

APPORTIONMENT

Reflections on the Politics of Mathematics

by William Lucas and David Housman

Dividing up the seats in the federal House of Representatives among fifty states might seem to be an elementary exercise in arithmetic, requiring merely a simple rounding of fractions. This is not the case, however. How to apportion the Congressional seats has been debated frequently and at length for over two hundred years, and the issue is likely to receive considerable attention by the Congress and the courts in the next year or two, in the wake of the recent national census.

The long-standing contention is over the method used to arrive at an integral number of representatives for each state from a mathematical quotient of population figures. In fact, the mathematical problem was the occasion of the first presidential veto in United States history: George Washington vetoed the initial apportionment bill passed by the nation's first Congress. Over the years, four different mathematical procedures have been followed and others have been proposed. Although all of them appear reasonable in their approach, none of those yet devised has all the

"common-sense" properties any "reasonable" method should have. Also, the possibilities for political advantage give the controversy intriguing overtones that are unusual in debates about mathematics. In this article, we touch on the ramifications of the apportionment problem, as well as its mathematical basis.

We note that the problem of apportioning Congressional seats is distinct from the reapportionment or redistricting problem, which is concerned with determining the boundaries of the Congressional districts within a state. This problem is also one of major concern for many legislatures and courts this year.

THE HISTORICAL ROLE OF THE CENSUS

The apportionment issue was addressed in the United States Constitution, which established the census and set forth the first rules for enumeration and for allocation of taxes and Congressional seats.

Article I, Section 2 of the original Constitution includes the statement:

Representatives and direct taxes shall be apportioned among the several states which may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of representatives shall not exceed one for every thirty thousand, but each state shall have at least one. . .

The original stipulations about what groups should be counted have been modified a number of times. In 1868 the Fourteenth Amendment to the Constitution eliminated the three-fifths rule for counting slaves. The census of 1940 included all Indians. Since 1970 certain overseas citizens have been allocated to their "home" 16

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