COMMUNICATIONS

EXPERIMENTAL APPROACHES TO VOTE-COUNTING

THEORY IN NOMINATING CHOICE

To the Editor:

Professor William H. Riker's essay* on "Voting and the Summation of Preferences" (this Review, Vol. 55, December 1961, pp. 900-11) is a most useful contribution. It needs to be supplemented by some comment on the applicability of this material in the field of nominating choice; also on the applicability of experimental approaches to ascertain the frequency with which the problems that concern Riker may in fact occur in nature.

The best-known elections in the United States in which a choice among three or more alternatives is likely to occur are those involved in making party nominations. In either one party or the other, almost every presidential year has seen three or more candidates competing for a presidential nomination. Situations involving as many as six or seven candidates have been relatively common in state primaries, as for example those involving the gubernatorial candidates in Alabama and Texas in 1962.

If the work by Duncan Black and his predecessors to which Riker calls attention had been known fifty years ago, the evolution of primary elections in this country might conceivably have taken a somewhat different form. Black seems, in fact, to have produced a fundamental discovery showing why either plurality choice without a majority, or a run-off between the two leading first-choice candidates, can easily result in the selection of the "wrong" candidate if the candidate or candidates at the center of the spectrum happen to be weakest in first-choice strength, although strong in second- or third-choice strength—an event which one could suppose must be relatively common.

A simple illustration of a familiar kind will make the point. Suppose three candidates, A, B, and C, of whom A and C are leading, but are strongly opposed to each other. The supporters of each reject the other, but would be willing to accept B, the man in the middle. In this case, the distribution of the voters in terms of their preference orders might be about as follows:

<table>
<thead>
<tr>
<th>Preference</th>
<th>Per Cent of Voters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40 15 10 35</td>
</tr>
<tr>
<td>1st</td>
<td>A B B C</td>
</tr>
<tr>
<td>2nd</td>
<td>B A C B</td>
</tr>
<tr>
<td>3rd</td>
<td>C C A A</td>
</tr>
</tbody>
</table>

Black argues that in such a case, that candidate should be chosen who could defeat each of the others when paired against them one at a time, as B could do in the present case. Yet B would be defeated in any primary election decided on the basis of an initial plurality or of a run-off between the two first-choice leaders. Such a plurality defeat is exactly what happened to Governor Thomas E. Dewey in the 1948 Wisconsin primary, when the Republican vote divided Stassen 40 per cent, Dewey 24 per cent, and MacArthur 36—a situation, moreover, in which Dewey was undoubtedly the candidate of the center and could probably have defeated either of his opponents in a two-way test.

We used Blacks' work to some extent in The Politics of National Party Conventions (p. 315, n. 24, and p. 489, n. 7), but if it had come to our attention sooner and we had assimilated it more fully, our treatment of the alternative vote and of the hazards of plurality voting would have been somewhat different. In a more recent study, I applied Black's criterion directly in attempting to assess the results of the Democratic convention of 1960, and concluded, on the basis of the Gallup poll data that Kennedy probably could have defeated each of the other candidates in a two-way test and could therefore be regarded as a majority choice of his party (David et al., The Presidential Election and Transition 1960-61, pp. 18-19).

In this particular instance, there was no evidence of nontransitivity of social choice. The "Arrow problem" to which Riker devotes so much attention apparently did not arise, although on a priori grounds, the situation was especially conducive to nontransitivity because of the cross-cutting effect of the religious issue.

The Arrow problem is so intriguing intellectually that it is easy to overlook the paucity of empirical data demonstrating cases in which it actually occurred, despite the extensive discussion the problem has received over a ten-year period. If I understand Riker's essay correctly, he does not cite a single case of nontransitivity of social choice in an actual situation involving real people, although he refers at pages 909-910 to various types of experimental work leading to somewhat conflicting results. Gordon Tullock of the University of Virginia, co-author with James M. Buchanan of The Calculus of Consent (1962), tells me that he not is aware of any documented cases in the
literature, and furthermore seems to be in at least partial disagreement with Riker on the frequency with which such cases might be expected if there were enough experimental work to provide a basis for a conclusion. On a priori grounds arising out of theories of his own, Tullock believes that actual cases would be quite infrequent in situations involving only three or four alternatives, although they would occur; while Riker seems to think they might occur rather often.

The subject is one that lends itself readily to classroom experimentation, as well as to use of sample surveys; and the problems involved in a simple lack of majority preference on a first-choice basis will always be important, whatever happens to the Arrow problem. In hopes of finding a factual example of nontransitivity on a legislative issue, as well as other potential results, I made up a ballot offering three alternatives, as follows:

A. Federal aid for public schools only
B. Federal aid for public and private (including parochial) schools
C. No federal aid for either schools

Each respondent was also asked to indicate whether he considered himself a Democrat, Neutral, or Republican.

This ballot was presented to a class in an introductory course in government and 68 usable ballots were obtained. The party split proved to be 24-D, 21-N, and 23-R. The numbers of students in the total group voting each preference order were as follows:

<table>
<thead>
<tr>
<th>Preference</th>
<th>Rockefeller</th>
<th>Nixon</th>
<th>Romney</th>
<th>Goldwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>26</td>
<td>18</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>2nd</td>
<td>21</td>
<td>24</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>3rd</td>
<td>11</td>
<td>18</td>
<td>29</td>
<td>12</td>
</tr>
<tr>
<td>4th</td>
<td>12</td>
<td>10</td>
<td>19</td>
<td>29</td>
</tr>
</tbody>
</table>

In this group, no one had a majority as either first choice or last choice. Rockefeller would have been the winner on a first-choice plurality basis; a run-off would have occurred between Rockefeller and Goldwater. In this group, Rockefeller would win the run-off by 41 to 29—assuming no vote-shifting—and in this case a run-off would also produce the "correct" outcome, since Rockefeller could defeat each of the other candidates in a two-way race. Nixon, however, would have defeated Goldwater in a two-way race, 42 to 28, and it could be argued that if there is to be a run-off, it should take place between Rockefeller and Nixon rather than Rockefeller and Goldwater. On a Borda count according to the method of marks (see Black), by which 3 marks are given for each first choice, 2 for each second choice, 1 for each third choice, and 0 for each fourth or last choice, Rockefeller's count was 131, Nixon's 120, Goldwater's 90, and Romney's 79. In a two-way race, however, Romney would have defeated Goldwater by 37 to 33.

The results just given for outcomes in the various two-way combinations were derived from the original counting chart, set up as a series of tree diagrams in which each of the four first-choice possibilities is followed by its three second-choice possibilities, those in turn by their two third-choice possibilities, and those in turn by the corresponding fourth-choice possibilities. Use of such a chart greatly facilitates the original ballot counting and thereafter makes it possible to assemble results on any desired basis with a minimum of retabulation.

When the 23 Republican ballots in this group were tabulated separately, the preference distributions were as follows:
In this group, again no one has a first-choice majority, but Goldwater would be the winner on a plurality basis. In a run-off, however, Nixon would have his chance and would defeat Goldwater 13 to 10. On a two-way basis, Nixon defeats each of the other candidates, Goldwater defeats Rockefeller and Romney, and Rockefeller defeats Romney; there is no evidence of nontransitivity. The Borda count is Nixon 41, Goldwater 36, Rockefeller 34, and Romney 27.

The four candidates were arranged from left to right in the previous tabulations on the basis of commonly held opinions about their positions in relation to each other. The voting distributions on the tree diagrams, however, provide empirical evidence for an ordering in which Rockefeller and Goldwater occupy the polar positions, with Nixon nearest to Rockefeller and Romney nearest to Goldwater. Evidences of these relationships are apparent in all the diagrams, but especially in those for the 23 Republican voters, where Nixon was the second choice of all the Rockefeller voters, Romney was the principal second choice of the Goldwater voters, and Rockefeller was the second choice of most of the Nixon voters. Goldwater and Romney divided the last choice positions for the Rockefeller and Nixon voters, while Rockefeller and Nixon performed this office for the Goldwater and Romney voters. All of this suggests that the actual voting results can be used to array a group of candidates along a spectrum in the absence of other evidence, if the voting process provides a complete array of preference data, as it could at least in classroom experiments or sample surveys.

These experiments have been reported in part because the results have some intrinsic interest, but primarily to illustrate a method of experimentation that can be used either in the classroom or in sample surveys. This in turn suggests a number of conclusions of some potential interest to the profession:

1. An experimental method is available to demonstrate to students the complexity of preference structures in situations of multiple alternatives. Such properties of opinion as conflict and consensus or the lack of it can be studied. With the addition of other scaling devices, intensity could also be studied.

2. Used repeatedly, such experiments could be used to demonstrate some of the other properties of opinion, notably stability, instability, and latency—properties of special importance in the development of a presidential nominating choice.

3. Such experiments can be used to demonstrate the difficulties inherent in arriving at valid majority decisions in situations involving a choice among multiple alternatives of candidates or policies. This is the classic problem of the national party conventions and of any primary election where there has been no effective pre-election screening of the candidates.

4. Sample surveys along these lines, used effectively with adequate publication of the results, could do much to create a more informed public opinion in situations involving multiple alternatives, including preconvention proceedings on presidential nominations and primary elections in states where multiple candidacies are typical.

5. If some method of accumulating the results can be devised, it would be possible to obtain empirical answers to at least three questions on which answers are needed, namely, (a) whether existing primary election systems involving mere plurality choice or a run-off tend frequently to select nominees who are not in fact the majority choice of their party on any basis; (b) whether such systems tend to select from the extremes more often than from the center in situations of multiple candidacies, as Black implies at page 75 of his book; and (c) whether the problem of nontransitivity of social choice exists in nature with sufficient frequency to deserve consideration in the design of electoral systems.

6. In future election years, substantial research funds could appropriately be invested in sample surveys during the intervals preceding the holding of primary elections in a considerable number of situations involving multiple candidacies. It would be desirable to pretest situations involving three or more candidates that will be settled by a plurality as well as those that will be settled by a run-off. Sample surveys in as many as fifteen or twenty primary election situations in the same year could do much to clear up the questions raised in the preceding paragraph.

7. Finally, after the steps indicated, presumably it would be possible to develop a vote-counting theory in nominating choice, as well as an improved system for holding primary elections, that would not only rest on a sounder empirical foundation than is presently avail-
ON BRZEZINSKI'S USE OF HISTORY

To the Editor:

May I comment on some aspects of the article on "Deviation Control" in your March issue?

Since differences in organizational purposes may condition methods of action and the kind of organizational unity that is required, I question whether "the most vital and distinctive aspect of the activities of the Church," the "spiritual" aspect "which defines its unique character," "can be altogether excluded from consideration" in a discussion of tactics toward deviation. The role of concentrated force, the rationale of command and obedience, the methods through which cohesion is best attained may very well differ for an organization that hopes to achieve an external re-modeling of institutions, through revolutionary seizures of power and through techniques of control preceding general consent, and for an organization that conceives its goal as a continuous, continually repeated process, inherently un-coercible, occurring within individual men. The Church has always been aware that diverse and spontaneous movements of thought and action initiated by persons apart from the hierarchy have been a major factor in its success (insistence on conformity of thought and method would have decimated the roster of saints—eliminating Aquinas, among others). As a matter of historical fact, the conditions within which the Church developed gave it no chance to become "a single homogeneous unit" in which "the center" could exercise a degree of control remotely comparable to that of Stalin in the Party. Both its purposes and its possibilities have required it to depend heavily on persuasion, reasoning, tradition, the rule of law, and diplomatic compromise; it has always had to combine an insistence on some fixed principles and procedures with an acceptance of a considerable degree of internal diversity and autonomy, open debate, and unresolved disagreement. Thus the conception of organizational unity within which issues of deviation are to be considered has never, I suggest, been the same for the Church as for the Party.

Moreover, the relation of doctrine to action differs for the two institutions. The dogmas on which the Church insists do not purport to be determinative of organizational policy in relation to the course of history; they deal with relationships presumed to be invariable; and the maintenance of the faith, believed to be divinely revealed, is itself an intrinsic part of the Church's goal. The concrete applications of the faith to moral conduct and organizational action are understood to be to some degree contingent on shifting circumstance, open to dispute, and subject to merely positive determination; but wherever conceptions of the ultimate, invariable relations of God and man are at issue, the Church is inherently committed to seek consistency and to insist on conformity. In principle, this means that the condemnation of a statement clearly incompatible with dogma already defined can not properly be subordinated to any tactical consideration; to suggest that the Church could maintain its unity through ignoring such a deviation is to suggest that it should abandon what it has always conceived to be its role. But the authoritative definition of doctrines not yet clearly defined must necessarily proceed with great caution and take into account the system of previous commitments and the consensus—or lack of consensus—of theologians. These distinctions, I suggest, are

both true and necessary can probably be demonstrated if the appropriate kind of sample survey evidence is obtained in future years; and classroom experiments may be useful for the same purpose in the meantime. At any rate, an exploration of Black's theories has tended to confirm my own faith in the national convention system of presidential nominations.\(^1\)

Paul T. David

University of Virginia

\(^1\) An article of mine on the presidential nominating process, in the Spring 1962 issue of *Law and Contemporary Problems*, deals more fully with some applications of the notions discussed here.