does little by itself to restrain partisan abuse. It has one small virtue: it makes it difficult to win that last district. The twentieth district will be impossible to win unless the "friendlies" have the support of 50 percent-plus-twenty.

A. Equinumerosity

Requiring that each district have at least approximately equal population ("equinumerosity," what the Court refers to as the principle of "one person, one vote") substantially diminishes one's ability to affect outcomes. If an equinumerosity constraint applies, 19 out of ten million would come nowhere near giving one the ability to ensure a favorable electoral outcome in even a single district, no matter how much discretion one otherwise had to determine how a "district" should be defined. Surprisingly, however, the principle of equinumerosity is in itself insufficient to ensure even a semblance of what one would consider majority rule.

Suppose the voters in our state are precisely split in their support of the two parties. In theory, if equinumerosity is the only constraint, the "friendlies" will still be able to engineer victories for themselves in 19 out of twenty districts. The technique simply involves making sure that at least half of the voters in each district but one are

"friendlies." From that last district, one would scavenge the winning majorities in each of the others. To make these majorities as secure as possible, the "friendlies" would want to cede the last district to the "unfriendlies" by a margin of 100 percent to zero. Thus, with only 50 percent of the popular vote, the "friendlies" can nevertheless be guaranteed majorities in 95 percent of the districts in the state.

B. Contiguity

An additional idea -- that districts must consist of contiguous territory ("contiguity") as well as be equinumerous -- is necessary to prevent this sort of result. The idea of contiguity is so integrated with our concept of what a "district" is that it generally remains unanalyzed. <38>

Although a majority of states have either constitutional or statutory contiguity requirements, <39> the Supreme Court has never ruled that a district must be composed of contiguous areas. And while there are court cases involving contiguity, these never address the question whether districts must be contiguous, but rather deal with such questions as what land is contiguous to what, or how insubstantial a connection may be without becoming non-contiguous, or when land is contiguous although isolated by a body of water. <40>

Without the constraint of contiguity, the results of elections in which the equinumerosity constraint had been conscientiously obeyed could be just as undemocratic as those in our original example, where one person was designated as an entire district. Indeed, no matter how many districts there are, a party with 50 percent support can theoretically win in all the districts but one. <41> In a state with 45 districts, a resourceful partisan hand could fashion victories in 44 of those districts. In a state with 5,000 districts, skimpy majorities could be arranged in 4,999.

Admittedly, these possibilities are theoretical extremes; as the number of districts increases it becomes harder to create safe majorities in all but one. <42> But entirely realistic statements of the problem make it clear that population equality without the constraint of contiguity is an all but meaningless limitation on malign partisanship.

No matter how many districts in the state, although the "friendlies" have the support of only 50 percent of the state's voters, they can, even while adhering to the principle of equinumerous districts, guarantee themselves 25 percent margin victories in 80 percent of the races, so long as they need not worry about contiguity. <43> Smaller margins than 25 percent could well be tolerable, because non-contiguous districts need not "erode," as normal districts do when people move. If they were prepared to abide victory margins of only 10 percent-plus, the "friendlies" could guarantee themselves wins

in 90 percent of all districts. <44> If confident enough to risk margins of only 5 percent, they could carry 95 percent of all districts. <45>

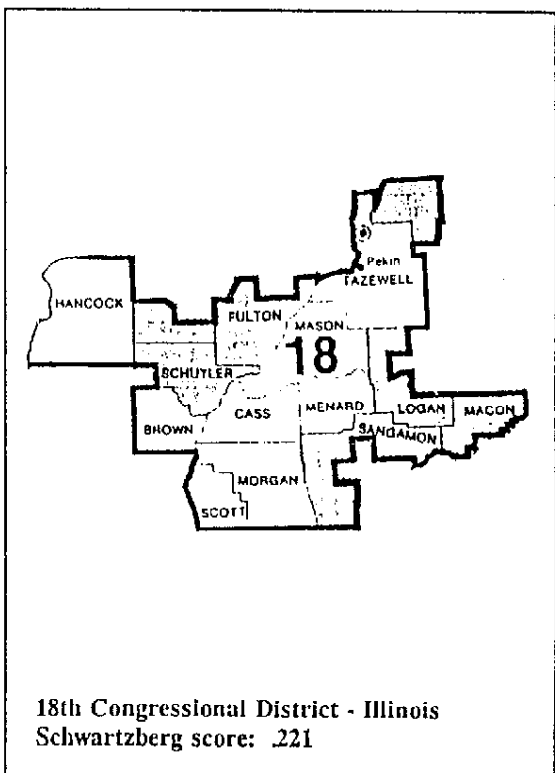
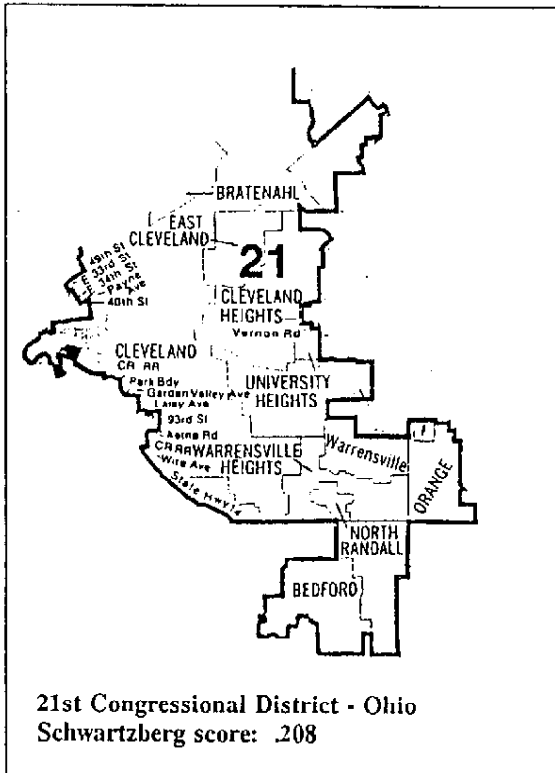
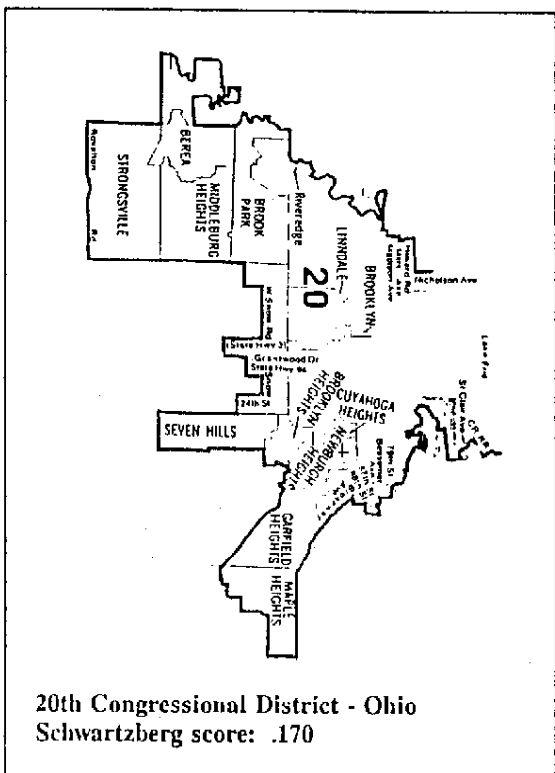
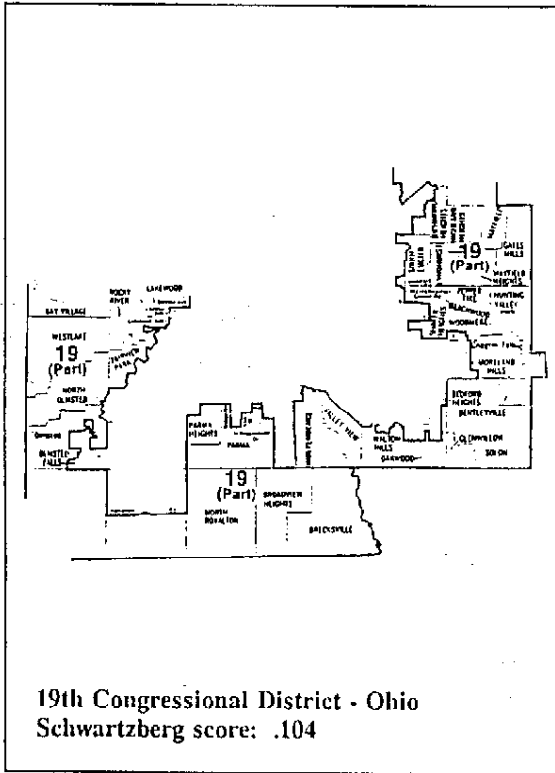
Without contiguity, then, equinumerosity is so diminished in importance that it becomes primarily a symbolic rather than a practical restraint on partisan districting. A requirement of contiguity exponentially shrinks the number of available districting options, because in constructing one district, the map-maker necessarily forecloses the possibility of constructing countless others that would intersect the first. <46> *But whatever contiguity adds, non-compactness can take away.*

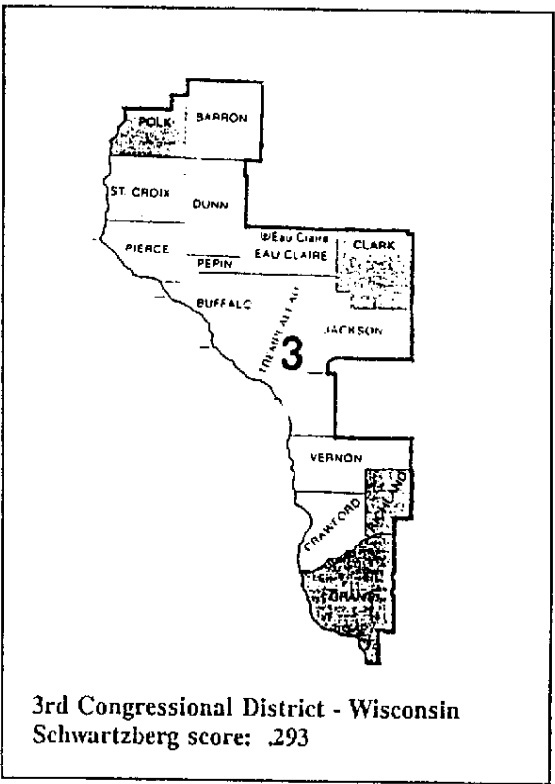
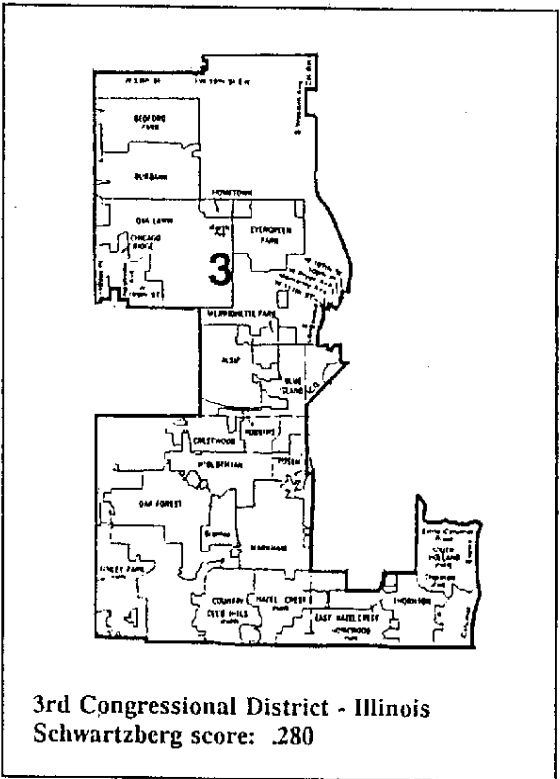
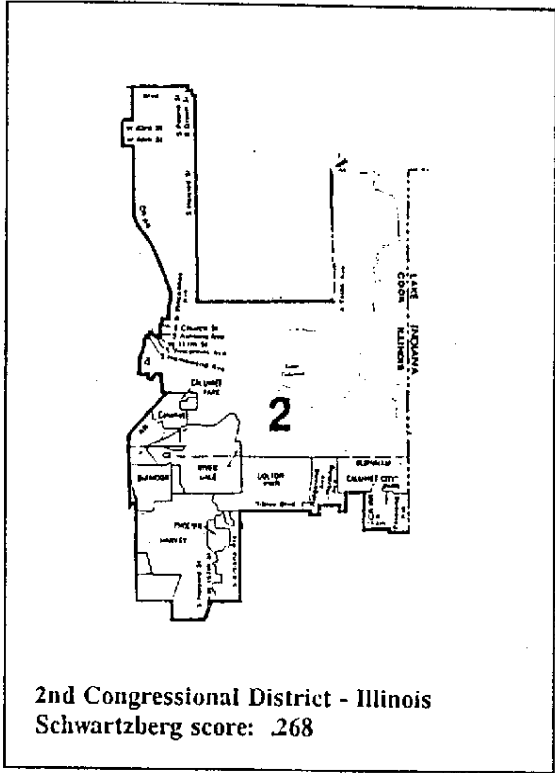
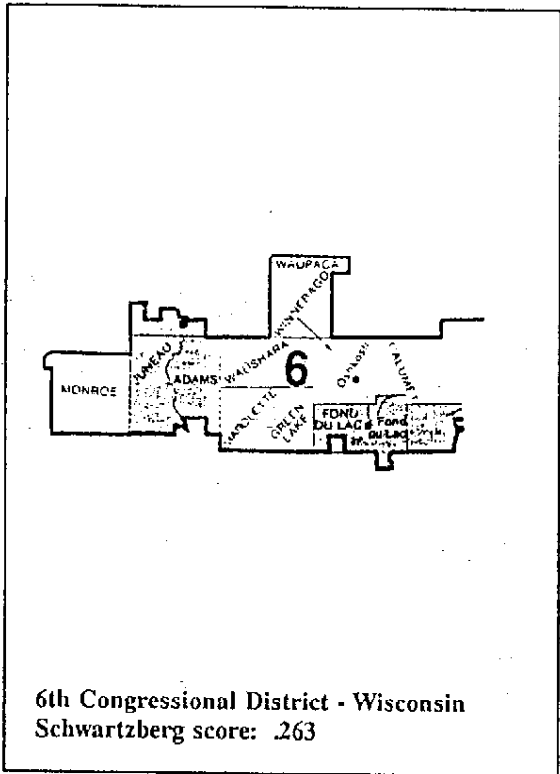
C. Compactness

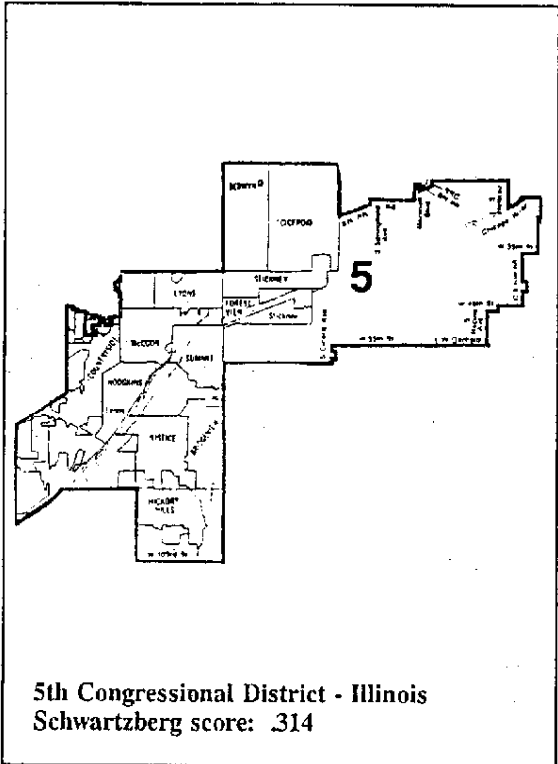
"Compactness" -- broadly defined, a requirement that district boundaries be without uncalled-for spikes, indentations, or silly meanderings -- is essential, for *non-compactness* may be used to render contiguity entirely irrelevant as a constraint. For any existing scheme of contiguous districts, a single voter, no matter where in the state he lives, could in theory be included in *any* district by means of a gerrymandered plan that neither displaces any other voter nor renders any part of any district non-contiguous.

Generalizing further, for any spatial arrangement of voters, there can be constructed a scheme of contiguous districts such that each district contains only those voters that have been specified in advance, regardless of where they live in the state. The resulting district map may not look pretty -- in places, districts might be stretched thin as telephone wires -- but it can be done.

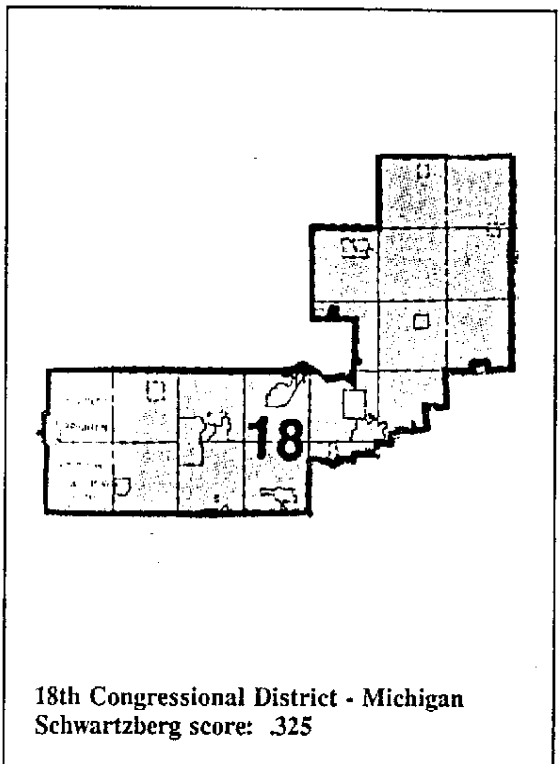
Enough leeway to distort shapes exists within current law to permit effective contiguous gerrymanders. One federal case has established that a bridge is sufficient to establish contiguity. <47> California's Sixth Congressional District "has four distinct and detached parts. Two are connected only by water, the other two by a narrow piece of land used for railroad yards." <48> The district maps on the following pages are examples of how non-compactness can be used to subvert the restraint of contiguity. <49>



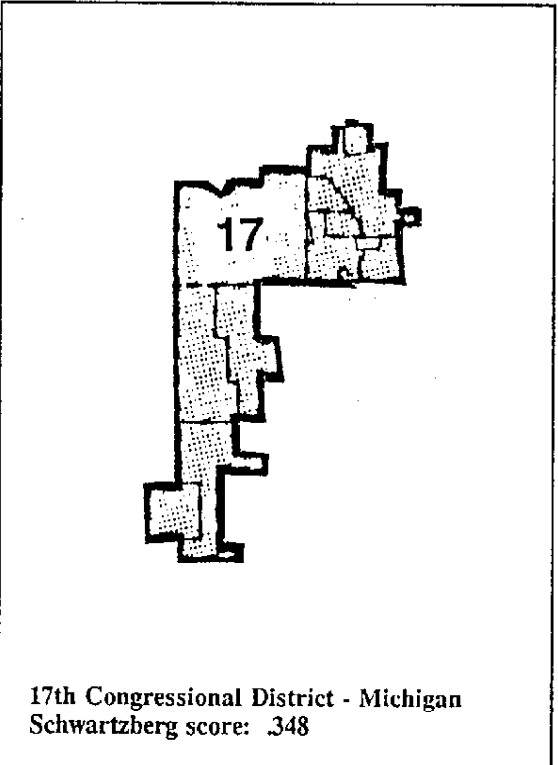




5th Congressional District - Illinois
Schwartzberg score: .314



18th Congressional District - Michigan
Schwartzberg score: .325



17th Congressional District - Michigan
Schwartzberg score: .348



1st Congressional District - Missouri
Schwartzberg score: .379

D. Safeguards of a Fair Electoral Process

The anti-manipulation potency of equinumerosity, contiguity, and compactness are mechanically interdependent; if any one is entirely ignored, then the other two are rendered ineffectual. At present only population equality has been constitutionally required; but if the efficacy of the equal population principle depends on at least some minimal requirement of contiguity, to that extent contiguity must also be constitutionally required. If contiguity can in its turn be rendered meaningless without some sort of compactness criterion, to that extent compactness must be constitutionally required.

The three criteria have a functional as well as a mechanical interdependence. Their function is to guarantee the fair administration of an electoral system based on voter districts. This objective has proved to be remarkably difficult to achieve, because the district system is itself based on something of a mixed motive. On the one hand it seeks to afford minorities protection from the domination of the statewide majority that occurs under at-large voting systems; on the other hand it tries to preserve the benefits of majority rule.

Historically the district system developed in colonial assemblies. The idea was to move away from at-large elections in order to protect minority interests. <50> If every election were held on a statewide basis, a party with only 50 percent-plus-one of the popular vote would elect 100 percent of the legislators in each state (just as it now elects 100 percent of the executive branch -- the governor -- of each state). <51>

District elections shift the balance of power towards local majorities, tending to make legislators attentive to local needs and allowing minority parties at least some direct representation in the assembly. Gerrymandering defeats these objectives. It makes the results of district elections look more like the results of at-large elections, where a party holding even a small majority can completely dominate at the polls.

Compactness, following contiguity and equinumerosity, would simply be the last in a series of moves and countermoves between these clashing interests. As long as there have been democracies there has been tension between majorities and minorities. The Constitution was itself an innovation in the resolution of this tension. <52> Another minority-protecting innovation, adopted even before the Constitution, was the "district" itself. <53> Gerrymandering is in essence the majority's way of abating the restraining character of district-based rather than at-large elections. The anti-gerrymandering principle, which includes contiguity and compactness, is a legitimate and effective riposte.

IV. COMPACTNESS AS A RESTRAINT ON PARTISAN MANIPULATION

The compactness requirement focuses on and foils a technique that is indispensable to creating effective gerrymanders. An understanding of successful gerrymandering will serve to clarify why this is so.

A gerrymanderer begins by assuming that his party has a certain amount of support statewide; he then apportions that support strategically among individual districts. The goal is to control the winning and losing margins in every district.

At the threshold, the gerrymanderer encounters a difficulty: friendlies and unfriendlies will be inconveniently dispersed in the area he is trying to gerrymander. Because people do not naturally arrange themselves to suit his purposes, he must help them, putting them where he needs them to be, by drawing districts to contain enough friendlies to outvote the unfriendlies by a comfortable margin. Boundary lines are stretched and shrunk to include certain neighborhoods of voters and exclude others. In this process, districts become non-compact.

If compactness is a constraint, however, a gerrymanderer will find his job noticeably harder, although not absolutely impossible, as commentators are quick to point out. <54> Computers can endlessly crank out district plans that conform to a fixed standard of compactness. Indeed, even under the constraint of compactness, an *infinite* number of district plans is still theoretically possible.

The point of a compactness requirement, however, is not to make gerrymandering logically impossible, but to make it practically useless, so that it becomes an ineffective tool for routine use. So long as partisan map-makers are left with any discretion whatsoever, gerrymandering will continue to exist. But gerrymandering can be limited, and the worst cases can be prevented.

Before making the case that compactness inhibits "effective gerrymandering," it is necessary to clarify the meaning of "effective." An effective gerrymander, for purposes of our argument, is one that has been designed to increase the disparity between a party's actual support among the population and its seats in the legislature, and which actually achieves this result.

No one can say *a priori* how many seats a party is "entitled to" given a particular level of popular support. But a compactness standard does not seek to answer that question. A compactness requirement, by purely mechanical operation, tends to inhibit gerrymandering. By inhibiting gerrymandering, in turn, compactness automatically advances proportional representation, not by fiat but by empirical tendency. A compactness requirement, in other words, makes it superfluous for a court (or any other arbiter of fairness) to aim at proportional representation directly. <55>

A. Compactness as a Weapon Against Effective Gerrymandering

A requirement of compactness would prevent "effective gerrymandering." Consider again our hypothetical state with twenty congressional districts, and with a voting population evenly divided between two parties. With no compactness requirement, the party controlling the districting could readily arrange wins in 19 of those districts. The more that compactness is given as a constraint on the discretion of the map-makers, the greater their difficulty in arranging wins in 19 districts. At a certain level of compactness, only 18 districts will be secure. Tighten up on the compactness requirement some more and only 17 can be counted on. And so on. If the only acceptable plan were the most compact plan (according to whatever definition of compactness one were using), results more like 10-10 or 11-9 are what would usually emerge.

Several scholars have recognized the power of the compactness standard. Morrill, for example, suggests that, "[e]xcept in isolated instances, it is quite difficult to gerrymander compactly. In most plans, the consistent operation of a compactness criterion will have a random effect on political partisanship." <56>

Other commentators have doubted that a compactness standard would have much preventive value, <57> saying that, at most, a compactness standard might be useful for *identifying* gerrymandering but probably would not be useful in *remedying* it. Thus Dixon speaks of the "myth of compactness" and disparages "a rigid compactness rule," yet admits that a "rule of compactness and contiguity, if used merely to force an explanation for odd-shaped districts, can have much merit." <58> In the same vein, Grofman states that "the usefulness of requiring that districts be compact has been vastly overrated," although he then concedes "its usefulness as an indicia of possible gerrymandering" and includes it as one of twelve such indicators. <59>

It seems doubtful to us that a criterion could rightly be described as futile if one thought that, in principle, it would allow a judge to ascertain whether a given map was gerrymandered or not. Admit that the criterion will differentiate gerrymandered from ungerrymandered maps, and the problem of a proper remedy should be altogether straightforward. The judge could simply enjoin the use of an unconstitutionally uncompact districting plan, and go right on enjoining successor plans, until a map were submitted that did not possess evidence of gerrymandering. The map-makers would eventually come up with something acceptable.

B. Compactness as a Neutral Standard

Lowenstein and Steinberg have gone beyond simply doubting that the compactness standard would do much good, believing that it would actually do much harm. <60> According to them, compactness "is not neutral. On the whole, the adoption of compactness as a criterion for drafting or evaluating districting plans will systematically advance the interests of the Republican Party and correspondingly disadvantage the Democratic Party." <61> The proffered reason is that Democrat partisans tend to be unusually highly concentrated in cities. Compact districts thus will tend to cluster Democrat partisans in a few districts where many of their votes will be "wasted." The result will be a sort of natural gerrymander favoring Republicans. <62>

This argument is unconvincing for three reasons. The first is simply that Lowenstein and Steinberg have little evidence -- Grofman calls their data "sketchy to the point of nonexistence" <63> -- to suggest that the Democrat-to-Republican ratio in heavily Democrat areas is consistently higher than the Republican-to-Democrat ratio in heavily Republican areas. Indeed, their reliance on non-U.S. experience, together with their concession that their analysis of the demographic picture is oversimplified, <64> make it evident that the fact on which their argument depends has not been established.

A second and better reason to reject the Lowenstein-Steinberg analysis is that it assumes, contrary to experience, that natural gerrymanders are indeed robust and effective creatures, whose existence can be sustained without a little help from their partisan friends. This seems unlikely.

As opponents of gerrymander reform never tire of pointing out, even gerrymanders created with all the skill that partisans can command are fragile and often risky things. Targeted voters are concentrated in a few districts in the hopes of winning many other districts by modest margins. A small miscalculation that leads to a loss in a marginal district will saddle the clumsy, or unlucky, gerrymanderer with the worst of all worlds. He will have deliberately created opposition strongholds, where the votes of his own party's supporters will have been "wasted" on purpose; and he will also be wasting votes, unintentionally, in marginal districts. Only a few such unintentional marginal losses can torpedo the value of an entire gerrymander.

Thus Lowenstein and Steinberg must believe more than they say about the resiliency of natural gerrymanders. Even if it has been established beyond doubt that the two parties' voter dispersion differs systematically from one place to another, it must still be shown that a very large majority of the marginal districts created by a "natural" gerrymander are won by Republicans. We are aware of no indication that this will occur. It is equally possible that the Democrats will carry *enough* marginal districts to ruin any natural gerrymander. The balance may even tip in their favor if, as may well

be the case, their "core" districts turn out to be more steadfastly Democrat than the Republican strongholds are steadfastly Republican.

There is a third response, more fundamental, to the Lowenstein-Steinberg claim that compactness is merely "a Republican Trojan horse" <65>: it simply does not matter legally, nor should it matter at all except to an adamant partisan, that a fairness-enhancing reform will hurt one party and help another. It is simply the breaks of the game that fair ground rules hurt people, including innocent people, who would profit from the existence and application of unfair ground rules. As Shapiro has pointed out:

Neither party chose to represent whom they did because of their geographic stacking or dispersion or with an eye to how their choice would affect their electoral fortunes if the world were suddenly to come ungerrymandered. If geography favors the Republicans in an ungerrymandered world, that is a purely fortuitous result, unforeseeable by either party when it chose its ideologies and clientele. Such stacking ought to be treated as extraneous to the goal of constraining the self-serving actions of legislatures. <66>

C. Compactness as a "Good Government" Tool

Professor Cain has made a different critique of the value of compactness -- what might be called the "good government" reasons for skepticism about this criterion. <67> He begins by making a list of all the "good government" values that one would like to see embodied by electoral districts. He then argues that these values may or may not be furthered by the adoption of a compactness standard, and that, in general, its good effects and bad effects will wash. Thus, for example, the compactness criterion may make it difficult to preserve "communities of interest," however these are defined. <68>

But even if Cain is right in his evaluation of compactness as a "good government" principle, the value of preventing gerrymandering outweighs the independent benefits we can associate with compactness. Although compactness may have some independent value as a principle of democracy, <69> one needs no better reason for embracing the compactness principle than that it makes effective gerrymandering more difficult. Gerrymandering is, after all, a pathology of democratic government. <70> It allows legislators to play unfairly with what is perhaps their most solemn and central power: setting the constitutive terms of the democratic argument.

D. Compactness and Proportional Representation

Cain seeks to strengthen his argument by pointing out that compactness may at times conflict with the "good government" value of proportional representation. <71> But surely he overstates the dangers. While it is true that no one can say positively that compactness always and everywhere improves proportional representation, a principle need not be absolutely universal, like the law of gravity, in order to be useful. As we have stressed, compactness inhibits gerrymandering by general empirical tendency and therefore serves, by general empirical tendency, to improve proportional representation.

One should hardly be surprised by the existence of counterexamples. It must be conceded, for example, that because single-member districts are naturally skewed against minorities, there are going to be cases in which accurate proportional representation may be more readily accommodated by non-compact districts. In such cases enforcing a compactness standard may seem counter-productive.

In the real world only a limited number of circumstances give rise to this situation, and they can be disposed of easily. Most likely is the case where racial minorities have achieved a level of representation under the Voting Rights Act <72> beyond what their numbers might warrant in ordinary single-member district elections. The wisdom of deliberately concentrating racial minorities to create minority-dominated districts has been widely and ably debated, and need not be considered here. <73> A race-conscious electoral policy, assuming we are to have one, can be accommodated by a legal compactness standard by the simple expedient of requiring that non-compactness be *explained*. If the explanation is that non-compactness was forced by the requirements of the Voting Rights Act, this should be legally sufficient.

There is a second counter-example -- we know of no third -- in which compactness would impede the good government value of proportional representation. Bi-partisan gerrymandering might well lead to closer proportional representation for both the minority and majority parties than un-rigged elections would allow.

The Supreme Court upheld such a bi-partisan plan in Connecticut in *Gaffney v. Cummings*. <74> But this should hardly persuade, for any number of good government values could be achieved through, let's say, rigged elections. People who manipulate elections will always have some public-spirited defense of their conduct. But the wisdom of allowing such bi-partisan gerrymanders is far more dubious even than in the Voting Rights Act cases.

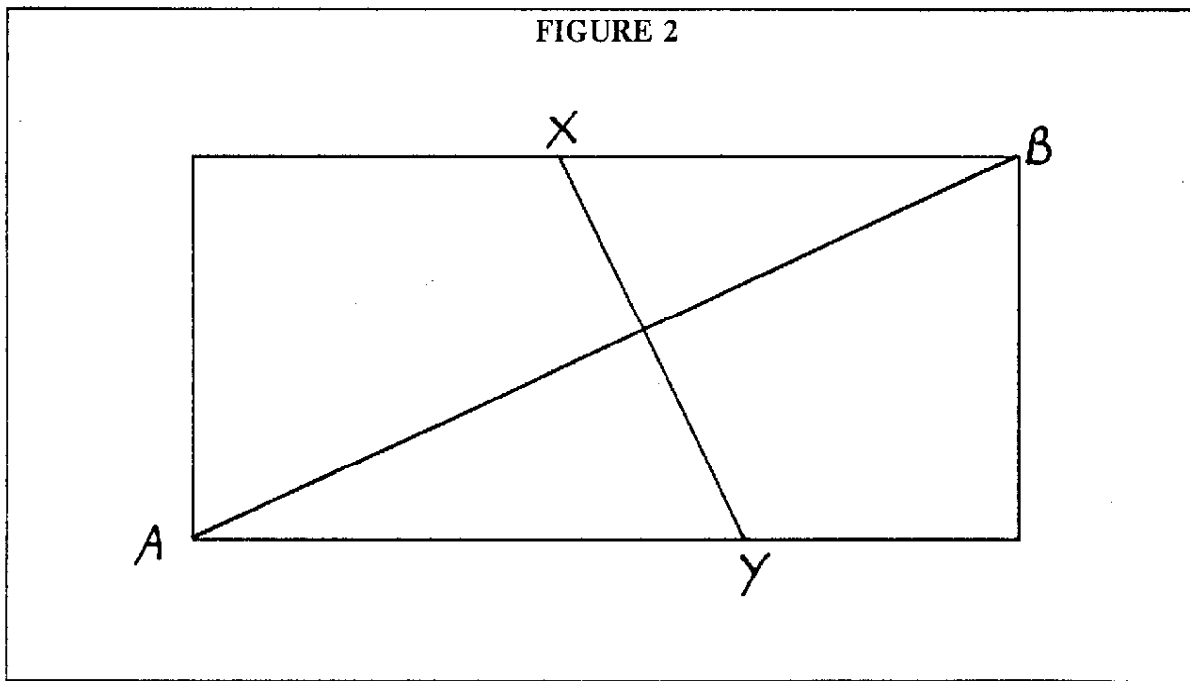
The problem of self-constituting assemblies remains under a bi-partisan accord. We should be skeptical of legislators' attempts to persuade us that their habit of designing district maps to keep incumbents' seats as safe as possible is really an innocent

manifestation of concern for the public welfare. But even assuming, as we reluctantly must after *Gaffney*, that such arrangements are permissible, it is possible to accommodate them within the law simply by saying that the value of such bi-partisan arrangements justifies the non-compactness.

V. A WORKABLE COMPACTNESS STANDARD

Ideally, a compactness measure should have two main qualities. First, it should measure the right thing -- that which gives it anti-gerrymandering power. Second, it should be infinitely discriminating -- in other words, it should gauge a range of shapes across a spectrum, giving incrementally better scores to shapes that are incrementally more compact. The best way to grasp the meaning of these characteristics is by illustration.

Suppose that in calculating compactness we divided the longest straight line whose endpoints were within a district by the longest line perpendicular to it whose endpoints were also in the district. A score of 1 is the lowest and best for any district. (In Figure 2 below, divide the length of line A-B by the length of line X-Y. Its score is 2.22.) This simple method will weed out many districts that would be deemed non-compact by any reasonable observer.



The problem with this method, however, is that it is not discriminating -- in fact it is so non-discriminating that one might question whether it measures the right thing. A district shaped like a rectangle might score exactly the same as one shaped like a cross. In fact both scores may be "perfect."

If a rectangle and a cross both have perfect scores, what (non-circular) argument would justify the claim that they should not? It must be remembered that one is not on a futile search after some Platonic definition of "compactness"; what one is seeking is only a kind of compactness that frustrates gerrymandering. Thus it would be unnecessary to defend the relevance of such observations as that a cross "looks" less compact than a rectangle, or that it has concave surfaces while a rectangle does not, or that it encloses less area than a rectangle with the same perimeter. *A compactness standard is inadequate if it is not sensitive to manipulations of shape that give more leeway to partisans.*

This is why the perpendicular-line rule fails. It does not adequately discriminate against partisan behavior. It cannot tell the difference between a district plan constructed of tiled squares, and one that is a jig-saw puzzle of irregular shapes where the perpendicular maximums of individual districts happen to be equal. But partisan map-makers most assuredly can tell the difference. Such people would much prefer the leeway to make T-shaped or L-shaped districts, or shapes in between. Having such leeway facilitates the business of targeted inclusion and exclusion of voters -- in other words, facilitates gerrymandering.

For the purposes of defining legislative compactness, there are only two standards worthy of consideration. The first may be called "minimum line length." The second is a slightly modified version of a standard proposed by Joseph E. Schwartzberg. <75> We discuss these in order.

A. Minimum line length

A minimum line length standard requires that the length of all district lines in a state, when added together, be as short as possible. Unlike the measure already considered, minimum line length is concerned solely with the compactness of the *set of districts in a state*, not with the compactness of any particular district within the set. It notices and measures exactly what gerrymanderers are trying to do; namely, distort the lines of individual districts in order to achieve a global result favorable to their client.

While minimum line length would probably be a workable tool to combat gerrymandering, it is subject to two criticisms, one theoretical and the other practical. Because it focuses on the set of districts and does not pay attention to the configuration

of any individual district, minimum line length allows for the possibility of an extremely non-compact individual district. As a theoretical matter, then, minimum line length is completely oblivious to whatever "good government" values individual district compactness may be thought to serve. <76>

There is a weightier and more practical objection to the minimum line length standard. To the extent that any departure at all from the standard is allowed -- and inevitably there will be some leeway allowed -- the standard is relatively easy to subvert. If the minimum line length standard in a state is 1,000 miles with a permissible deviation of 5 percent (fifty miles), <77> the gerrymanderer will still be left with the power to draw fifty miles of non-compact district lines. The more districts there are in a state, the longer the total minimum line length standard will probably be; hence, the more miles of leeway there will be. Small non-compact districts -- which will always be in cities -- would generally do little to unsettle a minimum line length score. Indeed, as long as a single district in our hypothetical state had a perimeter of less than fifty miles, a gerrymanderer could give it *any shape he chose*.

B. Schwartzberg's standard

A different criterion of compactness betters minimum line length and the perpendicular line rule. This is the measure proposed by Schwartzberg, <78> who defines compactness in terms of the effectiveness of a shape's perimeter in capturing area.

Schwartzberg's standard measures the ratio of a shape's perimeter to its area. Not every ratio of perimeter-to-area, however, will adequately gauge the compactness of that area, as the following illustration shows. Consider two squares of different sizes, one with two-mile sides and one with ten-mile sides. The smaller square has a perimeter of eight, an area of four, and therefore a ratio of 2.0. The larger square has a perimeter of forty and an area of one hundred, or a ratio of 0.4. The shapes, although they are identical, have very different scores.

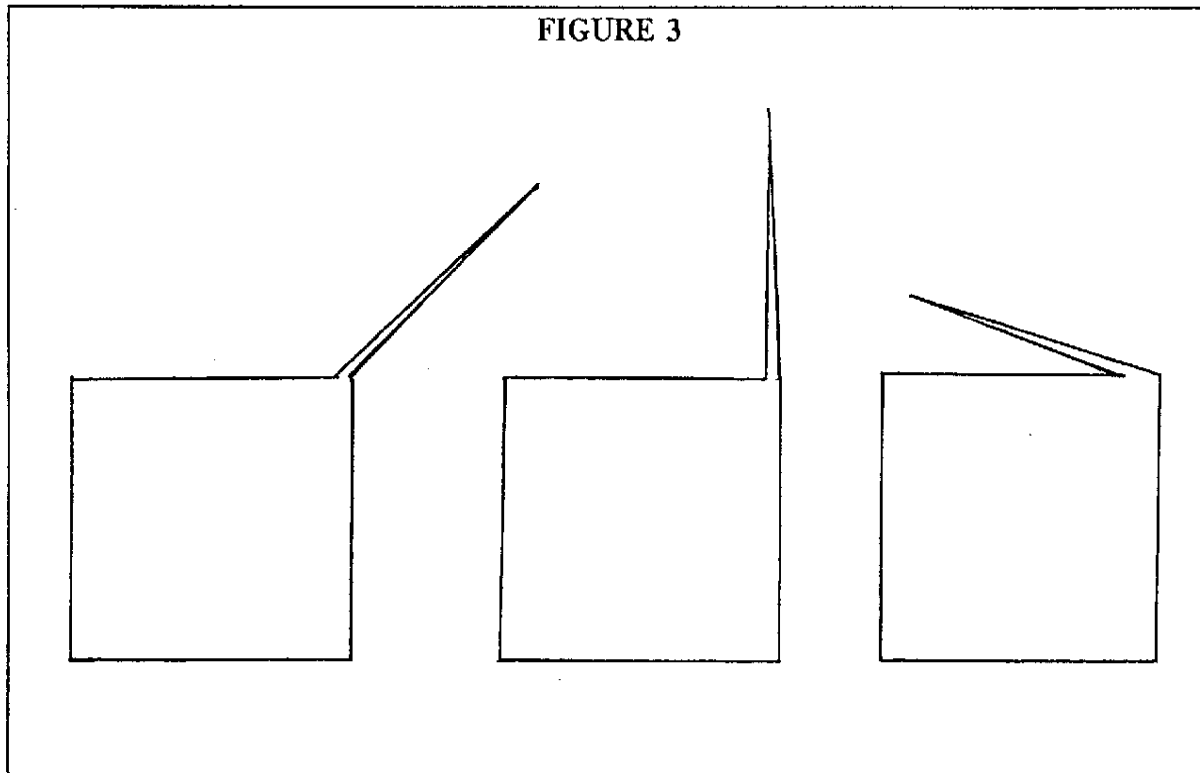
There is a technique, however, that avoids this anomaly: renormalizing the perimeter-to-area ratio against an absolute scale. For any length of a perimeter, whether ten inches or ten miles long, a circle is the geometric shape that encloses the maximum possible area. Every other shape must somewhere make a concession of some kind, and thus its perimeter will not be used with the greatest possible efficiency to capture area. The absolute measure of a shape's efficiency is thus determined by *dividing the area of the shape by the area of a circle with a perimeter of equal length*. <79> When this formula is applied, all calculations result in a figure between 0 and 1

(1 being the best possible score) and all identical shapes, regardless of size, score the same. <80>

The Schwartzberg criterion measures a gerrymanderer's self-indulgence as surely as a breathalyser measures a drunkard's. Any deviation from any given shape that changes a district's area and perimeter to the same extent -- no matter where the protrusion is added, which way it is oriented, how far it is from the district's center, or how it is shaped -- will degrade the district's Schwartzberg score by an identical amount.

The Schwartzberg measure highlights the best features of the other criteria of compactness. It charges points when districts are longer than they are wide; when boundaries are far from the center; when lines are indented; or indeed whenever the district lines are longer than they need to be. The Schwartzberg test even measures "smoothness," taking away points for any irregularities in a boundary, even in a generally compact district. <81>

The superiority of the Schwartzberg measure from the anti-gerrymandering point of view is simply that it assigns identical scores to shapes that possess identical *a priori* value to gerrymanderers. Thus each of the shapes in Figure 3 below have (and ought to have) identical Schwartzberg scores.



There is one sense in which the Schwartzberg measure apparently fails to charge identical scores to deformed figures with identical *a priori* value to gerrymanderers. If one of the districts in Figure 3 had, rather than a "spike," an indentation of the same size, it would score worse under the Schwartzberg standard.

This is something of an anomaly because both shapes should have an equal value to would-be gerrymanderers. The difference exists because projections add to a figure's perimeter while adding to its area; indentations add to perimeter while *subtracting* from area. Using five miles of perimeter to add area leads to a higher score than using five miles of perimeter to subtract an equal amount of area.

Perhaps this kind of discrepancy is inevitable when one uses a compactness measure that looks not to the set of districts but rather to each individual district. But gerrymanderers *do* operate globally, worrying about the set of districts rather than one particular district at a time. They thus should value an indentation and an outcropping identically -- both can be used equally to manipulate populations.

Despite the theoretical objection to the Schwartzberg criterion, it nevertheless works well in practice. The Schwartzberg standard is so sensitive to any deviation that it is impossible to gerrymander comfortably using either the spike or the indentation. Adding perimeter in a greater proportion than area will always drop the score. In that sense there are no "wrong" results: districts with appendages or indentations will always score worse than those without. <82>

VI. CONCLUSION

It is ironic that reapportionment, a project made necessary by fidelity to democratic principles, should become the occasion for so much gamey partisan brawling, but the fact cannot be denied. In the districting game, legislators are fighting for their own political lives and that of their party, just as surely as, and even more enduringly than, is true of an election campaign. Depending on how district lines are drawn, it is possible for a minority party to control a majority of seats in the state assembly and its state's delegation to the U.S. House of Representatives. More to the point, a party that enjoys only a small majority in popular support over its principal competitor can, through its control of the districting process, translate this popular edge into preemptive institutional dominance.

In a democracy, parties are supposed to gain political power by persuading voters to vote for them. Paradigmatically such persuasion takes the form of rational appeals to the public interest and common welfare. Realistically we know that appeals to the

electorate are often emotional in tone and selfish in intent. Still, even practical people usually admit that it is proper to impose at least some limits on the game of getting electoral political advantage.

Gerrymandering is very opposite in spirit and in practice to the "rational persuasion" method of winning elections. It is nothing but a technique for getting political power without having to persuade voters. And in a democratic society -- at least of the American kind -- intending to gain power by some method other than appealing to voters is *prima facie* wrong. "Gerrymander" is a term of abuse. It is used polemically as a way of discrediting the opposition. <83> Ordinary voters believe that gerrymandering is one of many ways politicians *frustrate*, rather than facilitate, the popular will.

Ordinary voters, furthermore, are right. Gerrymandering does indeed impose on them. The most obvious purpose of a gerrymander is to diminish the political efficacy of certain voters' votes. The minority party's votes are less likely ever to influence elections. Politicians have even less need to pay attention to the views of voters whose franchise has been emasculated. A person ought to be entitled to complain if a politician has manipulated the lines on a map in order to make the outcome of an election a foregone conclusion.

And thus we urge a remedy that gives teeth to the voter's entitlement to complain. In addition to adhering to criteria that mandate that legislative districts be composed of contiguous territories and have equal populations, those who define district boundaries must also respect a third criterion: compactness.

Without the ability to distend district lines so as to include or exclude blocks of voters whose political loyalties are known, it is not practically possible to gerrymander. The diagnostic and peculiar mark of the gerrymander is the non-compact district. Anyone who eyeballs a few legislative district maps will quickly learn to recognize gerrymanders, although admittedly with imperfect accuracy. But one need not rely on seat-of-the-pants reckoning to find the sort of non-compactness that implies gerrymandering. Schwartzberg's mathematical standard is a superior way to measure the kind of non-compactness that is associated with gerrymandering, and without which gerrymandering would become an unworkable project.

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For information about the authors, and for ordering information or reprint permission, please see page 36.

ENDNOTES

1. For example, Richard L. Engstrom, Jr. "The Supreme Court and Equipopulous Gerrymandering: A Remaining Obstacle in the Quest for Fair and Effective Representation," *Arizona State Law Journal* (1976); Elmer C. Griffith, *The Rise and Development of the Gerrymander* (1907) (Reprint New York, NY: Arno Press, 1974).
2. *Gomillion v. Lightfoot*, 364 U.S. 339 (1960).
3. Race-conscious line-drawing is one of the remedies available under the Voting Rights Act, 42 U.S.C. sec. 1973 et seq.; *United Jewish Organizations of Williamsburg v. Carey*, 430 U.S. 144 (1977).
4. *Gaffney v. Cummings*, 412 U.S. 735 (1973).
5. "Cracking" somewhat obscurely refers to the fact the opposition's support has been ineffectually divided.
6. The authors wish neither to deny the existence of strong and growing third parties in the United States, nor disparage their importance in the electoral process. For the purposes of a discussion of gerrymandering, however, they are irrelevant -- and more power to them for being so.
7. Gerrymandering software for desktop computers increases in power and sophistication almost, it seems, by the month, with correlative augmentations in the capabilities of those with the political authority to draw district boundaries. See "New Age of Gerrymandering: Political Magic by Computer?" *New York Times*, January 10, 1989, page 1; and Mitch Betts, "Gerrymandering Made Easy in 1990," *Computerworld*, August 28, 1989, page 1.
8. The authors acknowledge that there is no generally accepted theory of *how* a legislature is supposed to reflect its constituents' interests and values. Which interests, which values, ought to be represented? And, for that matter, what is meant by "represented"? There is no generally accepted theory of how a legislator "represents" -- whether as a "delegate," or a "trustee," or an "agent," or something else. Words like "portraying," "signifying," "mirroring," and "making present" have been applied to approximate the evidently ineffable idea of representation. See generally J. Roland Pennock and John W. Chapman, editors, *Representation* (New York, NY: Lieber-Atherton, 1968); therein see chapters on "Practical Representation," "Political Representation: An Overview," and "Representation in Law and Equity."
9. We have heard it said, in fact, that democracy itself is fundamentally flawed to the extent that legislatures can always find ways -- gerrymandering is only one among them -- to immunize themselves against the popular will. The problem is not so much one of how to *establish* equitable rules, but rather how to overcome the unwillingness of elected officials to *abide by them* once established. We are sympathetic to this view but, for the purposes of this paper, take the "first things first" position. It is essential to establish equitable rules, so that we may have something to which our elected officials can be held accountable.
10. Martin Shapiro, "Gerrymandering, Unfairness, and the Supreme Court," 33 *UCLA Law Review* (1985), pages 227, 239.
11. The problem of gerrymandering could be addressed, it should be noted, by the elimination of district-based voting. That is, the at-large election of state representatives would solve the problem of political manipulation of district boundaries. Such a proposal, of course, presents difficulties of its own, some of which are addressed at page 17 in this *Policy Study*.

12. "And there is nobody around to fix it except courts." Martin Shapiro, *supra* note 10, at page 251. This is not Shapiro's view, but his characterization of the view supporting the justiciability of gerrymandering claims.
13. Peter Schuck, "The Thickest Thicket: Partisan Gerrymandering and the Judicial Regulation of Politics," 87 *Columbia Law Review* (1987), page 1361.
14. See, for example, the discussions of districting in California, Indiana, and Pennsylvania in Michael Barone and Grant Ujifusa, editors, *The Almanac of American Politics* (Washington, DC: Barone & Co., 1984).
15. For example, by Peter Schuck, *supra* note 13, page 1340; and Norman Ornstein, "Genesis of a Gerrymanderer," *The Wall Street Journal*, May 7, 1985.
16. See Warren Lee Kostroski, "Party and Incumbency in Postwar Senate Elections: Trends, Patterns and Models," 67 *American Political Science Review* (1973), page 1213; Robert S. Erikson, "Research Note: The Advantage of Incumbency in Congressional Elections," *Polity*, Vol. 3, No. 3 (Spring 1971), pages 395-405.
17. *Davis v. Bandemer*, 478 U.S. 109 (1986). The *Davis* Court relied on the notion advanced in *Reynolds v. Sims*, 377 U.S. 533 (1964), that a denial of "fair representation" can be a basis for a constitutional claim, and on other cases, especially *Gaffney v. Cummings*, 412 U.S. 735 (1973), where the Court reached the merits of a claim that the Connecticut legislature had constructed a bi-partisan gerrymander. See discussion in *Davis* at 119.
18. *Davis*, 478 U.S. at 127-143 (Parts III & IV).
19. Although Democrat candidates received almost 52 percent of the vote statewide in House races in 1982, they only won 43 of 100 seats. In two counties where Democrat candidates won 46.6 percent of the vote they won only three of 21 House seats. *Davis*, 478 U.S. at 114-117, 175-177.
20. *Davis*, 478 U.S. at 131.
21. A reference to a standard the Court had previously applied in race discrimination violations of the Voting Rights Act. *Davis*, 478 U.S. at 131 (citing *Rogers v. Lodge*, 458 U.S. 613, 624 (1982)).
22. *Davis*, 478 U.S. at 133.
23. See, for example, *Washington v. Davis*, 426 U.S. 229 (1976).
24. See, for example, the indicia of gerrymandering listed by Bernard Grofman, "For Single Member-Districts Random is Not Equal," in *Representation and Redistricting Issues* (Lexington, MA: Lexington Books, 1982), pages 117-118. In *Village of Arlington Heights v. Metropolitan Housing Authority*, 429 U.S. 252 (1977), the Supreme Court discussed the interplay of "intent" and "impact" in a related context, that of racial discrimination. "Disproportionate impact . . . is not the sole touchstone of an invidious racial discrimination. . . . Determining whether invidious discriminatory purpose was a motivating factor demands a sensitive inquiry into such circumstantial and direct evidence of intent as may be available. The impact of official action -- whether it 'bears more heavily on one race than another,' *Washington v. Davis*, *supra* note 23, 426 U.S. at 242 -- may provide an important starting point. . . . [But absent] a pattern as stark as that in *Gomillion* or *Yick Wo*, impact alone is not determinative, and the Court must look to other evidence."
25. See, for example, *Davis*, 478 U.S. at 131 n. 12.

26. See, for example, *Baker v. Carr*, 369 U.S. 186 (1962); *Wesberry v. Sanders*, 376 U.S. 1 (1964); and *Reynolds v. Sims*, 377 U.S. 533 (1964). Malapportionment refers to a violation of constitutional or statutory requirements that districts be of approximately equal populations ("equinumerosity") and consist of contiguous territory ("contiguity").
27. *Reynolds v. Sims*, 377 U.S. 533 (1964).
28. *Reynolds*, 377 U.S. at 561.
29. Cited in *Baker*, 369 U.S. at 201, 208, 248; and *Reynolds*, 377 U.S. at 554, 555. See, for example, *Ex Parte Siebold*, 100 U.S. 371 (1879) and *U.S. v. Saylor*, 322 U.S. 385 (1944) (ballot stuffing); *U.S. v. Mosely*, 238 U.S. 383 (1915) (failure to count votes); *Ex Parte Yarbrough*, 110 U.S. 651 (1884) (physical assault of voters); *Guinn v. U.S.*, 238 U.S. 347 (1915) and *Lane v. Wilson*, 307 U.S. 268 (1939) ("grandfather" clauses and literacy tests); *Nixon v. Hemdon*, 273 U.S. 536 (1927) (statutes explicitly denying the right to vote on account of race in primaries that were in effect the general election); *Nixon v. Condon*, 286 U.S. 70 (1932) (statutes that accomplished same purpose by allowing political parties to "set the rules" for voting in their primaries).
30. As Justice Stewart wrote, "Nobody's right to vote has been denied. Nobody's right to vote has been restricted. Nobody has been deprived of the right to have his vote counted. The voting right cases which the Court cites are, therefore, completely wide of the mark." *Lucas v. Forty-Fourth General Assembly of Colorado*, 377 U.S. 713, 744 (1964).
31. Justice Frankfurter's response, however, remains persuasive: a "determination whether treatment is equal presupposes a determination concerning the nature of the relationship [between individuals and the state]. This, with respect to apportionment, means an inquiry into the theoretic base of representation in an acceptably republican state." *Reynolds*, 377 U.S. at 301.
32. *Reynolds*, 377 U.S. at 652-653.
33. *Davis*, 478 U.S. at 125 n. 9.
34. "[I]n order to succeed, the *Bandemer* plaintiffs were required to prove . . . intentional discrimination against an identifiable political group and an actual discriminatory effect on that group." *Davis*, 478 U.S. at 127.
35. In constitutional law, distinguishing group rights from individual rights is almost nonsense: groups are always collections of individuals; and individuals are the ones that have rights that are imposed on, even if, for the sake of convenience, groups are sometimes allowed to be plaintiffs. Constitutional harms, however, harm individuals, not groups. See generally Martin Shapiro, *supra* note 10, page 233 *passim*.
36. See, for example, *Reynolds*, 377 U.S. at 567.
37. See, for example, *Casteneda v. Partida*, 430 U.S. 482 (1977) and cases cited therein.
38. See, for example, Bernard Grofman, "Criteria for Districting: A Social Science Perspective," 33 *UCLA Law Review* (1985), pages 77, 84 ("Contiguity is a relatively trivial requirement and usually a noncontroversial one."); Richard G. Niemi, "The Relationship Between Votes and Seats: The Ultimate Question in Political Gerrymandering," 33 *UCLA Law Review* (1985), pages 185, 187 ("That political districts should be contiguous -- that all parts of a district should be connected -- is not likely to be important in gerrymandering cases because it is relatively noncontroversial.")
39. See Bernard Grofman, *ibid.*, page 179 *passim* (Table 3).

40. See, for example, *Wells v. Rockefeller*, 311 F. Supp. 48 (S.D.N.Y. 1970), *aff'd*, 398 U.S. 901 (1970); *Badillo v. Katz*, 73 Misc. 2d 836, 343 N.Y.S.2d 451 (N.Y. Sup. 1973); *Holmes v. Farmer*, 475 A.2d 976 (R.I. 1984).
41. The only purely mathematical limit on this tactic is the requirement that total number of voters in an average district be at least twice the total number of districts minus one. Thus our twenty districts must each contain at least $2 \times (20 - 1)$, or 38, voters, before we can assure wins in 19 districts with only 50 percent of the statewide vote. As a practical matter the number of voters in a district will always be much larger than the total number of districts.
42. We have assumed apportionment on the basis of voter registration. If non-contiguous districts could be apportioned on the basis of total population the opportunities for those who seek to influence elections are further increased. The crafty tactical move at this point is to create small majorities of voters by packing a district with non-voting residents. In spirit this maneuver is similar to creating one-person districts which are won by a vote of 1 to 0.
43. That is, 62.5 to 37.5 percent. The other 20 percent of the districts would be ceded to the opposition, which would carry them unanimously.
44. Specifically, the margins would be 55.56 to 44.44 percent in the contested districts, with the others being carried unanimously by the unfriendlys.
45. The exact margin in contested districts would be 52.63 to 47.36 percent.
46. See for example, "The Geography of Representation: A Review of Recent Findings," in Bernard Grofman, editor, *Electoral Laws and Their Political Consequences* (New York, NY: Agathon, 1986), page 188.
47. *Wells*, 311 F. Supp. at 53.
48. 1 Cong. Quarterly, *State Politics and Redistricting* 149 (1982).
49. Maps are from U.S. Department of Commerce, Bureau of the Census, *Congressional District Atlas: Districts of the 99th Congress*, issued January 1985. (Library of Congress #84-601164)
50. See, for example, *Gaffney*, 412 U.S. at 753; *Davis*, 478 U.S. at 130.
51. See Elmer C. Griffith, *supra* note 1, page 47. See also "The Effect of At-Large Versus District Elections on Racial Minorities in U.S. Municipalities," in Bernard Grofman, editor, *Electoral Laws and Their Political Consequences*, *supra* note 46.
52. *Federalist Papers*, 10 and 51.
53. See Elmer C. Griffith, *supra* note 1, footnote 1, page 23, *passim*.
54. See particularly Bernard Grofman, *supra* note 38, page 89.
55. See Peter Schuck, *supra* note 13, page 23; *Davis*, 478 U.S. at 145 (opinion of O'Connor J.).
56. Richard L. Morrill, *Political Redistricting and Geographic Theory* (Washington, DC: Association of American Geographers, 1981), page 21.
57. Few would assert that the compactness standard would do literally nothing. See Bernard Grofman, *supra* note 38, pages 90-91.

58. Robert G. Dixon, Jr. *Democratic Representation: Reapportionment in Law and Politics* (New York, NY: Oxford University Press, 1968), pages 460-461.
59. Bernard Grofman, *supra* note 38, pages 89, 118.
60. Daniel H. Lowenstein and Jonathan Steinberg, "The Quest for Legislative Districting in the Public Interest: Elusive or Illusory?" 33 *UCLA Law Review* 4 (1985).
61. *Ibid.*, page 23.
62. The same argument is suggested in briefs opposing justiciability in *Davis*. See, for example, Brief of Appellants, page 18 ("A preference for compact and contiguous districts is really nothing but a policy decision in favor of political groups whose support is evenly distributed about a state"); Brief Amicus Curiae of the Assembly of the State of California Prior to Consideration of Jurisdiction, page 13.
63. Bernard Grofman, *supra* note 38, page 92 n. 67.
64. Daniel H. Lowenstein and Jonathan Steinberg, *supra* note 60, page 24.
65. *Ibid.*, page 27.
66. Martin Shapiro, *supra* note 10, page 240.
67. Bruce E. Cain, "The Reapportionment Puzzle", 33 *UCLA Law Review* (1985), page 32.
68. *Ibid.*, page 40.
69. See *Karcher v. Daggett*, 462 U.S. 725, 756 (1982) (Stevens J. concurring); but see Bruce E. Cain, *ibid.*
70. Martin Shapiro, *supra* note 10, footnote 8.
71. Bruce E. Cain, *supra* note 67, pages 35-36.
72. 42 U.S.C. 1973 (as amended).
73. See, for example, Bruce E. Cain, *supra* note 67, page 166.
74. *Gaffney v. Cummings*, 412 U.S. 735 (1973).
75. Joseph E. Schwartzberg, "Reapportionment, Gerrymanders, and the Notion of 'Compactness,'" 50 *Minnesota Law Review* (1966), page 443.
76. As Justice Stevens has put it, "To some extent, geographical compactness serves independent values; it facilitates political organization, electoral campaigning, and constituent representation." Concurring in *Karcher v. Daggett*, 462 U.S. at 756. For a convincing critique of the "independent value" of compactness see Bruce E. Cain, *supra* note 67, page 32 *passim*.
77. Common Cause suggests five percent. See Common Cause, *Toward a System of "Fair and Effective Representation"* (Washington, DC: Common Cause, 1977), page 51, cited in Bruce E. Cain, *supra* note 67, page 32.
78. See Joseph E. Schwartzberg, *supra* note 75.

79. The compactness of any shape can be obtained by using the following formula: (4 times π , multiplied by the district's area) divided by (the square of the length of the district's perimeter.)

This is not literally Schwartzberg's measurement, but a variant. Instead of using the ratio of areas, he used perimeters. Thus the "relative compactness" of a shape "may be determined by finding the ratio of its perimeter to the perimeter of a circle of equal area." Schwartzberg, *supra* note 75, page 444. Both equations really measure the same thing, and are mathematically translatable -- the modification proposed here yields a score that is always the inverse of the square of that yielded by Schwartzberg's method. But our measure is easier to use and understand. It yields scores as a fraction between "zero" and "one," with "one" being the highest. Schwartzberg's method yields scores on a scale from "one" to "infinity" (again with "one" being the best). Hence, the significance of a particular score may be difficult to grasp.

Our variant on Schwartzberg is close enough to the original to make it appropriate to refer to it as "the Schwartzberg method," and it will be so referred to throughout this *Policy Study*.

80. For example, squares of any size score .785.

81. Adopting the principle of Schwartzberg-compactness would present a minor problem of practical administration, namely, what one does with jagged natural boundaries like rivers, coastlines, and so on. It would make little sense in terms of inhibiting gerrymandering to penalize map-makers for distorted boundaries that they had no hand in making. The entire problem can be eliminated by adopting a simple convention. Let map-makers draw any fictional, "rounded" lines they want for the purpose of determining the compactness score, provided that they follow these two simple rules:

- (1) all land actually in a district must be contained within its rounded boundaries, and
- (2) neither water, nor land that is not part of a district, may be included in the "area" component of the Schwartzberg calculation.

These two rules guarantee that any boundary lines drawn over water or other states will be as short as possible, but have no effect on internal, man-made lines.

82. Further, an outcropping from one district will typically (though not always) result in an indentation in another, so the overall score will tend to be adequately penalized.
83. See, for example, "Picasso Democracy," *Wall Street Journal* editorial, August 24, 1987, page 12; "Stacking the House," *Wall Street Journal* editorial, April 2, 1985, page 28; "California Scheming," *Washington Post*, August 18, 1983, page A29; "Gerryduck in Louisiana," *New York Times* editorial, October 1, 1983; and "A Fair Blow at Foul Districting," *New York Times* editorial, June 24, 1983. See generally Elmer C. Griffith, *supra* note 1.

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