SOCIO-ENGINEERING PROBLEMS REPORT No. F-420

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Revised 9/11/80
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A series of informal working papers on the social impact of computers and the potential spin-off of theoretical concepts from computer science to the analysis of social systems.

"The Sociological Entropy of Electing City Council Members by District."

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Abstract

The concept of entropy originally derived in the thermodynamics of steam engines and more recently used in the analysis of the efficiency of electrical communication codes (telegraph) and then in the efficiency of computer coding of images, and also in the efficiency of computer-communication systems is now being extended to the anlysis of social systems. A recent example of such a social system is the political sub-system of city councils. The change from election of city council members at large to election by districts results in an increase of the sociological entropy(negentropy) of the system, provided fifteen other variable of the social system remain constant or have changes that are accurately known. In general when the other variables remain constant an increase in the negentropy corresponds to an increase in the degree of democracy in the social system.

*Note = Appendices E, C D& F from original report F 421 are now included in a separate report No. F-423.

 City Council Districts Established November 1978

(Adjusted more accurately later)

(a) City wide elections, ten council members:

5 live in district #2

3 in #6

1 in #5

1 in #9

Negentropy, $N = -K \sum p_i \log p_i$

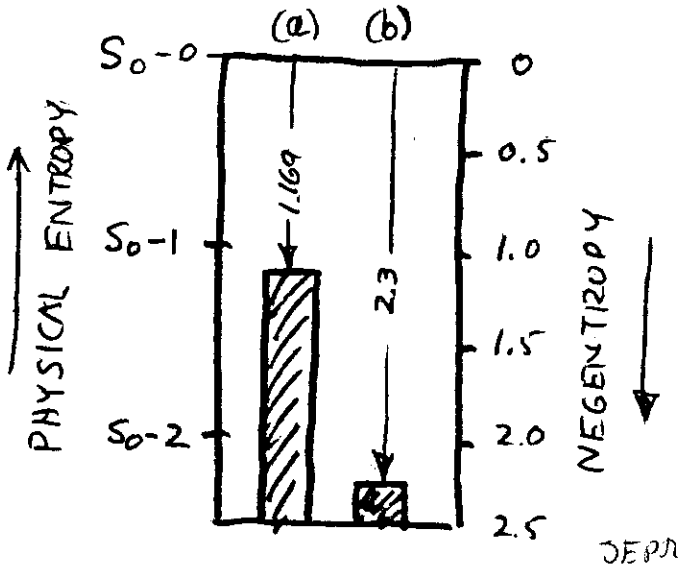
$= -[0.5 \ln 0.5 + 0.3 \ln 0.3 + 2(0.1 \ln .1) +$
$+ 0 + 0 + 0 + 0 + 0 + 0] =$

$= -[-.346 - .3612 - .46] = \boxed{1.169}$

(b) District elections, ten districts:

Negentropy, $N = -K \sum p_i \log p_i =$

$= -[10 (\frac{1}{10} \ln 0.1) = \boxed{2.3}$



The deliberations in SanJose in 1977 and the election in 1978 in which the voters approved the plan for district elections are mentioned in Appendix A.

The calculations on the previous page show that the change from city-wide elction of council members to district elections increased the negentropy of the system from 1.169 to 2.3. This corresponds to an increase in the degree of democracy in the system, if the following parameters remain constant:

Table II. List of Relevant Parameters.

Energy/Mass(Population)
Feedback
Structure
Bonds between Elements
Growth/Evolution
Metabolism
Reproduction
Dependence of Species
Learning Processes
Individual Development
Symbols/Language
Organization
Division of Labor

The recognition of the above parameters is very important to avoid making erroneous conclusions from mathematical calculations. In the 1930's some similar calculations about Hitler's Nazi Germany were made without attempting to find the complete set of relavent parameters. Such calculations led to erroneous conclusions, where many important parameters were not accounted for.

The discussion of where the above parameters come from is in Appendix D, "Relationship of Application of Communication Theory to the larger field of General Systems Theory.

The earlier application of the concept of entropy is discussed in Appendix B, "Steam Engine and the Macroscopic Systems Concept of Entropy."

The history of how the concept of entropy was conceived to relate also to non-measureable parameters is discussed in Appendix C, in two parts:

(c) Information Theory, and
(d) Possible Relationship of Political and Religious Freedom with Maximizing Negentropy.

A sample of the recent literature on entropy in the social sciences that will have to be checked in the development further of these concepts to practical political problems is listed in Appendix E.

3 plans offered

Public to weigh electing council by city districts

The citizens of San Jose will get their first look this month at a proposed plan to divide the city into districts for the purpose of electing City Council members.

The city's Charter Review Committee has set three public hearings to discuss the districting plans. The first will be at 7:30 p.m. Sept. 8 in City Hall council chambers.

Up for consideration are three plans that would cut the city into either six, eight or 10 districts. The City Council would have to approve one or more of the plans before submitting the question to voters.

More than 3,000 organizations and persons in San Jose have been contacted by the committee and asked for comment about the plans and for suggestions as to where the other two public hearings should be held.

A subcommittee of the Charter Review Committee has been working on the alignments for almost a year. The subcommittee is backing the plan to form 10 districts. Under that division each district would have about 60,000 residents.

The districts were based on a city population of 560,000 and developed with the idea of lasting without major changes until 1990.

The 10-district plan, subcommittee members said, conforms closely to the city's planning areas.

Under the eight-district plan, population per district would be about 70,000. The six-district configuration would have about 93,000 in each zone.

All three options have an East Side district with more than 50 per cent Chicano residents. It was formed to insure election of an ethnic minority representative to the City Council.

The two other public hearings called by the committee will be held in the Willow Glen and Evergreen areas, though a specfic time and location hasn't been determined.

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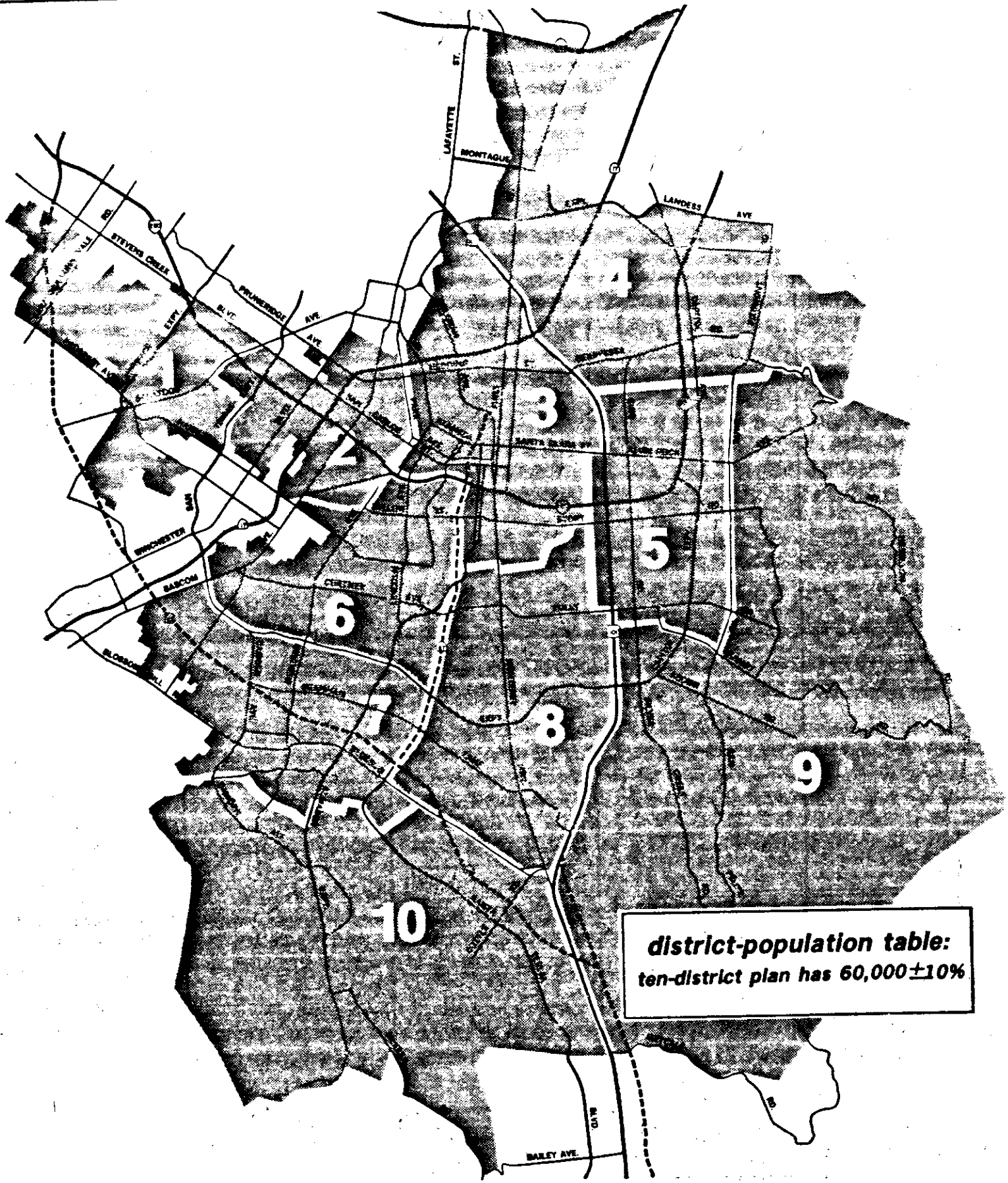

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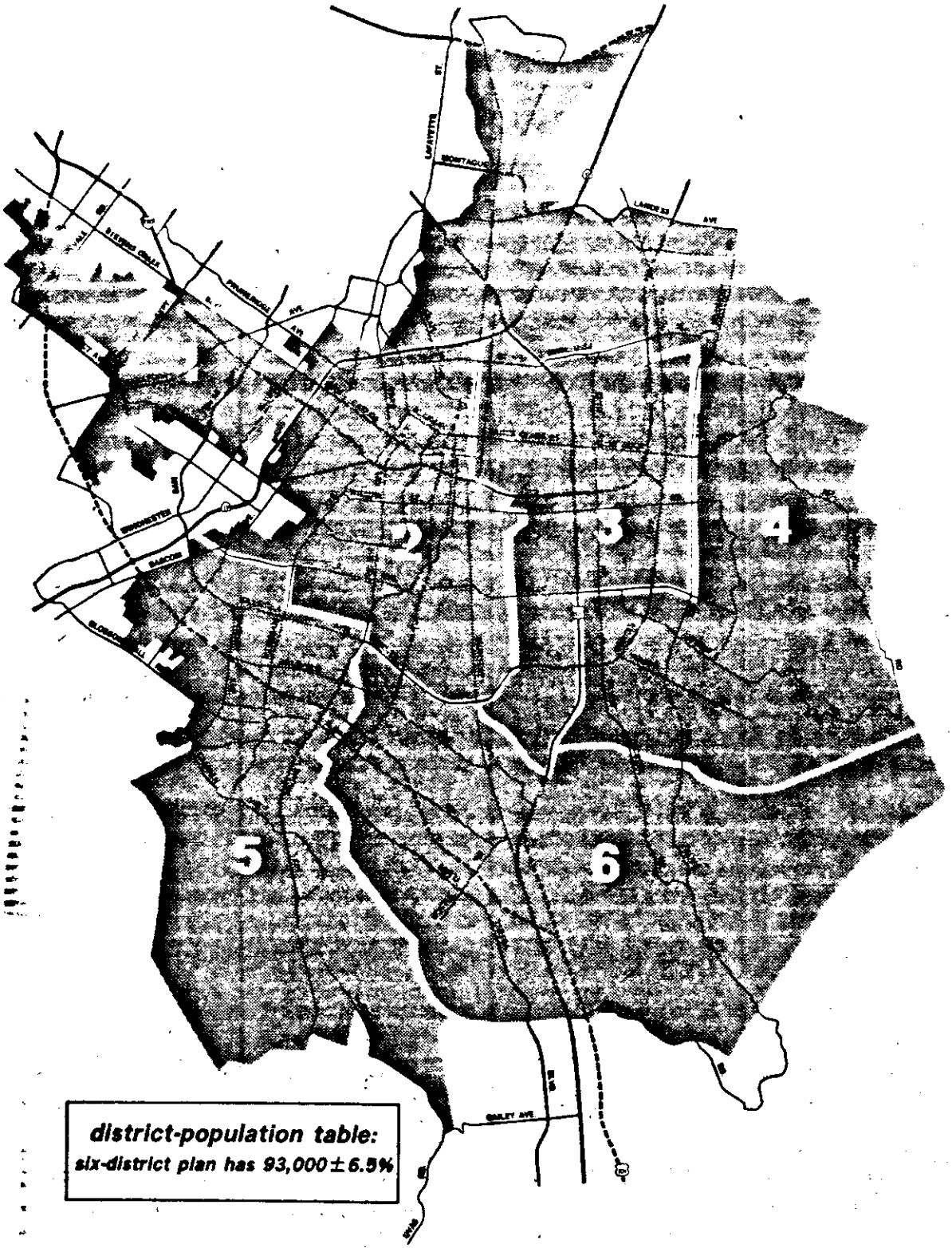

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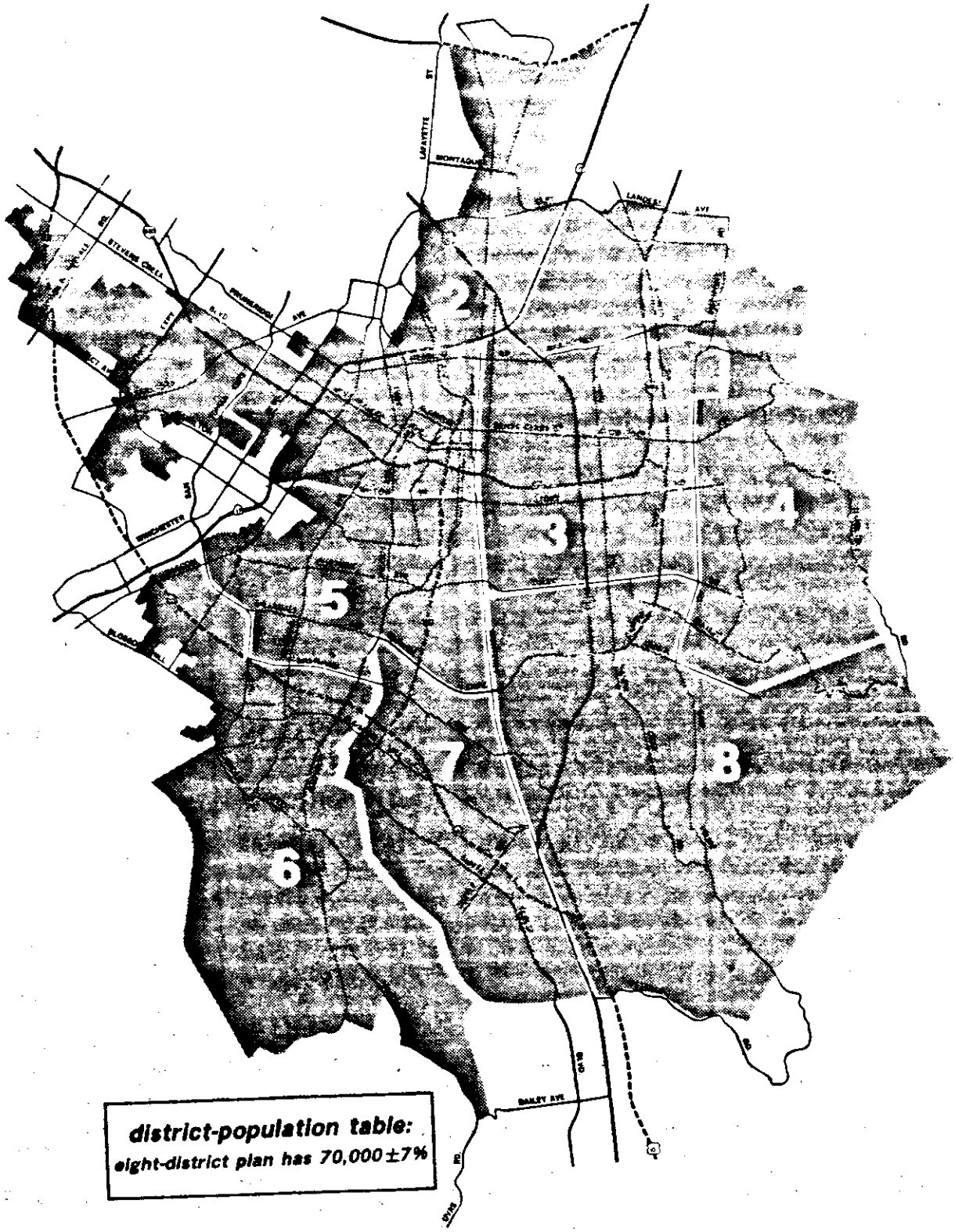

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