ALTERNATIVE POLICIES FOR ACHIEVING THE GOALS

ALTERNATIVES TO SINGLE-MEMBER PLURALITY DISTRICTS: LEGAL AND EMPIRICAL ISSUES*

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INTRODUCTION. In 1968, Paul Freund wrote that

> *While the major outlines of the reapportionment doctrine may be settled, there remain a host of questions still unresolved: its application to local government, the legal status of gerrymandering, the limits on multimember districts, the use of weighted or fractional voting in the legislature.*
>
> (Paul A. Freund, Foreward to Dixon, 1968: vi)

The latter three of these issues remain largely unresolved, and it is the last two issues on which this paper will focus.

While single-member districting (smd) is the most common form of representation in the U.S., apportionment schemes at the state and local level often make use of multimember districts (Klain 1955; Jewell 1971), the polar type of which is, of course, the at-large election;[1] and in one state (New York) weighted voting is the most common of the various systems in use for county government.[2] In the late 1960's and 70's such non-smd systems have come under increasing challenge as violating 14th Amendment "equal protection" standards.

Of the justifications advanced for deviations from the equal population rule, the desire to preserve local political boundaries is the most commonly voiced and the most frequently accepted. However, if the desire to preserve political boundaries is made a major concern, then this leads to consideration of systems of representation other than simple single-member districting and raises real constitutional issues as to what equal representation consists of. (See Grofman and Scarrow, 1981a forthcoming.) If political subunits are of discrepant sizes, in a single-member districting system some small units will be denied their "own" representatives, while some larger units will be divided up. Political

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A methodological appendix, discussing in detail seventeen recent empirical studies of at-large vs. ward districting, is available upon request from the author.

boundaries can be fully preserved only by (1) allowing for multiple-member districts (which may use plurality voting, or some form of proportional representation), or (2) using weighted voting to compensate for population differences across political subunits.

A REVIEW OF RECENT COURT CASES ON MULTIMEMBER DISTRICTS AND AT-LARGE ELECTIONS. Although multimember plans typically allocate the number of representatives to a district in direct proportion to that district's population, in the aftermath of the Supreme Court's entrance into the "political thicket" of reapportionment, the constitutionality of multimember districts and at-large elections has recently been challenged on several grounds related to "one man, one vote" issues.

First, multimember districts are said to submerge political, especially racial, minorities.

> *The "winner-take-all" character of the typical election scheme creates the possibility that a specific majority will elect all the representatives from a multimember district whereas the outvoted minority might have been able to elect some representatives if the multimember district had been broken down into several single-member districts* . . . (Tribe, 1978: 750).

A second accusation against multimember districts is based on a mathematical argument advanced by Banzhaf (1966) which shows that residents of smaller districts are being denied equal representation because residents in the larger districts who are electing representatives proportional to their numbers have a more than proportionate chance of affecting election outcomes.[3]

A third and related challenge against multimember districts is based on the alleged propensity of representatives from such districts to act as a bloc. Chosen from the same constituency, almost certainly of the same party, the identity of interests among such representatives could be expected to be greater than those chosen from the same population divided up into plural distinct districts.

A fourth claim is that as the number of legislative seats within the district increases, the difficulty for the voter in making intelligent choices among candidates also increases. Ballots tend to become unwieldy, confusing, and too lengthy to allow thoughtful consideration.

A final charge brought against at-large elections is that, when candidates are elected at large, residents of particular districts may feel that they have no representative especially responsible to them (see *Chapman v. Meier* [1975]).[4]

Multimember districts have, however, not been without their defenders. Around the turn of the century replacing district systems with at-large elections was the goal of municipal reformers anxious to break the power of "ward" politicians. Similarly, Bryce

(1889: 463-64; cited in Klain, 1955: 1118) deplored the spread of single-member districts, holding them responsible for the decline in quality of state legislatures. "The area of choice being smaller, inferior men are chosen." This charge has been endorsed by both politicians and political scientists (see Klain, 1955: 1118, no. 30). The claim has also been made by some political scientists that "equal representation is technically more feasible with multiple districts" (Klain, 1955: 1117; and see references cited in Klain, 1955: 1117, no. 26; also see citations in *Whitcomb v. Chavis,*[5] by which is meant the statistical observation that the fewer the districts the easier it is to design districts so as to obtain exact population equality among them).

In the first of the post-*Baker* cases challenging multimember districts (*Fortson v. Dorsey* [1965])[6] the complaint was that voters in the Georgia legislature's single-member districts could elect their own representatives; while voters in the multimember districts (who elected representatives at large but with the candidates required to be residents of a subdistrict, with each subdistrict allocated exactly one representative) were, it was proposed, being denied their own representative, since voters from outside the subdistrict helped to choose the subdistrict's representative. "The Court upheld Georgia's districting system, concluding that voters in multimember districts did indeed elect their own representatives--the representatives of the *county*, rather than of the subdistrict in which they happened to reside" (Tribe, 1978: 752), emphasis ours). In *Fortson* the Supreme Court held (as it had in *Reynolds v. Sims*[7]) that "equal protection does not necessarily require formation of all single-member districts in a state's legislative apportionment scheme." However, the Court had not yet been confronted with the full range of arguments against multimember districting. In particular, it had not yet been confronted with an alternative way of measuring citizen "weight" in an apportionment system involving districts of different sizes.

In the next case to come up on this issue, *Burns v. Richardson* (1965), the Court reiterated[8] the standard advanced in *Fortson*[9] that "the legislative choice of multimember districts is subject to constitutional challenge only upon a showing that the plan was designed to or would operate to minimize or cancel out the voting strength of racial or political groups." In *Burns, Kilgarlin et al. v. Hill* (1964)[10] and in *Whitcomb v. Chavis* the Court majority held no such showing was made. However, the holding in *Whitcomb* asserted that "the validity of multimember districts is justiciable"[11] and it "left open the possibility not only that a particular multimember district might be shown to cancel out the voting power of a minority group but also that multimember districts might eventually be declared illegal per se *if some of the indictments leveled at such districts generally could be established by more persuasive evidence*" (Tribe, 1978: 753, n. 18, emphasis ours).

In *Whitcomb* the Court squarely confronted for the first time the issue of the alleged overrepresentation of residents of the larger multimember districts as measured by their ability to affect

election outcomes. In *Whitcomb*[12] the Court reiterated its views in *Reynolds v. Sims* on what is required for full and effective participation in the political process, to wit:

> *Full and effective participation by all citizens in state government requires, therefore, that each citizen have an equally effective voice in the election of members of his . . . legislature* (emphasis ours).[13]

The challenge to the multimember apportionment scheme in *Whitcomb* rested on two quite distinct bases. The first was the assertion that the Marion County district "illegally minimizes and cancels out the voting power of a cognizable racial minority in Marion county."[14] This claim, as we noted above, was rejected by the Court on the grounds of an inadequate showing as to the facts. The second was the claim (based on the argument in Banzhaf, 1966) that "voting power does not vary inversely with the size of the district and that to increase legislative seats in proportion to increased population gives undue voting power to the voter in the multimember district since he has more chances to determine election outcomes than does the voter in the single-member district."[15] This claim was also rejected by the Court. (See note 3.)

If minority votes are not needed to win elections and there are no districts in which minorities predominate, minorities may be frozen out completely. The Supreme Court held this to have occurred for Blacks in Dallas County, Texas, and Mexican-Americans in Bexar County, Texas (*White v. Regester*).[16] In *White* the Court found the Democratic party organization in Dallas County "did not need the support of the Negro community to win elections in the county, and it did not therefore exhibit good faith concern for the political and other needs and aspirations of the Negro community." Also, the Court in *White* upheld the lower court findings that "the Black community had been effectively excluded from participation in the Democratic primary selection process."[17] The Supreme Court in *White* similarly upheld District Court findings that Bexar County's "multimember districts invidiously excluded Mexican-Americans from political participation" and that single-member districts were "required to remedy the effects of past and present discrimination against Mexican-Americans."[18]

In *White* the Court revealed that the hints, offered in *Fortson* and *Whitcomb*, that a properly mounted challenge to multimember districts (mmds), when sustained by an *historical* record of discrimination, could in fact succeed, were not idle ones. Other mmd schemes have subsequently been struck down by the federal courts. For example, in *Kruidenic v. McCulloch*[19] an 11-member district was held unconstitutional; while in two important parallel cases, *Graves v. Barnes* (1972)[20] and *Graves v. Barnes* (1974),[21] mixed single and multimember districting for the Texas state legislature was repudiated as discriminatory against Mexican-Americans and Blacks in a number of the most populous Texas counties. Moreover, in *Connor v. Johnson* (1971)[22] and *Chapman v. Meier* (1975), the Supreme Court struck down judicially created apportionment schemes involving multimember districts, "creating a

virtually *per se* rule against court-ordered multimember district plans in the absence of exigent circumstances" (Tribe, 1978: 755, emphasis ours).[23] Furthermore, the Justice Department, under the Voting Rights Act of 1965, has, in effect, prevented any jurisdiction covered by that act from *changing* to a pure at-large system.

As of 1970 "more than 60 percent of the cities (and one third of the counties) in this country elect their legislative bodies at large rather than by districts, and the proportion of those has been growing" (Jewell, 1971: 52). At the municipal level, it has been argued that at-large elections have acted to discriminate against racial and other minorities (Washington, 1971; Karnig and Welch, 1978; Heilig, 1978; Jones, 1976). With increasing frequency since the mid 1970's federal courts have been hearing cases challenging local electoral structure--cases often arising out of the Voting Rights Act. Until the 1980 ruling in *City of Mobile, Alabama v. Bolden*[24] (see discussion below) it had appeared that the major arena of apportionment challenges in the 1980's would have been with respect to at-large elections.[25]

That the Supreme Court would eventually declare at-large districting unconstitutional on its face was in our view never at all likely, since the Court had proceeded quite cautiously with respect to multimember districts, and in an aside in *Lucas v. Colorado General Assembly* (1964)[26] the Court asserted that, despite certain undesirable features of multimember elections, apportionment schemes which provide for the at-large election of a number of legislators from a county, or any political subdivision, are not "presumptively constitutionally defective." (See also *Beer v. U.S.* [1976]).[27] Nonetheless, where a substantial racial minority exists and where there is a clear-cut history of past discrimination, at-large elections had successfully been challenged under standards enunciated in 1973 by the Federal Court of Appeal, Fifth Circuit in *Zimmer v. McKeithen* (485 F. 2d 1297).[28]

In *Zimmer* it was held that unconstitutional discrimination could be demonstrated through a preponderance of evidence including (1) lack of access of minorities to the nomination process, (2) the unresponsiveness of legislators to the particularized interests of minorities, (3) a tenuous state policy underlying the preference for multimember or at-large districting, or (4) the existence of past discrimination precluding effective minority participation in the election system. In *Zimmer*, the Fifth Circuit Court also enunciated criteria which would provide indirect evidence of discrimination--including large districts, a majority vote requirement, provisions prohibiting "bullet" ("single-shot") voting, and the lack of geographically linked posts. However, the suffiency of these standards has now (1980) been repudiated by the Supreme Court in the *Mobile* case.

In *Mobile*, the Supreme Court enunciated a new and much stronger requirement. It is no longer enough to demonstrate that a given at-large districting is discriminatory in its *effects*, but rather one must also show that it is discriminatory in *intent*.[29] The

discriminatory purpose doctrine in *Mobile* was derived from two earlier decisions, *Washington v. Davis* (1976)[30] and *Arlington Heights v. Metropolitan Housing Development Corp.* (1977).[31,32,33]

In *Mobile*, a decision marked by the absence of a majority opinion and a plethora of competing views, the only thing which is sure is that the Court no longer acknowledges the dual standard enunciated in *Fortson* (emphasis ours) that a plan is subject to constitutional challenge upon a showing that the plan "*was designed to or would operate to* minimize or cancel out the voting strength of racial or political groups."[34] Indeed, quite remarkably, Justices Stewart, Burger, Powell,and Rehnquist argue in *Mobile*[35] that the Court has *never* had such a dual standard of intent *or* impact, and that the language in *Fortson* (repeated in *Burns*) doesn't mean what it obviously says. For an instructive example of legal doublethink,note 13 in Mobile can hardly be bettered. (See, in this context, Marshall's stinging dissenting opinion in *Mobile*.)

The principal consequence of the *Mobile* decision is that it will be extremely difficult to mount a successful challenge to an at-large election system, no matter how invidious may be its discriminatory impact on the representation of racial or linguistic minorities. The only optimistic note that can be sounded in the light of *Mobile* is that the *Mobile* decision does not (directly) affect the constitutional legitimacy of Justice Department action (under the Voting Rights Act) to forestall *changes* to at-large districting.

AT-LARGE ELECTIONS AND MINORITY REPRESENTATION: A BRIEF OVERVIEW OF THE EMPIRICAL EVIDENCE. The Supreme Court has been presented with a number of different challenges to the constitutionality of multimember districts and of at-large elections, including ones based on game theoretic arguments (see Grofman and Scarrow, 1981a, for details). However, the only challenge that the Court has accepted as legitimate grounds for overturning an apportionment scheme is evidence that the plan "was designed to or would operate to minimize or cancel out the strength of racial or political groups" (*Fortson*).[36]

Confining ourselves to the issue of at-large vs. ward elections (the analysis for multimember vs. single member districting is analogous), there are four different ways the question of impact on racial representation has been approached.

First, a priori theoretical arguments have been advanced to show why minorities are less likely to be successful in at-large rather than district-level competitions. Second, historical evidence has been amassed for a particular unit of government to demonstrate that Blacks (or Mexican-Americans), although a substantial minority, have not been proportionally successful in electing representatives of their own kind--evidence which seems particularly telling when coupled with an historical record of racially polarized voting. Third, before-and-after case studies have been done of cities which switched from at-large to ward elections or vice versa. Fourth, cross-sectional analysis has been done comparing proportionality of racial and Hispanic representation in cities with various types of electoral systems.

Let us first examine the theoretical arguments on the relationship between election system and equity of minority representation: According to Tribe (1978: 755, n. 26)

> *. . . well-established mathematical principles make clear that the likelihood of a minority's being able to elect a representative decreases as district size increases. Since the use of multimember districts leads, for any given size of the . . . legislature, to a higher average population per district, it exacerbates the always present likelihood that a minority will be left completely without representation.*

We would wish to qualify Tribe's assessment because, as suggested by our discussion below, it leaves out the politics of the situation. Following Grofman and Scarrow (1978) we can, however, make Tribe's statement above (and analogous remarks in Comment [1970: 1587-1588] and elsewhere) considerably more precise by looking at the notion of thresholds of representation and exclusion. The *threshold of representation*, T_R (Rokkan, 1968; Rae, Hanby and Loosemore, 1971; Grofman, 1975) is the minimum support necessary to earn a group its first legislative seat. The *threshold of exclusion*, T_E (Loosemore and Hanby, 1971; Grofman, 1975), on the other hand, is the maximum support which can be attained by a group and nonetheless fail to win it even one seat. Both those indices are rooted in the notion of an election as an n-person game.

If we let m be the number of representatives elected from the district and the number of candidates contesting the race, and posit the minority group to run one candidate, then if all voters cast all the votes to which they are entitled, the thresholds of representation and exclusion became as in expression (1) below:

$$T_E = \frac{m}{m+1} \quad , \quad T_R = \frac{m}{\ell} \qquad (1)$$

Hence, for single-member district plurality elections $T_E = \frac{1}{2}$ and $T_R = \frac{1}{\ell}$. Clearly $\frac{m}{m+1} > \frac{1}{2}$ for $m > 1$; and $\frac{m}{\ell} > \frac{1}{\ell}$ for $m > 1$. Hence, for a minority constituting a fixed percentage of the population in each district, the maximum strength (under the worst of circumstances) that a minority group (fielding one candidate) can have and still be excluded from representation is higher under mmd plurality (bloc) voting than under smd plurality voting; and the minimum strength (under the most favorable of circumstances = all groups other than your own being of the same size) needed to gain a first seat is also higher under mmd bloc voting than under smd plurality. Thus, whether the best of circumstances or the worst, under the specified assumption as to distribution of minority strength across districts and as to voter behavior, for plurality elections, smds are always better for minority representation than mmds.

In addition to these purely analytic arguments, it has also been noted that:

> *In district races . . ., due to residential segregation, Black candidates tend to have an electorate which is at least primarily Black; given the minority status of Blacks in most American cities, Black aspirants in all but a few at-large races must contend with a White electoral majority, and White voters are less apt to vote for Black candidates than a fellow Black would be. Moreover, at-large contests allegedly increase campaign costs, tend to require endorsement by civic associations and the media, and are based often on name recognition--all elements which putatively reduce the chances of Black electoral success.* (Karnig and Welch, 1978: 2)

Turning now to the empirical approaches, we find a pattern of markedly contradicting claims.[37] At the municipal level, it has been argued that at-large elections have traditionally been used to discriminate against racial and other minorities (Karnig and Welch, 1978; Heilig, 1978; Jones, 1976; Washington, 1971). It should also be noted that, although many "at-large systems may not have been adopted with the specific intent of weakening Black political influence, there are documented instances where cities have changed to at-large systems as tactics to dilute Black political influence" (Jones, 1976: 346; see also Heilig, 1978; Sloan and French, 1971).

While we find intuitively plausible Malcolm Jewell's view that "it is difficult to see how any local legislative body--city, county, or metropolitan--can be perceived as giving adequate voice and vote to minorities if it is elected in at-large elections without any form of districting or proportional representation" (Jewell, 1971: 53; cf. Dixon, 1971: 33-34); the empirical evidence on this point is far from clear.

On the negative side:

(1) In Lakeland (a pseudonymous satellite city near Detroit) which shifted from ward to at-large elections with designated representatives, Sloan (1969) found no change in Black representation.[38]

(2) Using cross-sectional methods, Cole (1974) has shown that in 16 New Jersey cities Black representation is not significantly affected by the presence of at-large elections.

(3) MacManus (1978) in looking at 243 central cities, has argued that once controls are introduced for socioeconomic and other factors, the impact of district elections on Black city council representation vanishes. Moreover, MacManus (1978) singles out those cities which experienced a change in election system during the past decade and finds no significant difference in the proportionality of Black representation between those cities which shifted from ward to at-large and those which shifted the other way, although the meaningfulness of this cross-sectional comparison is vitiated by the strong ceteris paribus assumption implicitly required.

(4) Welch and Karnig (1978: 2) provide evidence indicating that school districts with at-large contests actually have greater Black representation in school board elections, though their limited sample of cities with district-based representation makes confident generalization impossible.

On the positive side:

(1) Raleigh, North Carolina, and Charlotte, North Carolina, recently, via referendum, shifted from at-large to ward elections; and Mundt (1979) finds that in Charlotte, Blacks now hold 27.3% of council seats as compared to 5.4% between 1945-1975 (see also Heilig, 1978), although in Raleigh, Black representation remains unchanged.[39]

(2) In Fort Worth and San Antonio the 1977 change from at-large to ward elections lead to a "dramatic increase" in Mexican-American representation in both cities (Cotrell and Fleischman, 1979).

(3) Using the same cross-sectional data base of 273 central cities as MacManus (1978), Robinson and Dye (1978) come to quite different conclusions.[40] They assert (1978: 137) that "Black representation is significantly greater in cities with ward elections than in cities with at-large elections and further assert (1978: 139, 140, emphasis ours) that "at-large election is the single most influential independent variable" and that "reformed government structures significantly and *independently* contribute to Black underrepresentation."

(4) Using the same data base as both MacManus (1978) and Robinson and Dye (1978), Taebel (1978), who challenges the suitability of the ratio measure of inequity used by Robinson and Dye (1978) and uses instead the difference measure of MacManus (1978), nonetheless finds that both for Blacks and Hispanics there is a relationship between at-large elections and inequity of minority representation, although this relationship is stronger for Blacks than for Hispanics (especially when controlled for size of city council).[41]

(5) In the study which we believe to be the most impressive in its methodological rigor, which looks at the 264 American cities with population over 25,000 and with at least ten percent Black population, and which focuses on the 66 cities which combine district with at-large representation, Karnig and Welch (1978) show that in cities with a mixed system, the district component is almost perfectly proportional in its racial representation while the at-large component is far from equitable (N = 66); and that in cities using district systems Black representation is nearly proportional to Black population (.92 on the difference measure, -1.3% on the ratio measure [N = 62]); while in pure at-large cities representation is quite inequitable (.62 on the ratio measure, -9.6% on the difference measure [N = 111]).[42]

The nine studies we have cited above (and other studies in this area) suffer from a variety of methodological flaws or limitations.

Although the case studies are longitudinal, in none of the case studies are there any control groups, so that we can't be sure that changes in patterns of minority representation are *causally* linked to changes in type of electoral system--minority representation may be changing due to other factors. In the cross-sectional studies (with the exception of the within-city comparisons for mixed systems in Karnig and Welch [1978]), we have the usual difficulty of causal inference. If cities with at-large elections differ in systematic ways from those with ward elections (not captured by the control variables used), then differences (or absence of differences) in equity of minority representation may be artifactual. Moreover, the cross-sectional studies differ in their operationalization of equity of representation, some using a ratio measure (Robinson and Dye, 1978; Welch and Karnig, 1978), some a difference measure (Cole, 1974; McManus, 1978; Taebel, 1978). These differences in operationalization can lead to differences in result. (See footnote 41.) Only Karnig and Welch (1978) and Grofman (in an unpublished retabulation of data in Sloan [1969]) make use of both the ratio and the difference measures.

The cross-sectional studies also differ in which other variables (e.g., city council, council size, percent Black population, city population, city median income level, city manager vs. mayor vs. commission, etc.) are controlled for and in the fineness of categorization of type of electoral system used, with most authors using a trichotomous classification (ward, mixed, at-large) but some studies (MacManus, 1978; Karnig and Welch, 1978) introducing other potentially significant distinctions, e.g., as between at-large elections with and without designated representatives. Also, the cross-sectional studies vary tremendously in the data being examined, with sample bases ranging from cities over 25,000, to central cities exclusively, to central cities excluding those with minimal Black populations, to very large cities (populations over 250,000).

One omission common to all the cross-sectional studies is that (for those cities with explicit *or* implicit partisan contests) they do not differentiate between cities under Republican control and those under Democratic control. This is an important omission because we would anticipate that Black representation would be comparatively lower in Republican-controlled areas because Blacks are customarily part of the Democratic party constituency. Finally, and we believe most importantly, the cross-sectional studies do not (MacManus [1978] and Taebel [1978] are partial exceptions) look at geographic concentration of minorities in the cities they investigate. Clearly, the nature of political and demographic realities will determine the extent to which single-member or multimember districting will help or hinder particular minorities. If a minority is reasonably large and geographically concentrated, it may expect to get its "own" representative(s) in a single-member district but might be swamped by other groups if forced to compete for representation in a very large multimember district. On the other hand, if a minority is not geographically concentrated and if it has some political "clout," it may be far more effective in a

larger mutimember unit, where it may be granted some representation, perhaps even representation proportional to its numbers, than engaged in fighting *and losing* a number of struggles for control of single-member districts. (See discussion in Carpenetti, 1972.)

Nonetheless, if we look to the representation not of any particular minority group, but of minorities in general, then an argument can be made on behalf of single-member districts as opposed to at-large elections which we find to be compelling. At-large elections put minority representation at the discretion of the majority. In polarized situations, this is likely to leave minorities completely unrepresented.

WEIGHTED VOTING. As of 1960, most New York counties used a unit voting system for their county boards of supervisors in which each town/city ward was given one representative. This scheme was, not surprisingly, struck down in *Graham v. Board of Supervisors of Erie County* (1967).[43] In the 1960's, in response to the voiding of unit-voting systems, nearly half of New York's 57 counties sought to preserve township-based representation while still complying with Court directives on "one man, one vote" by shifting to weighted voting schemes similar to that in use in Nassau County (a county which, since 1917, had used weighted voting). Two cases involving such counties (Saratoga County and Washington County) were combined and decided by the New York Court of Appeals in an important decision, *Iannucci v. Board of Supervisors of the County of Washington*. In that case, the Court held that weighted voting was permissible only if the weights led to Banzhaf power values for each legislator proportional to the population he/she represented. (See Banzhaf, 1965, 1966; Brams, 1975; Lucas, 1974; Grofman and Scarrow, 1980.)[44,45] We shall quote the Court's opinion at some length:

> *Although the small towns in a county would be separately represented on the board, each might actually be less able to affect the passage of legislation than if the county were divided into districts of equal population with equal representation on the board and several of the smaller towns were joined together in a single district. (See Banzhaf 1965: 317). . . The significant standard for measuring a legislator's voting power, as Mr. Banzhaf points out, is not the number or fraction of votes which he may cast but, rather his ability. . .by his vote, to affect the passage or defeat of a measure. . . And he goes on to demonstrate that a weighted voting plan, while apparently distributing this voting power in proportion to population, may actually operate to deprive the smaller towns of what little voting power they possess, to such an extent that some of them might be completely disenfranchised and rendered incapable of affecting any legislation.*
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> (*Iannucci*, emphasis ours)[46]

The principle of one man-one vote is violated, however, when the power of a representative to affect the passage of legislation by his vote, rather than by influencing his colleagues, does not roughly correspond to the proportion of the population in his constituency. Thus, for example, a particular weighted voting scheme would be invalid if 60% of the population were represented by a single legislator who was entitled to cast 60% of the votes. Although his vote would apparently be weighted only in proportion to the population he represented, he would actually possess 100% of the voting power whenever a simple majority was all that was necessary to enact legislation. Similarly a plan would be invalid if it was mathematically impossible for a particular legislator representing say 5% of the population to ever cast a decisive vote. Ideally, in any weighted voting plan, it should be mathematically possible for every member of the legislative body to cast the decisive vote on legislation in the same ratio which the population of his constituency bears to the total population. Only then would a member representing 5% of the population have, at least in theory, the same voting power (5%) under a weighted voting plan as he would have in a legislative body which did not use weighted voting--e.g., as a member of a 20-member body with each member entitled to cast a single vote. This is what is meant by the one man-one vote principle as applied to weighted voting plans for municipal governments. A legislator's voting power, measured by the mathematical possibility of his casting a decisive vote, must approximate the power he would have in a legislature which did not employ weighted voting.
(*Iannucci*, emphasis ours)[47]

The Court then went on to confess itself unable to determine whether the plans before it met the criterion proposed, and asserted that the Boards are not entitled to rely on the presumption that their legislative apportionments are constitutional. Rather,

. . .with respect to weighted voting. . .a considered judgment is impossible without computer analyses and, accordingly, if the boards choose to reapportion themselves by the use of weighted voting, there is no alternative but to require them to come forward with such analyses and demonstrate the validity of their reapportionment plans.
(*Iannucci*, emphasis ours)[48]

With these words the court ushered in the age of computerized weighted voting in New York county government. The experiences of the 24 New York counties which have used weighted voting offer a number of useful lessons to legislatures considering options other than simple single-member districting and a number of lessons in terms of evaluating the ability of lawyers and judges to understand sophisticated mathematical arguments in the "one man, one vote" area.

First, in many counties weighted voting has given rise to situations in which a coalition of a very few of the large political units can wield majority control. Second, by allowing modified weighted voting, without recognizing that representatives from the same district elected by the same constituency are likely to vote as a bloc, the courts have inadvertently allowed the largest unit in one New York county a disproportionate share of the power (Grofman and Scarrow, 1981b, forthcoming). Third, in general, weighted voting systems fail to satisfy the criterion of equalizing "person power"; i.e., they do not allocate a number of representatives proportional to the population represented, thus failing to recognize that legislators perform services which have nothing to do with voting and which require personal attention. (See Grofman and Scarrow, 1981a, forthcoming.) Fourth, New York courts have unknowingly shifted the method of measurement used to measure the fairness of power apportionments in weighted voting schemes, so as to apply an extremely weak standard which is at variance with that used by the U.S. Supreme Court for judging single-member district schemes. Fifth, the court-imposed requirement of computer calculations to obtain optimal weight assignments for weighted voting systems has proven largely unnecessary; i.e., the assignment of weights according to simple population proportions would have produced power scores which matched population proportions almost exactly. (For extended discussion, see Grofman and Scarrow, 1979, 1980, 1981 forthcoming, 1981b forthcoming.)[49]

In sum, it does not appear to me that weighted voting ought to be looked to as a means of providing particular geographic units (or geographically concentrated racial or linguistic minorities) a means of representation proportional to population. While weighted voting can be used to accomplish this end, I believe that its drawbacks more than outweight its benefits, especially as its constitutionality has never yet been subject to Supreme Court test. Nonetheless, if district sizes are permitted to vary only slightly from equipopulation, weighted voting might be a useful way of reconciling "one person, one vote" standards with maintenance of political subunit boundaries and without requiring much of any decennial shifting of district boundaries (Lee Papayanopoulos, personal communication, June 14, 1980).

PROPORTIONAL REPRESENTATION.

The Hare System. Slightly over two dozen U.S. cities have made use of proportional representation (in the form of the Hare single transferable vote) for their city council elections at some time during this century, primarily during the period 1915-1946 (Hoag and Hallett, 1926; Hallett, 1940). Most of these cities used PR for only a few elections, but seven cities (Ashtabula, Boulder, Cincinnati, Lowell, New York, Toledo, Wheeling), used PR for at least a decade, and one city (Cambridge) is still using PR and has done so since shortly after WWII, while New York began in the 1970's to use PR for school board elections. Until the early 60's, the National Municipal League had PR as one of the components of its model city charter.

The chief objections to PR were that (1) the Hare system was too complicated for voters to understand, (2) the Hare system was too complicated for voters to use, leading to lower turnout and a high proportion of spoiled ballots, (3) PR made stable majority rule government impossible, and (4) PR made it possible for "undesirables" e.g., kooks, communists, Negroes) to be elected.

The first charge is partly true but largely false. Certainly the Hare vote transfer procedure is rather complicated to explain, but most voters could readily grasp the basic idea that any group which composed a certain proportion of the electorate would be able under the Hare system to elect a representative of its choice. Moreover, it seems unlikely that Americans who can tell you how many games the Phillies are out of third in the division would readily be unable to comprehend the idea of rank-ordering their candidate preferences.

There is no evidence to support the second charge and little evidence to support the third charge, either (see esp. Dodd, 1976). Nonetheless, horror stories about the instability of European countries which used (party list) PR were used by PR opponents to attack the Hare system as malefic and un-American.

The fourth assertion, that PR led to the election of "undesirables," was responsible for the demise of PR in a number of instances. The election of alleged "irresponsibles" in Ashtabula, the election of communists in New York City, and the threatened election of a Black mayor in Cincinnati were key factors in the referendum repeals of PR in those cities.

The repudiation of PR by all but one of the American cities which used it has often been alleged to demonstrate its unsuitability for use in the U.S. Actually, as far as we are aware, in those cities where the Hare system was used it worked well, and its "undesirable" consequences were mostly in the eyes of the previously impregnably entrenched majority beholders. Whether the present day context of concern for effective minority representation can allow PR to make a "comeback" is an open question. There are a few signs of its present day resuscitation, e.g., use of the Hare System in the 1970's for school board elections in New York City, and the replacement of winner-take-all primaries with a form of proportional representation in the Democratic Party nominating process. (See Lengle, this volume.)

Cumulative Voting. Voting for the Illinois General Assembly has, for most of Illinois' period of statehood, made use of cumulative voting. Cumulative voting in Illinois takes place in three-member districts, in which voters may cast three votes for a single candidate or one and a half votes for each of two candidates or one vote apiece for three candidates.

One consequence of cumulative voting as it has been practiced in Illinois is that virtually all districts have elected one minority party and two majority party representatives, since (for a

two-party contest) only where the majority party has 75% or more of the voting strength (and can expect its loyalists to vote a straight party ticket) can that party capture all three seats in a district. Thus, the Republican downstate rural districts elect some Democratic representatives to the Illinois House and the Chicago Democratic districts elect some Republican representatives. This crossover prevents the urban-rural split in Illinois from being defined in purely partisan terms.

A proposal for the repeal of cumulative voting was made as part of a referendum to reduce the size of the Illinois Assembly. This referendum carried overwhelmingly in 1980 for reasons that had little or nothing to do with support/opposition to cumulative voting.

In our view, the Illinois experience demonstrates conclusively that the effect of a particular voting system can be understood only in the context of the politics in which it is embedded. In Illinois, cumulative voting has operated within the context of a rather two-party system. In Illinois, cumulative voting has not led to a proliferation of single-issue candidates or parties. Moreover, in Illinois, for a variety of reasons, the political parties have not run what (in retrospect) can be shown to be the optimal number of candidates. In particular, the majority party in each district plays it very safe. Even in cases where the majority party received over 60% of the vote--cases where it can be shown that it could not hurt for it to have run three candidates--over 80% of the time only two candidates were run (Brams, 1975: 120).[50]

In Illinois, cumulative voting has certainly not destroyed two-party government nor has it been accompanied by an unusual proliferation of "special interest" representatives--charges often leveled against PR systems. Furthermore, it has usually given rise to a *very* good fit between a party's vote share and its share of legislative seats. On balance, the cumulative voting record in Illinois was a quite favorable one (Sawyer and MacRae, 1962; Blair, 1973; Epstein and Grofman, work in progress).[51]

NOTES

1. For example, at present (according to the Council of State Governments) the upper house in 13 states and the lower house in 22 states utilize some multimember districts.

2. New York has 24 of its 62 counties using some form of weighted voting within the county legislature and 12 electing representatives from a combination of single- and multiple-member districts or multiple-member districts of various sizes.

3. In two articles which appeared in American law journals in the mid 1960's, a lawyer named John Banzhaf III (Banzhaf, 1965, 1966) proposed to evaluate representation systems in terms of the extent to which they allocated "power" fairly. Banzhaf's analysis makes use of game-theoretic notions in which power is equated with the ability to affect outcomes.

Consider a group of citizens choosing between two opposing candidates. To calculate the power of the individual voter, we generate the set of all possible voting coalitions among the district's electorate. If there are N voters in the district, then there will be 2^N possible coalitions. Then we ask, for each of these possible coalitions, whether a change in an individual voter's choice from Candidate A to Candidate B (or from Candidate B to Candidate A) would alter the electoral outcome. If so, that voter's ballot is said to be decisive. A voter's power is defined as the number of times, in all possible coalitions, that his vote could be decisive, and can best be expressed as a percentage--i.e., the number of his decisive votes divided by the total number of all the decisive votes of all the voters (including himself). The higher the percentage of voter coalitions in which his vote is decisive, the higher a voter's power score. The Banzhaf index has considerable intuitive appeal; power is based on ability to affect outcome. However, the Banzhaf calculations also rest on the not so reasonable proposition that all voting combinations are equally likely.

For single-member district systems, each district having equal populations, all voters have identical power; the ability of the voter in one district to affect his district's electoral outcome is identical with the ability of another voter in a neighboring district to affect the outcome there. But what about the case of multiple-member districts, with some districts of one size and others of another size? Here, since the voters who elect k representatives have k times as much importance as voters who can elect only one representative, we might expect that to equalize voter power we should assign the districts with k representatives k times as many voters as well, since with all votes of equal weight, intuitively, we would expect a voter's ability to decisively affect outcomes should be inversely proportional to district size. Banzhaf (1966) pointed out that this argument is mathematically incorrect and that actually the voters have decisive power proportional to the square root of district size.

This issue and the mathematics underlying this argument are discussed at length in Lucas (1974) and Grofman and Scarrow (1981a, forthcoming).

4. Chapman v. Meier (1975) 420 U.S. at 15-16.

5. Whitcomb v. Chavis (1971) 403 U.S. 124 at 157-158, n. 38.

6. Fortson v. Dorsey (1965) 379 U.S. 433.

7. Reynolds v. Sims (1964) 377 U.S. 533 at 57.

8. Burns v. Richardson (1965) 384 U.S. 73, at 74.

9. Fortson v. Dorsey (1965) 379 U.S. at 439.

10. Burns, Kilgarlin et al. v. Hill (1964) 386 U.S. 120.

11. Whitcomb v. Chavis (1971) 403 U.S. 124 at 125.

12. Whitcomb v. Chavis (1971) 403 U.S. 124 at 141.

13. Reynolds v. Sims (1964) 377 U.S. 533 at 565.

14. Whitcomb v. Chavis (1971) 403 U.S. at 144.

15. Whitcomb v. Chavis (1971) 403 U.S. at 144-145.

16. White v. Regester (1973) 412 U.S. at 767.

17. White v. Regester (1973) 412 U.S. at 767.

18. White v. Regester (1973) 412 U.S. at 769.

19. Kruidenic v. McCulloch ( ) 142 N.W. 2nd 355.

20. Graves v. Barnes (1972) 373 F. Supp. 704 (W.D., Texas).

21. Graves v. Barnes (1974) 378 F. Supp. 640 (W.D., Texas).

22. Connor v. Johnson (1971) 402 U.S. 690.

23. In East Carroll Parish School Board v. Marshall (1976) 424 U.S. 636 the Court held that single-member districting is the appropriate remedy for federal courts to impose where at-large election schemes have been found to unconstitutionally dilute the voting strength of Black minorities. In jurisdictions covered under the Voting Rights Act of 1965 (as interpreted by the U.S. Supreme Court in the Petersburg and Richmond cases (see below), since 1973 the Justice Department has had a ban on changes from ward to at-large districting.

24. City of Mobile, Alabama v. Bolden (1980) 48 L.W. 4436.

25. It appears as if a new wave of reformers has taken up district elections as a "reform" to replace the at-large elections which were a reform of an earlier generation of reformers. In addition to court challenge to at-large elections, referenda to replace at-large with district elections have taken place in a number of cities; and faced with the prospect of court challenge, a number of cities had voluntarily shifted from at-large to district elections. By one or the other of those mechanisms, at-large elections have been replaced with district systems in such cities as Albany, Georgia; Charleston, South Carolina; Forth Worth, Texas; Mobile, Alabama; Aberdeen, Mississippi; Raleigh, Virginia; San Antonio, Texas; San Francisco, California; and Waco, Texas (Heilig, 1978; Cotrell and Fleischman, 1979; Mundt, 1979). Neither political nor legal challenges against at-large elections or systems which mix district and at-large elections have, however, been uniformly successful. (See Karnig and Welch, 1978: 2; Cotrell and Fleischman, 1979, note 8.)

26. Lucas v. Colorado General Assembly (1964) 377 U.S. 713, n. 2.

27. Beer v. U.S. (1976) S. Ct. 1357.

28. Zimmer v. McKeithan (1973) F. 2d 1297. At-large elections for school board and police juries in Louisiana Parish (County) were repudiated in Zimmer, despite the fact that 46% of the registered voters in the parish were Black and some Black candidates had been elected in the previous at-large elections--including one candidate who had been defeated when running in his own ward when ward-based elections were in effect. (This

case was affirmed, albeit on other grounds, as East Carroll Parish School Board v. Marshall [1976] 424 U.S. 636. See discussion in Dolgow, 1977: 173-475.) In Wallace v. House (515 F. 2d 619 [5th Cir. 1975]), at-large municipal elections were invalidated in Ferriday, Louisiana, although a plan combining mixed single-member districts and at-large elections was upheld. (In that city, although Blacks constituted nearly fifty percent of the voters, under the at-large scheme they had controlled not one of its aldermanic seats.) A number of other at-large elections have been struck down, but in other jurisdictions at-large elections were sustained against legal challenge. (See e.g., Hendrix v. Joseph [1977] 559 F. 2d 1265 and David v. Gamson [1977] 553 F. 2d 923.)

In Richmond, Virginia, a shift from at-large to ward elections for city council was the price the city was required (by the Justice Department) to pay if it wished to annex a suburban area which was predominantly White--an annexation which would have kept the city population majority White. The Justice Department's authority to impose such a requirement under the Voting Rights Act of 1965 and 1975 was sustained by the U.S. Supreme Court in City of Richmond, Virginia v. United States (1975) 422 U.S. 358. (See also City of Petersburg, Virginia v. United States [1973] 410 U.S. 926.) See also Beer v. U.S. (1976) 76 S. Ct. 1357, in which the at-large component of a proposed change in election procedures for the New Orleans City Council election was exempted from Justice Department scrutiny because the at-large features remained unchanged from earlier election laws and thus were not held to be subject to review under the Voting Rights Act of 1965.

29. This result was anticipated in an earlier case before Fifth Circuit, Nevitt v. Sides (1978) 571 F.2d 209, in which the claim was rejected that at-large districting for a city council in a racially polarized city was per se discriminatory, and a showing of "intentional" discrimination found to be necessary. In Nevitt the court referred to at-large districting as "racially neutral, on its face," and the court asserted that "absent other evidence indicating the existence of intentional discrimination, state laws providing for at-large districting are entitled to the deference accorded any other statute; their means need only be reasonably related to ends properly within state cognizance." However, in Nevitt (at 221) the Court held that a plan, "racially neutral at its adoption" may be unconstitutional if it furthers "preexisting discrimination" or is used to "maintain" it. Moreover, and most importantly, in Nevitt the Fifth Circuit court majority was able, albeit through what we regard an ingenious logic chopping, to reconcile the proof of intent requirement enunciated by the U.S. Supreme Court in Washington v. Davis as being fully compatible with its own previous ruling in Zimmer v. McKeithen.

30. Washington v. Davis (1976) 426 U.S. 229.

31. Arlington Heights v. Metropolitan Housing Development Corp. (1977) 429 U.S. 252. Arlington Heights involved a zoning ordinance prohibiting multifamily dwellings, which was challenged

on the ground that the ordinance had a racially discriminatory effect. Washington v. Davis involved the constitutionality of a written personnel test which Blacks were four times more likely to fail than Whites. Both the ordinance and the test were found to be devoid of any racial overtones which would require Court intervention on constitutional grounds, since in neither case was there found any intent to engage in racial discrimination.

32. The difference between the purpose doctrine and earlier rulings can be shown with a quote from the holdings in Graves v. Barnes (1974) 378 F. Supp. 640 (emphasis ours):

> *Given general conditions indicating racial discrimination that has stunted the participation of Blacks and Mexican-Americans in life of state, plaintiffs who claim that multi-member legislative districts discriminated against such minority need only prove an aggregate of factors including restricted access of minority groups to slating of candidates for particular party nominations, consistent use of racial compaign tactics to defeat minority candidates or those championing minority concerns, indifference or hostility of district-wide representatives to particularized minority interests, and inability of minority groups to obtain representation in proportion to their percentage of district's population.*

33. We might also note that in Kirksey v. Board of Supervisors of Hind County, Mississippi (1977) 544 F. 2nd 139, a 1977 case which also reached the U.S. Court of Appeals, Fifth Circuit, wedge-shaped single-member districts which cut up the Black population so as to deprive them of majority control of any district were rejected as discriminatory even though direct discriminatory intent was not proved; while in City of Rome, Georgia v. United States (August 9, 1979) 472 F. Supp 221 (U.S. District Court, District of Columbia, a change of election system which introduced runoffs, numbered posts, and staggered elections was held to violate the Voting Rights Act even though no intent to discriminate was proved. In Kirksey there was an established history of previous discrimination and a holding that inequality of access to the political process was an inference which flowed from existence of economic and educational inequalities suffered by minority inhabitants of the county. In the words of Judge Godbold in that opinion, "nothing suggests that where purposeful and intentional discrimination already exists it can be constitutionally perpetuated into the future by neutral official action."

34. Fortson v. Dorsey (1965) 379 U.S. 433 at 439.

35. City of Mobile, Alabama v. Bolden (1980) 48 LW 4436, Note 13.

36. Fortson v. Dorsey (1965) 379 U.S. 433 at 439.

37. Karnig and Welch (1978: 2-4) review a number of these studies and the reasons why findings differ. We draw upon their analysis in our discussion below. A detailed discussion of over a dozen studies (including all those cited below) is available upon request from the author.

38. Sloan (1969; Table 3, 1967) does find that, under at-large elections with designated representatives, when two Blacks run against each other, the Black preferred by other Blacks is defeated in the city-balloting. Thus, while the percentage of Black representation may remain unchanged, the nature of that representation may have changed dramatically. We regard this as an extremely important point. A number of minority representatives proportional to minority population is not a sufficient condition for proportionate representation of minority interests; and indeed it may not even be a necessary one. We share the view of Tribe (1978: 658-659) that

> *To speak of a group's electing "its" representative is, after all, an oversimplification. Various candidates appeal in varying degrees to all population groups. Thus a minority might insure some representation even in a district where it could not come close to electing a candidate who espoused its views without reservation; the minority could help elect the candidate whose views were least obnoxious to its members. Of course, if there were clearly dichotomized minorities and majorities--and if voters never cast wayward ballots--the minority might still be completely denied representation. But these factual assumptions defy the facts of political life; there are many types of interests and many gradations of opinion, with the result that a process of accommodation is generally undertaken in which even small minorities can successfully vie for influence.*

39. McManus (1978), Taebel (1978), and Robinson and Dye (1978) look at the same cities. However, the exact data each look at is slightly different. See MacManus (1979).

40. Mundt (1979) has looked at Richmond. In response to legal challenge to a proposed annexation of White suburbs which would have reduced the percentage of Black population below 50%, there was a Justice Department-imposed shift from at-large to district elections in which four districts were created with a clear Black majority, four with a clear White majority, and one district which was a "swing" district. The swing district has been won by a Black candidate, creating Black majority control.

41. All but two of the (cross-sectional) studies concluding that at-large elections impede Black representation have employed the ratio approach (exceptions are Taebel, 1978, and Karnig and Welch, 1978), and both of the cross-sectional examinations uncovering no relationship between Black electability and electoral form have utilized the difference approach (Cole, 1974; MacManus, 1978).

42. Karnig and Welch find the most inequitable Black representation in cities using at-large elections with designated representatives (.44 on the ratio measure, -14.0% on the difference measure, N = 27).

43. Graham v. Board of Supervisers of Eri County (1967) 267 N.Y.S. 2nd 383.

44. Iannucci v. Board of Supervisors of the County of Washington (1967) 282 N.Y. 2nd 502. See Footnote 3 for a definition of the Banzhaf Index.

45. So long as each legislator has a single YEA or NAY vote on issues coming before the legislature, the question of legislative power does not have to be explicitly addressed. Thus, in the leading apportionment cases which have come before the U.S. Supreme Court, all of which have involved single- or multiple-member districts with each elected representative eligible to cast a single vote, it seems to be simply assumed that the justification for examining the number of persons contained within each district is the fact that their elected representatives by their vote wield equal decision-making power in the affairs of the polity; and that equality of apportionment thus indirectly results in equality of policy-making power among citizens.

But what about weighted voting schemes (also fractional voting schemes) where, say, a legislator from a district with 20,000 population casts two votes, while a legislator from a district with 10,000 population casts only one vote? Again, it was John Banzhaf III who pointed out the fallacy of such "common sense" apportionment schemes. Consider, for example, a three-member committee, with members A and B with two votes, and member C with only one vote. Despite the fact that vote shares (weights) are not equal, from the standpoint of Banzhaf's concept of decisive votes all committee members have equal power (1/3, 1/3, 1/3) when a majority (3 of 5 votes) is needed. When a two-thirds vote is necessary for passage, the power scores change. Now member C has no power at all (in the language of game theory, he is a dummy), while the other two members each hold 50 percent of the power. Banzhaf's argument is simply that when weighted voting schemes are designed, weights should be assigned in such a way that a legislator's power (as contrasted with the number of votes he wields) should be made proportional to the number of citizens in his district.

46. Iannucci v. Board of Supervisors of the Country of Washington (1967) 282 N.Y.S. 2nd 502 at 507.

47. Iannucci v. Board of Supervisors of the Country of Washington (1967) 282 N.Y.S. 2nd 502 at 508.

48. Iannucci v. Board of Supervisors of the Country of Washington (1967) 282 N.Y.S. 2nd 502 at 510.

49. New York courts have also failed to recognize the mathematical identity between weighted voting systems and multi-member district systems in which district representatives vote as a bloc. This is an important omission because partisan politics in New York makes bloc voting at the district level the reality in most New York political units with multimember districts.

50. Among the reasons why parties did not pursue an "optimal" strategy are (a) electoral uncertainties with them which prevent the clear identification of an optimal strategy (Brams, 1975: 120); (b) understanding opposite numbers in the other party--sweetheart deals which preserve incumbents and eliminate two-party competition (Sawyer and MacRae, 1962: 939-945);

(c) control by the party's incumbents in the district of the number of candidates to be slated. Incumbents are reluctant to see additional candidates on the ballot. Candidates who aren't certain of election may act as individuals rather than as part of a party slate, thus potentially jeopardizing the electoral success of the party's other candidate(s). In particular, they may jeopardize the electoral success of the incumbent(s) running for reelection. (David Epstein, Parliamentarian, Illinois House of Representatives, Personal communication, July 11, 1980); and (d) since the early 70's, a clause in the Illinois constitution compels political parties to run no fewer than two candidates in each district. With a handful of exceptions, this provision has been complied with throughout the state.

51. In November 1980 cumulative voting for the Illinois House was abolished as part of a referendum to reduce the size of the legislature.

REFERENCES

BANZHAF, J. (1965) "Weighted voting doesn't work: A mathematical analysis," Rutgers Law Review 19: 317-343.

_____ (1966) "Multi-member electoral districts--do they violate the 'one-man, one-vote' principle?" Yale Law Journal 75: 1309-1338.

BLAIR, G. (1973) "Cumulative voting: An effective electoral device for fair and minority representation," in Lee Papayanopoulos (Ed.), Democratic Representation and Apportionment. New York: New York Academy of Sciences, 20-26.

BRAMS, S. (1975) Game Theory and Politics. New York: Free Press, 1975.

BRYCE, J. (1889) The American Commonwealth, Vol. 1, London.

CARPENETTI, W. (1972) "Legislative apportionment: Multimember districts and fair representation," University of Pennsylvania Law Review 120: 666-700.

COLE, L. (1978) "Electing Blacks to municipal office: Structural and social determinants," Urban Affairs Quarterly 10: 17-39.

COMMENT (1970) "Effective representation and multi-member districts," Michigan Law Review 68: 1577.

COTTRELL, C. and A. FLEISCHMAN (1979) "The change from at-large to district representation and political participation of minority groups in Fort Worth and San Antonio, Texas," presented at the Annual Meeting of the American Political Science Association, August 30-September 3, Washington, D.C.

DIXON, R. (1968) Democratic Representation and Reapportionment in Law and Politics. New York: Oxford University Press.

_____ (1971) "The court, the people, and 'one man, one vote,'" in Nelson W. Polsby (Ed.), Reapportionment in the 1970's. Berkeley: University of California Press, 7-45.

DODD, L. (1976) Coalitions in Parliamentary Government. Princeton, NJ: Princeton University Press.

DOLGOW, S. (1977) "Political representation: The search for judicial standards," Brooklyn Law Review 43: 431-487.

GROFMAN, B. (1975) "A review of macro-election systems," in Rudolph Wildenmann (Ed.), German Political Yearbook (Sozialwissenschaftliches Jahrbuch fur Politik), Munich, Germany: Verlag 4: 303-352.

GROFMAN, B. and H. SCARROW (1978) "Game theory and the U.S. courts: One man, one vote, one value," School of Social Sciences Research Report, University of California, Irvine, December.

_____ (1979) "Iannucci and its aftermath: Game theory and weighted voting in the State of New York," in Steven Brams (Ed.), Applied Game Theory. Vienna: Springer-Verlag.

_____ (1980) "Mathematics, social science and the courts: Two case studies," in Michael Saks and Charles Baron (Eds.), The Use/Nonuse/Misuse of Applied Social Research in the Courts. Cambridge, MA: Abt Associates, 117-127.

_____ (1981a, forthcoming) "The riddle of apportionment--equity of what?", National Civic Review.

_____ (1981b, forthcoming) "Weighted voting: The record in New York County government," Legislative Studies Quarterly.

HALLETT, G. (1926) Proportional Representation. New York: Macmillan.

HEILIG, P. (1978) "The abandonment of 'reform' in a southern city: Outcomes of a return to district politics," delivered at the Annual Meeting of the Midwest Political Science Association.

HOAG, C. and G. HALLETT (1926) Proportional Representation. New York: Macmillan (Reprinted New York: Macmillan, 1969).

JEWELL, M. (1970) "Commentary on 'the court, the people' and 'one man, one vote,'" in Nelson Polsby (Ed.), Reapportionment in the 1970's. Berkeley: University of California Press, 46-52.

JONES, B. (1976) "Distributional considerations in models of government service provision," Convention paper, Southwest Political Science Association, Dallas, Texas, April.

KARNIG, A. and S. WELCH (1978) "Electoral structure and Black representation on city councils. An updated examination," delivered at the Annual Meeting of the Midwest Political Science Association. Chicago, April.

KLAIN, M. (1955) "A new look at the constituencies: A recount and a reappraisal," American Political Science Review 1105-1119.

LOOSEMORE, J. and V. HANBY (1971) "The theoretical limits of maximum distortion: Some analytic expressons for electoral systems," British Journal of Political Science 1 (October).

LUCAS, W. (1974) "Measuring power in weighted voting systems," Case Studies in Applied Mathematics. Mathematics Association of America, Module in Applied Mathematics, 1976. (Originally published as Technical Report No. 227, Department of Operations Research, College of Engineering, Cornell University, Ithaca, New York, September.

MACMANUS, S. (1979) "'At-large elections and minimum representation': An adversarial critique," Social Science Quarterly 60, No. 2: 338-340.

_____ (1978) "City council election procedures and minority representation: Are they related?" Social Science Quarterly 59, No. 1: 153-161.

MUNDT, R. (1979) "Referenda in Charlotte and Raleigh, and court action in Richmond: Comparative studies on the revival of district representation," paper presented at the APSA.

RAE, D., V. HANBY, and J. LOOSEMORE (1971) "Thresholds of representation and thresholds of exclusion: An analytic note on electoral systems," Comparative Political Studies 3: 479-488.

ROBINSON, T. and T. DYE (1978) "Reformism and Black representation on city councils," Social Science Quarterly 59: 31: 133-141.

ROKKAN, S. (1968) "Elections: Electoral systems," International Encyclopedia of the Social Sciences. New York: Crowell-Collier, MacMillan.

SAWYER, J. and D. MACRAE (1962) "Game theory and cumulative voting in Illinois 1902-1954," American Political Science Review 56: 936-946.

SLOAN, L. (1969) "'Good government' and the politics of race," Social Problems 17, #2: 161-167.

SLOAN, L. and R. FRENCH (1971) "Black rule in the urban South," Transaction/Society 9: (November/December).

TAEBEL, D. (1978) "Minority representation on city councils: The impact of structure on Blacks and Hispanics," Social Science Quarterly 59: 142-152.

TRIBE, L. (1978) American Constitutional Law. Minneola, NY: Foundation Press.

WASHINGTON, R. (1971) "Does the Constitution guarantee fair and effective representation to all interest groups making up the electorate?" Harvard Law Journal 17: 91-130.

WELCH, S. and A. KARNIG (1978) "Representation of Blacks on big city school boards," Social Science Quarterly 59: 162-171.