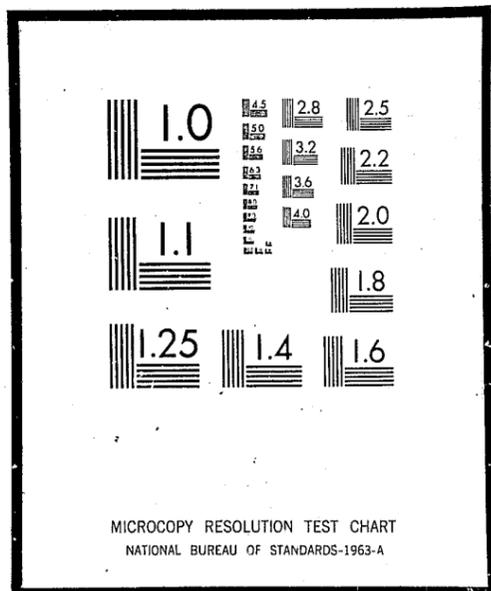


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U.S. DEPARTMENT OF JUSTICE
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION
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JURY SYSTEM OPERATION

FINAL REPORT

November 1974

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DEPARTMENT OF JUSTICE
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BIRD ENGINEERING-RESEARCH ASSOCIATES, INC.
Post Office Box 37, Vienna, Virginia 22180

READING ROOM

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EXECUTIVE SUMMARY

This report summarizes a "Jury System Operation Study" sponsored by the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration, United States Department of Justice. The study was conducted by Bird Engineering-Research Associates, Inc., under Grant No. 73-NI-99-0012-G.

The study's principal objective was to develop and analyze knowledge concerning jury system operation and to disseminate the results as guidelines for state and local courts of general jurisdiction to optimize juror utilization. The synthesis of the study is embodied in A Guide to Juror Usage, previously submitted to LEAA and currently under revision prior to government publication. The purpose of this report is to bring together the many subject areas which led to the Guide. Individual reports covering the juror utilization in each of the courts studied have been released to the jurisdictions cooperating with the study and to the National Institute, and are summarized in this report along with some of the analytical techniques developed during these studies.

Each of the courts studied were found to have areas of juror utilization which could be improved. The problems faced by some courts had been readily solved by others. The Guide then provided this communication between the courts and provided a means by which courts can analyze their own juror utilization, establish corrective action, and finally implement and monitor the changes.

While other studies have examined individual courts, the effort under this grant was to formulate general guidelines applicable to many courts. Other studies were examined to further develop the system given in A Guide to Juror Usage.

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FINAL REPORT

JURY SYSTEM OPERATION

1. INTRODUCTION

It is estimated that some two million people are called for jury duty in the United States and that they furnish approximately twenty million juror days per year. The approximate cost in fees alone of this group of citizens is some 200 million dollars and the imputed cost some three times greater. Preliminary studies had indicated that a considerable part of jury system cost might be eliminated by improvement of the management techniques in calling and utilizing jurors. Reduction of the number of juror days of 20% was considered as an overall goal with much greater reductions in some particular courts, especially in large metropolitan areas.

This goal of improving juror utilization and reducing jury system costs was buttressed by a parallel goal of improving juror morale and the citizens' willingness to serve. The reduction in jurors' time was predicated on reducing the time wasted in the jury lounge or in unnecessarily large panels. This waste of time is one of the major complaints that jurors make about jury service. The jurors seldom complain when they serve on trials. Indeed, our studies of juror reactions show a deep faith in the jury system, jury service always being rated highly as a worthwhile personal experience and an important public contribution. Waiting in the jury lounge and waste of time are the universal negative reactions.

1.1 Specific Aims

The specific aims of the study were as follows:

- (1) To study a number of courts and to apply and adapt developed principles and practices to improve juror usage.
- (2) To formulate mathematical models based upon experience accumulated in the different courts, and to simulate experience under controlled conditions.
- (3) To develop, from experience and from extended theory, practical rules and procedures which might become applicable in all courts.

These specific aims have been accomplished. Under the first of these aims, six different court systems were studied in depth. These studies required that parameters be defined so that meaningful quantitative measurements could be made. These are discussed in Section 2. Reports covering the specific analysis of each of the courts were published and distributed to each jurisdiction cooperating with this study. Each of these individual court studies was made available to the court as an assessment of the current juror usage situation and as a guide to corrective action. The purpose of this report is to bring these specific studies into a more general focus. This is the subject of Section 3.

The second specific aim of this study, the formulation of models and computer simulation programs, will be discussed in Section 4. Given the number of judges, voir dire and trial time averages, and panel sizes, operation of the jury system can be simulated for any court. This simulation might compare the observed usage of jurors with that developed as optimum and to determine the sensitivity of juror usage parameters to the court operational parameters (i. e., panel size, trial length, etc.).

Under the third aim, the rules and procedures are formalized in A Guide to Juror Usage. This Guide brings together the practice and theory that might be applied by any court administrator. The test of the Guide will be the extent to which it is utilized by judges, court administrators, and jury clerks. Projected plans for the Guide following the current review will include field testing in a number of courts, with changes being incorporated before printing and large-scale dissemination.

In support of these primary aims, many other studies were made during the grant period. One of these was the objective measurement of juror attitudes by means of an exit questionnaire. This measurement was considered necessary as a supplement to the study of each court system. The comparative results of these exit questionnaires will be presented in Section 5.

Many papers and reports were written during this grant. These are listed in Appendix A and are available from Bird Associates. Appendix B contains a bibliography of related source material. Several additional papers were not widely distributed due to their incidental nature. These are included in Appendix C. The detailed distributions of the parameters described in Section 3 are found in Appendix D.

2. MEASURES OF EFFECTIVENESS

An ideal measure of juror utilization effectiveness would permit court-to-court comparisons of how well jurors are being used, and also would reveal whether a court is improving when steps were taken to improve juror usage. From the analyst's standpoint, it is unfortunate that the use of jurors is so integrated with court operation that juror usage cannot be studied independently from the whole operation of the court, or effectively normalized to comparable dimensions of court performance to permit useful court-to-court comparisons. This is because important dimensions of the way each court operates have a dominant influence on juror utilization. For example, average voir dire duration (to which juror utilization is most sensitive) varies from about 15 minutes to several days from jurisdiction-to-jurisdiction. Jury sizes and voir dire panel sizes also vary widely, even for similar types of cases.

What a measure of juror utilization effectiveness can fairly reveal, therefore, is how well a particular court operates its jury system in rough comparison to other courts and, with good precision, how effectively changes to improve juror utilization in a particular court have worked.

A number of measures of effective juror utilization were examined. Each was found to have some limit to its application, and to contain certain biases and insensitivities to important operating variations encountered in practice. The measures investigated for this study are shown in Figure 1.

The most widely used measure of effectiveness, the JUI (juror utilization index), is computed as:

$$\begin{aligned} \text{JUI} &= \frac{\Sigma \text{ juror days available}}{\Sigma \text{ trial days}} \\ &= \text{manpower required per trial day} \end{aligned}$$

The JUI is the most widely used measure of overall jury system effectiveness because it is given in a prescribed monthly report (Form JS-11) for all United States District Courts. The disadvantages of the JUI is that the computation is biased by a mixture of 6- and 12-member juries and the length of the trial. This first bias has been

MEASURE	APPLICABLE TO								BIASED BY	INSENSITIVE TO	REMARKS
	SINGLE VOIR DIRE	MULTIPLE VOIR DIRE	POOL	JUDGE	JUROR	ADMIN.	PARTIES TO ACTION	COST			
JUROR USAGE INDEX (JUROR DAYS/TRIAL DAY)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(a) 6 VS 12 (b) DAYS/TRIAL	NUMBER OF TRIALS	USED ON JS-11
JDPT (JUROR DAYS/TRIAL)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(a) 6 VS 12 (b) DAYS/TRIAL	NUMBER OF TRIALS	
PERCENT OF TIME USEFULLY SPENT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	PANELS KEPT WAITING IN COURTROOM	JUDGE	DIFFICULT TO GET WITHOUT COMPUTER OR POOL DATA
PROBABILITY OF JUDGE WAITING	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCHEDULE METHODS	JUROR	STUDIED PARAMETRICALLY WITH PANEL SIZE, NO. CALLED IN
LENGTH OF JUDGE'S WAIT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCHEDULE METHODS	JUROR	
PEOPLE BROUGHT IN INDEX (PBI)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6 VS 12	TRIAL PARTIES	TOO SENSITIVE TO HIGH USAGE

Figure 1. Measures of Effectiveness

corrected in the revised form shown in Figure 2, recommended in A Guide to Juror Usage. A paper which shows the correlation between the JUI and the percent of Jurors serving is included in Appendix C. Another paper detailing the use of the JUI and the trends of this measure in United States Federal District Courts was published in the Journal of Quality Technology. A reprint of this article may also be found in Appendix C.

An alternative to the JUI is the JDPT (number of juror days per trial) computed as:

$$JDPT = \frac{\sum \text{juror days available}}{\sum \text{trials}}$$

The advantage of this parameter is that it is easily calculated from data available in all courts. That is, the juror days available, which is the juror days paid, and the number of jury trials. This measure gives the juror manpower used for each trial. The bias of trial length and jury size is also present in this measure.

The PBI (number of people brought in per voir dire panel) was also considered. This is computed as:

$$PBI = \frac{\sum \text{people brought in (summoned and kept)}}{\sum \text{panels}}$$

= manpower required per panel.

The PBI, like all measures which deal with panels or trials as a single dimension, is biased by combinations of the 6- and 12-member jury, and by trial duration patterns in the jurisdictions. The main problem found with the PBI is that it is too sensitive to low usage days and is not bounded.

Using actual data, the PBI and JDPT were shown to be closely correlated to the JUI. The JUI is the preferred measure based upon current usage and the lack of any noted advantage with either the JDPT or PBI.

PETIT JURORS USED

FOR MONTH OF <u>FEBRUARY</u>		YEAR <u>1971</u>		PLACE OF HOLDING COURT _____			
DATE (record daily)	A JURIES IN TRIAL		NUMBER OF JURORS				F (optional) <small>In this space each court may record such facts about daily juror situations as it finds helpful for later usage analysis (e.g., number of jurors requested by each judge vs. number actually used, times when same juror serves on more than one trial on given day, identity of capital offense cases, etc.).</small>
	6-man	12-man	Total Available To Serve B	Served on Trial Juries C	Challenged And Not Reached D	Not Used E	
<u>Feb 1</u>	<u>0</u>	<u>2</u>	<u>50</u>	<u>24</u>	<u>24</u>	<u>2</u>	
<u>4</u>	<u>1</u>	<u>2</u>	<u>100</u>	<u>60</u>	<u>30</u>	<u>10</u>	
<u>5</u>	<u>3</u>	<u>1</u>	<u>95</u>	<u>30</u>	<u>0</u>	<u>65</u>	
<u>6</u>	<u>4</u>	<u>2</u>	<u>90</u>	<u>48</u>	<u>24</u>	<u>18</u>	
<u>7</u>	<u>6</u>	<u>0</u>	<u>90</u>	<u>36</u>	<u>24</u>	<u>30</u>	
<u>8</u>	<u>5</u>	<u>0</u>	<u>60</u>	<u>30</u>	<u>0</u>	<u>30</u>	
<u>11</u>	<u>4</u>	<u>3</u>	<u>125</u>	<u>60</u>	<u>60</u>	<u>5</u>	
<u>12</u>	<u>2</u>	<u>2</u>	<u>100</u>	<u>36</u>	<u>0</u>	<u>64</u>	
<u>13</u>	<u>3</u>	<u>2</u>	<u>100</u>	<u>42</u>	<u>12</u>	<u>46</u>	
<u>14</u>	<u>4</u>	<u>3</u>	<u>100</u>	<u>60</u>	<u>36</u>	<u>4</u>	
<u>15</u>	<u>1</u>	<u>1</u>	<u>50</u>	<u>18</u>	<u>0</u>	<u>32</u>	
<u>18</u>	<u>3</u>	<u>3</u>	<u>110</u>	<u>54</u>	<u>54</u>	<u>2</u>	
<u>19</u>	<u>2</u>	<u>4</u>	<u>110</u>	<u>60</u>	<u>9</u>	<u>41</u>	
<u>20</u>	<u>3</u>	<u>3</u>	<u>90</u>	<u>54</u>	<u>12</u>	<u>24</u>	
<u>21</u>	<u>2</u>	<u>2</u>	<u>50</u>	<u>36</u>	<u>0</u>	<u>14</u>	
<u>24</u>	<u>1</u>	<u>1</u>	<u>30</u>	<u>18</u>	<u>0</u>	<u>12</u>	
<u>25</u>	<u>4</u>	<u>1</u>	<u>108</u>	<u>36</u>	<u>48</u>	<u>24</u>	
<u>26</u>	<u>3</u>	<u>2</u>	<u>101</u>	<u>60</u>	<u>16</u>	<u>25</u>	
<u>27</u>	<u>4</u>	<u>3</u>	<u>99</u>	<u>60</u>	<u>24</u>	<u>15</u>	
<u>28</u>	<u>3</u>	<u>3</u>	<u>80</u>	<u>54</u>	<u>0</u>	<u>26</u>	
MONTHLY TOTALS	61	40	1738 <small>Juror Days Available</small>	876	373	489	
6-man total x 0.5 = <u>30.5</u>							
12-man total = <u>40.0</u>							
Total Trial Days (weighted) = <u>70.5</u>							
Juror Days Available			<u>1738</u>				
Total Trial Days			<u>70.5</u>		24.7		
			JUROR USAGE INDEX				

INSTRUCTIONS

- 1 Column B, minus Column C, minus Column D, equals Column E.
- 2 Column A—show the number of separate jury trials in process, whether or not the trial is completed that day. Also if two trials occur in same courtroom within the day count these as two.
- 3 Column B—show total number reported as available to serve, whether or not put on a panel or a jury. Exclude any excused jurors if they were not paid an attendance fee.
- 4 Column C—show number serving any part of the day as sworn jurors for any specific case trial, even if case settles before evidence is introduced.
- 5 Column D—show number challenged and not reached during voir dire for any trial service that day. Persons challenged in one trial but used in another are counted in Column C.
- 6 Column E—show jurors neither challenged nor sworn for any specific trial.

Figure 2. Adapted JS-11 Form

The most precise measure of overall effectiveness, the percent of the jurors' time usefully spent, is difficult to apply because inherent in its application is the definition of what is "useful" in juror management. For example, if a panel is kept waiting in the courtroom while the judge conducts a conference, the proposition could be advanced that, since the panelists are doing what they have been called to do rather than sitting idly in the lounge, their time is being "usefully" spent. Other interpretations suggest juror utilization should be analyzed to determine whether manpower is being productively employed against more absolute standards. This measure is probably the most revealing overall measure but, even if the semantic and definitional problems can be overcome, it is tedious to compute and requires detailed data. Examples showing the percent of the time usefully spent for some typical court situations are given in the Guide (see page 2-5).

The probability of a judge having to wait when a panel is requested and the expected average duration of the wait are important measures, for they are the price paid for a high utilization of jurors, and they are measures which are easily understood by judges. However, they are very difficult to determine, especially when little actual data exists.

An example of the utility of these measures is shown in Figure 3. This figure was used to illustrate to the judges of a large metropolitan court the effect of reducing the juror pool. The probability of a judge waiting is seen to be zero down to about a 25% reduction. If the pool were reduced by 30%, a judge would wait about 3% of the time, or 1 in 33 requests. In this jurisdiction, a judge requests about one panel per week and, therefore, with a 30% reduction he might be expected to wait only once or twice a year. These waits will be, on the average, 15 minutes as shown by the value in parenthesis in Figure 3. This curve shows an important characteristic -- the sensitivity of the parameter. The curve becomes very steep very rapidly, indicating that caution is necessary to avoid the area of operation for which the probability of a wait is high.

While these measures (the probability of a judge waiting and the average wait) are very useful, they are very difficult to determine and are seldom calculated. When detailed data is available, these parameters and the percent of time usefully spent are calculated. But in most situations, the JUI is considered adequate to monitor the effectiveness with which the juror system is operating.

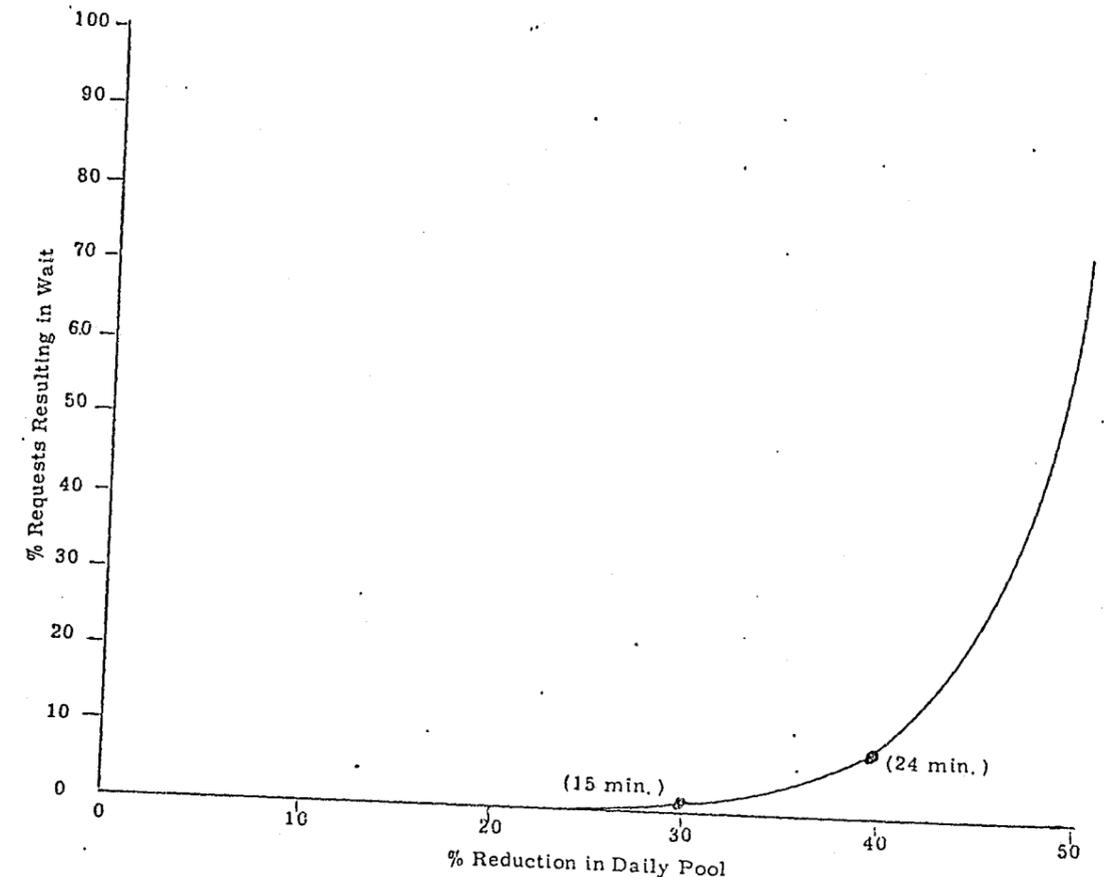


Figure 3. Effect of Pool Reduction

3. SUMMARY OF INDIVIDUAL COURT STUDIES

Six different court systems were studied in detail during the grant period. Individual reports on each of these have been issued and are listed in Appendix A. In addition, a number of other courts were visited or contacted due to known interesting operating procedures or existing data bases.

3.1 Selection of the Courts Studied

Courts were selected for a variety of reasons. Foremost among them was the willingness to cooperate and to furnish data for the study. No attempt was made to select courts in which juror usage was low and in which a potentially great saving might be made. On the contrary, courts were selected which had already been interested in or actively studying the problem of juror usage. Selection was also influenced by

a desire to include courts which might contribute new ideas or novel operating situations. For example, the court in Prince Georges County had high juror usage; Newark was a very efficient large city court; courts in Denver and in the state of Colorado were actively studying the problem; and the court in Houston used a novel jury term of one voir dire, or one day. Investigations of other novel practices, such as the use of standby juries in Cook County, Illinois and the multiple voir dire technique used in some of the federal district courts did not prove to be useful as anticipated. In these courts and several others, available operating statistics were obtained.

No two courts of those studied in detail had similar characteristics with respect to case disposition and trial processing parameters, such as the length of voir dire or trial, the size of panel, the number of jurors called per trial, or per day, the number of trials started per week per judge, the time or sequence of starting trials, and the like. Yet each of the selected courts appeared to be excellent in specific respects. A comparison of some of these parameters by court is shown in Figure 4. Determination of the size of jury pool in Prince Georges County was set, for instance, on the basis of the number of courtrooms available for trials. Procedures for handling jurors in Newark was also excellent. The Hennepin County court introduced a good dismissal policy. Many other innovative procedures were found.

On the other side, each of the courts had one or more aspects of their operations which could be improved. When these were pointed out, specific corrective action was considered by the courts.

3.2 Actions Taken by Specific Courts

Figure 5 shows the several characteristics, major recommendations, projected annual savings, and implementation to date in seven of the courts studied. The potential saving is not important, since the courts were not selected for that purpose. The important thing is the variety of the major recommendations. These include the following: (1) reduce call; (2) change scheduling; (3) reduce panel size; (4) eliminate unused panels; (5) establish dismissal policy; (6) distribute postponements over time; and (7) change procedures for summoning.

Jurisdiction	Judges Hearing Jury Trials	Voir Dire Length (Min.)		Trial Length (Hours)		Panel Size		Jury Size % 6-Member Jury (1)		Panel Requests %		Number in Panel Used		% Pool Manhours Used	JUI	Jury Trials/Judge/Week
		Civ.	Crim.	Civ.	Crim.	Civ.	Crim.	Civ.	Crim.	AM	PM	(6)	(12)			
Atlanta Judicial Circuit Fulton County, Georgia	10	78	86	10.4	8.9	26.8	47.4	0	0	66	34		33.9 (Crim.) 24.9 (Civ.)	50	38	1.2
7th Judicial Circuit Pr. Georges Cty. Maryland	9	19.8	20.4	8.5	6.5	22.6	33	0	0	88	12		26.5 (Crim.) 19.2 (Civ.)	N.A.	16	1.1
Houston Harris County Texas	26	114	96.4	15.4	9	25.5	34.4	5	0	53	47		30.3 (Crim.)	81	24	0.7
Minneapolis Hennepin County Minnesota	34	58.5	108.4	13.8	10.4	15.2	24	100	73	63	37	10.8	20.2	46	19	0.9
Denver City and County Colorado	34	111.7	170.7	14.3	10.3	18.2	23.7	(2) 100	39	89	11	12.3	27.5	52	24	0.3
Newark Essex County New Jersey	32	55.6	73.5	10.4	11.3	27.7	43	92	0	58	42	15.1	27.1	65	17	1.6

(1) All others -- 12-member juries.
(2) Includes 3 and 6-member juries.

Figure 4. Comparison of Court Operation Parameters

Court	Characteristics	Major Recommendations	Projected Annual Cost Savings	Implementation to Date
Fulton County Atlanta, Georgia	Medium size metropolitan court	<ul style="list-style-type: none"> ▪ Reduce call ▪ Change scheduling 	\$ 75,000	Size of jury call reduced
Seventh Judicial Circuit Prince Georges County, Maryland	Suburban medium-size Very high utilization	<ul style="list-style-type: none"> ▪ Abolish summons delivery by Sheriff ▪ Change scheduling 	Slight	<ul style="list-style-type: none"> ▪ Summons now mailed, rather than personally served ▪ Morning "roll call" abolished
Hennepin County Minneapolis, Minnesota	Large metropolitan court Good utilization	<ul style="list-style-type: none"> ▪ Reduce call ▪ Establish dismissal policy ▪ Distribute postponements 	\$ 50,000	<ul style="list-style-type: none"> ▪ Reduced call ▪ Recommendations distributed by Chief Judge to other judges
State Courts of Colorado (Six largest counties)	Large metropolitan (Denver) to small rural (Pueblo) courts	Vary by court; typical: <ul style="list-style-type: none"> ▪ Reduce panel size ▪ Eliminate unused panels ▪ Change scheduling 	\$ 30,000	State Court Administrator is implementing recommendations
Essex County Newark, New Jersey	Large metropolitan court High jury activity	<ul style="list-style-type: none"> ▪ Reduce panel sizes for all types of cases ▪ Change procedures 	\$200,000	Piggy-backing trials
Harris County Houston, Texas	Large metropolitan court Single day of service Single panel service (no recycling) Few exemptions	Change weekly call profile (daily)	\$ 18,000	None to date
Michigan (selected courts of general jurisdiction)	Large metropolitan courts Poor utilization in some	Reduce call	\$100,000 in Recorders Ct. Detroit	\$100,000 per year as reported

Figure 5. Courts Studied Under Grant

These recommendations indicate that all of the courts selected could be helped in some respect in improving their juror usage profile, despite the fact that they were chosen because of their interest in the problem of juror utilization and other points of excellence. However, these recommendations served as one point for developing the seven general rules of good juror usage as incorporated in the Guide to Juror Usage. General rules that emerged from the previous studies were supplemented by the specific situations found in the several courts. For instance, in one court, nearly half the panels were never used. This led to the rule against premature calling of panels.

Recommendations made for one court, in some instances, were adopted by another. Piggy-backing of trials, suggested as a useful practice in one court, was adopted court-wide by the assignment officer in another. The practice of summoning jurors by mail in place of sheriff-summoning was quickly borrowed by one court from another. How many additional changes in practices may have resulted from the cross-reading of the individual court reports may never be known.

3.3 Comparison of Court Statistics

The following sections compare and discuss the various court related statistics. Actual distribution of these parameters is found in Appendix D.

3.3.1 Voir Dire Starting Times

Voir dire starting times are important because they indicate the degree to which the workload of the court has been staggered, or spread uniformly over the working day. Two patterns were observed among the courts studied: one, in which 80 to 90 percent of the trials were started in the morning, and the other in which morning and afternoon starts were more evenly balanced.

The first type is illustrated by data from Prince Georges County, where 90 percent of the trials start before noon on the average each day. This pattern creates a peak demand for jurors during the morning hours. Its effect (in the instance of Prince Georges County) is partially offset by the short trial times; thus many of the trials started are finished the same day.

A similar pattern of trial times is evidenced by data from Denver, but there the trial times are longer and hence many of the trials run over from one day to another. The effect of the majority of morning starts is thus felt on juror utilization.

Atlanta and Essex County illustrate more continuous operation through the spreading of trial starts through morning and afternoon.

Curiously (but not necessarily correlative) is that distribution of trial starts is quite uniformly spread out through the day in Harris County where the one-day jury term is in operation. However, the effect of this even spreading of starts is not important in that jurisdiction because of the unique practice of keeping a juror for only one voir dire. Since jurors are not recycled to a pool, juror utilization would not be affected even if all trials started at the same time. The effect of spreading trial starts throughout the day is important only when recycling to a pool allows multiple use of the people called.

3.3.2 Panel Size

Average panel size for criminal trials varied from 23.7 members in Denver to 47.4 in Atlanta. Panel sizes for civil trials varied from 22.6 in Prince Georges to 27.7 in Essex County.

Civil panel sizes were much alike despite the fact that two of the courts used six-member juries in civil cases and the others did not. The pattern of civil panels tended to be alike, except in Atlanta where the practice of "striking down" in civil cases is followed. Typically, a panel of 24 was used, each side striking names off the list until they reached a jury of twelve.

Criminal panel sizes varied a great deal despite the fact that most of the courts used juries of twelve in criminal trials. Moreover, the shape of the distributions tended to differ among the courts, even when the averages were similar. Atlanta, with an average of 47.4 panel members, was operating part of this time under a statutory rule that a criminal panel must consist of 48 members and part of the time of 42 members. The change in statute to 42 was not followed precisely, so that most of the panels number exactly 48. By contrast, Essex County had an average of 43 panel members, but individual panel sizes went from 26 to 75. Denver, with its average of 23.7 panel members, had sharp peaks at 16 members, at 36 members, at 52, and at 60.

Panel sizes are determined in a variety of ways, but except for the statutory rules of Georgia mentioned above, they are largely dictated by rules of court and custom which is always tempered by specific prediction of the judge as to how many challenges for cause might be necessary in a given case.

3.3.3 Numbers Not Reached

Numbers not reached in a panel, that is, the panel members who were neither challenged nor selected for the jury, bear a relationship to the size of the panel actually needed. In general, this analysis shows that the larger the panel, the larger was the number not reached.

When panels are "struck down" as was the practice in selecting civil juries in Atlanta, the numbers not reached always equal zero and hence cannot be equated to practices in other jurisdictions.

The indication is that the number reached in the criminal panels varied less among the courts than did the panel sizes. This illustrates the tendency to excessive sizes of panels.

3.3.4 Duration of Voir Dires

Voir dire times differ among the six courts studied, from an average of 20.4 minutes in Prince Georges County to 170.7 minutes in Denver for criminal cases, and from 19.8 minutes in Prince Georges to 114.0 minutes in Harris County, Texas for civil cases. The details are given in Appendix D.

Although much has been written about the length of voir dires and the influence of alternative methods of conducting voir dires, the evidence presented here seems to show that influences are founded deep in local custom and tradition of the court. Each court seems to have a systematic pattern of voir dire times, which can be described as log normal distributions with a concentration of voir dire times in the neighborhood of the average with a long sweeping tail to the right toward the higher times. The patterns of the courts are much the same, but the averages are greatly different. The reason for the difference in averages is unknown, and can only be described as emanating from differences in practice among the courts.

The long voir dire times in the individual courts also are not easy to explain. The long voir dires were examined with respect to type of case, number of defendants, charges, judges, and other observable factors, but none of these factors seemed to offer a valid hypothesis as to the cause of the long times of the individual voir dires. The exceptionally long times are not easy to explain, but may well result from the importance placed on this critical stage of the proceeding where the ultimate trier of fact is carefully selected by the parties.

In certain courts, however, the patterns of the judges with respect to their average voir dire times also seemed to differ. In one nine-judge court, in which the average overall voir dire time was in the neighborhood of 80 minutes, three of the judges averaged below 50 minutes while the other six averaged 100 or more. The reason for these average differences is not known and may be case-related or rest with the temperament of the judge. In many courts, on the other hand, there appeared to be no observable differences, the voir dire times of each judge following closely the pattern of the court.

Voir dire times in civil trials tended to be shorter than for criminal trials, which is not a surprising finding. The averages in five of the six courts were appreciably less for civil than for criminal voir dires. In these five courts, the same judges heard both civil and criminal trials. In the one court in which civil voir dires are longer than the criminal, the civil and criminal courts are separated. Consequently, the longer civil voir dires in this one exception may be more influenced by the pattern of that part of the court than by the type of case.

The generalizations can be drawn that voir dire times are influenced, within the framework of the individual court, by the type of trial, and in some courts by the individual judges. The basic differences in voir dire times among the courts is largely unexplained. Additional study might productively be directed to this important phenomenon, since the length of voir dire has a direct influence on juror usage.

3.3.5 Duration of Trials

The length of trials also varies for the six different courts, but not nearly so much as for the voir dires. The average criminal trial times were from 6.5 hours in Prince Georges County to 11.3 hours in Essex County. Average times for civil trials ranged from 8.5 hours in Prince Georges County to 15.4 hours in Harris County.

As in the search for cause of differences among voir dire times, no factors were found sufficiently associated with the trial times to offer a reasonable hypothesis or explanation. The differences are thus associated with the practice of the courts. The time pattern of the trials among the courts is much the same, although the averages are different.

In all the courts except Essex County, the civil trials last, on the average, two to four hours longer than the criminal trials. In Essex County the reverse holds true, possibly because there are fewer civil trials and these use six-member juries. Other courts also use six-member juries in which civil trials average longer than criminal, so that the jury size alone is certainly not a conclusive explanation.

Analysis of the longer trials shows no set of causal factors providing a rational statistical explanation. Except for these trials of exceptional lengths, the times of the general pattern of trials are log-normally distributed. The length of trial is influenced to some extent by the judges in some courts, although the influence is much less than for the voir dire.

Measurement of trial times, made from the time on one day in which the trial starts to the time on another when it ends involves a matter of measurement estimation, for from the data collected, it was not known exactly when the particular court day ends nor when the next court day begins. In fact, these times may vary from court-to-court or from day-to-day within a court. Without recorded information on this point in each court, it was necessary to adopt a convention for the length of court day. In all courts, the court day is taken to be six hours, from 10 am to 1 pm, and from 2 pm to 5 pm, with an hour, from 1 pm to 2 pm for lunch. Thus, a trial that starts at 10 am on Monday and ends at 10 am on Tuesday was counted as exactly six hours. Time intervals earlier or later than starting times were subtracted from the six-hour daily units. Additional time for earlier starts than 10 am or finishes later than 5 pm were also not included. The time given for each trial is therefore approximate. The average trial times for each court may be biased upward or downward by this conventional six-hour day, for if the actual court day is longer, then the average trial length will be seen to be somewhat shorter than actually it is, whereas if the court day is shorter than six hours, the average trial length will be somewhat exaggerated. Such a bias could not account for the great differences in average trial time among the six courts studied.

By contrast, this problem of time measurement does not affect trials which end the same day they begin, nor does it affect voir dire times. In all the courts studied, voir dire times that ran over from one day to another were a great rarity. Voir dire times are measured within a day and generally present no problem. Voir dire times that span lunch hour may be scored as somewhat longer than they are if the luncheon break is actually longer than the allotted hour, as is the practice in some courts. Despite this, the contrast in voir dire times among the courts is free from the larger biases that may erroneously enter in the trial time comparisons.

The difference in trial times, and in voir dire times too, may have something to do with the temper of justice among the several courts. Possibly rapid jury selection followed by a quick trial might be said to be more callous and less fair than a long, slow, deliberate process of selection and trial accomplishment, but considerations of this type are far beyond a study of this kind. How is one to determine whether a fast trial is more or less just than a slow one, or whether the judges within a single court that take more time do a better and more deliberate job than those who are more businesslike? No answers to this question are now available, nor are fully satisfactory answers likely to be developed. A rough measure of relative justice for comparative purposes, the ratio of decisions for the plaintiff to all decisions, as used in other studies showed a remarkable consistency from one jurisdiction to another. Possibly examination of such ratios among the courts studied, and among the ratios of the several judges within a court, might establish some relationship with the trial times observed, but in setting such a comparison, close consideration would have to be given to the similarity of cases, the relative socio-economic characteristics within the jurisdictions, and prosecutive discretion and efficiency.

4. MATHEMATICAL MODELING AND COMPUTER SIMULATION

4.1 Introduction

There is no known analytical model or direct method to solve the juror supply problem. This section develops a relation between characteristics of a given court system and the risk of incurring a court delay caused by insufficient jurors using computer simulation methods. The simulation combines input data representing parameters of a court system with a fixed set of operating procedures to yield measures of system operation. In actual operation, any court is a rather flexible system able

to respond as needs arise. In this respect, the computer simulation is an approximation of the court system. During the development of a simulation, it is necessary to weigh the additional effort and complexity introduced to more accurately represent an actual court system against the information gained by these refinements. The analyst must be cognizant of the simulation ground rules and limitations when drawing conclusions from the results.

The objective of this study is juror utilization. To this objective the simulation is also directed, being concerned with employment of jurors and the flow of jurors responding to the needs of the court. With appropriate computer program modifications, the framework of this simulation could be used as a tool for assessing other court system operations.

Initial court simulation models drew at random, actual case information from a data file and processed these through the simulated court system. However, as familiarity with data from many jurisdictions developed, input distributions were derived for some case parameters.

4.2 Application of Simulation to Juror Utilization

Digital computer logic in the form of a computer program simulates the court as a system. The computer logic selects trial events, durations, and employment of jurors and combines them to allow the court to process trials for a period of time under a set of operating rules. Operating rules and some trial parameters are fixed for the duration of a simulation run but can be varied for subsequent runs. Other parameters are assigned various values during a run, each according to a probability density function. The form and descriptive parameters of probability density functions are fixed for a given run, but can be varied from run-to-run. As the simulation proceeds, information is accumulated at daily, weekly, and total run intervals to measure the performance of the system. The court system represented by the simulation utilizes a juror pool and contiguous voir dire (i. e., the trial immediately follows the voir dire).

The simulation is controlled by an internal clock which advances by variable incremental time steps. The steps coincide with those events which change the employment of jurors. The clock follows a daily and weekly schedule, with one minute being the smallest differential in time. When the clock advances to the next event, the incremental step (elapsed time) is used to evaluate the status of the court. Then the event is used to change the status of the court and the clock is again advanced to the next event.

Continuation of courtroom activities throughout the simulation run requires that each courtroom have a future time and associated event to be detected and processed as the clock advances. This requirement is implemented at the time an event is processed by posting the time of the next logical event in the particular courtroom. For example, at the start of a voir dire, the duration is determined, added to the present time and posted as the next event, end of voir dire for the courtroom.

The one exception to this procedure is when a panel is requested and there are insufficient jurors in the lounge. The time when jurors will be returned from panels and trials is not known and the trial enters a waiting line-queue. When jurors become available, trials in the queue have priority over normal calls for a panel. If more than one trial is in the queue, a first-in/first-out policy is observed.

Conducting trials follows the sequence of events illustrated in Figure 6. Each courtroom proceeds independently, except for trial start time, where a courtroom can be in any one of four possible states: voir dire, trial, between cases, and waiting for a panel. Performance assessment of the court system and juror employment at any time is a summation of the use of jurors in all the individual courtrooms and in the lounge.

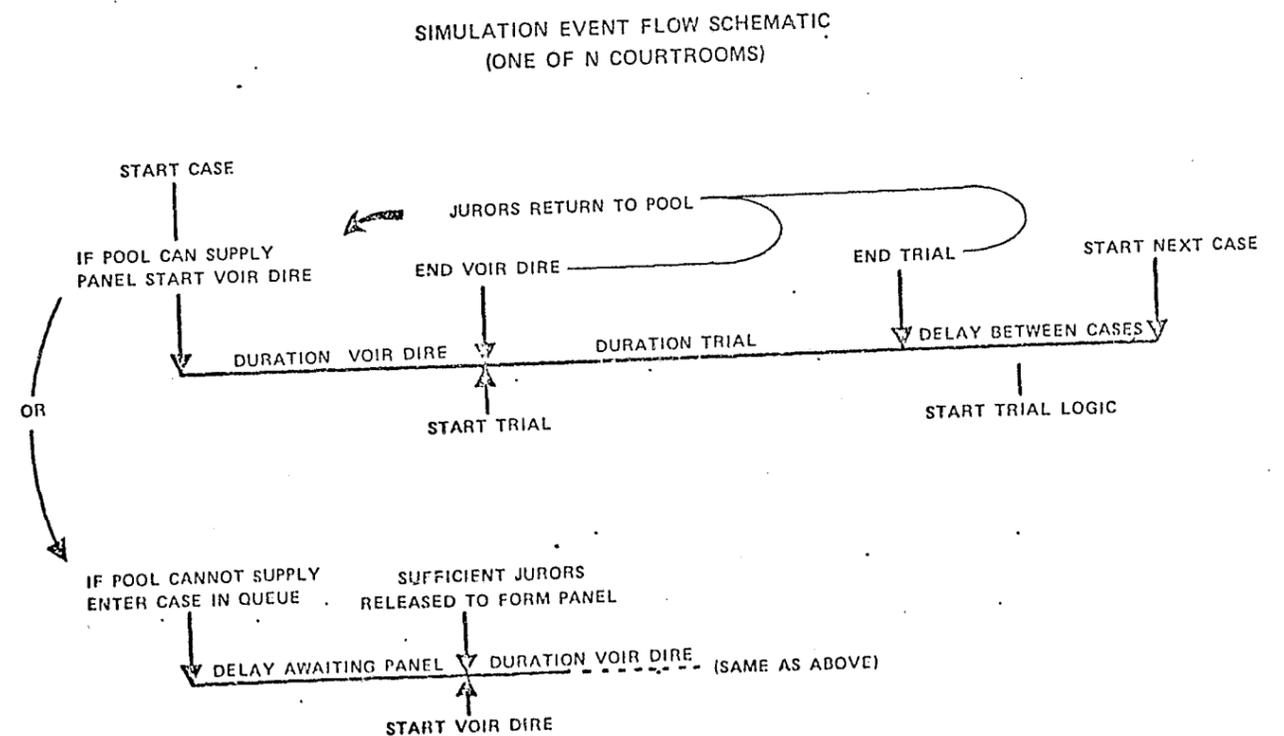


Figure 6. Simulation Event Flow Schematic
(One of N Courtrooms)

Figure 7 is a simplified computer flow diagram representing the simulated court system. Any reasonable number of courtrooms can be accommodated (1 to 32) but the number is fixed for the duration of a simulation run. The simulation run is initially started by assigning a trial start time to each courtroom. The trial start time logic is identical throughout the simulation run. Event times are stored in a matrix. Also stored with the time is the courtroom and type of event. The simulation proceeds, locating the next event and processing system changes until a predetermined number of weeks have elapsed.

4.3. Simulation Input Data

4.3.1 Input Parameters

This section presents the input information required for simulation operation. The nature, form, and distributional characteristics are presented and compared with the source data collected from court systems.

Input parameters to the simulation were derived from analysis of court data collected during this study. These parameters and their form are summarized in Table 1.

Table 1. Input Parameters

Parameter	Distribution	Controlling Variable
Duration of Voir Dire	Log normal	μ = average duration σ = spread of distribution
Duration of Trial	Log normal	μ = average time σ = spread of times
Start Time (AM-PM)	Proportion	
Trial Start Time given AM or PM	Normal/ censored to length of court day	μ = average time of trial start σ = spread of start times
Trial Starts per Day	Poisson	λ = average starts/day
Number of Courts	Constant	
Number in Pool	Constant	
Number in Jury	Constant	
Number in Panel	Constant	

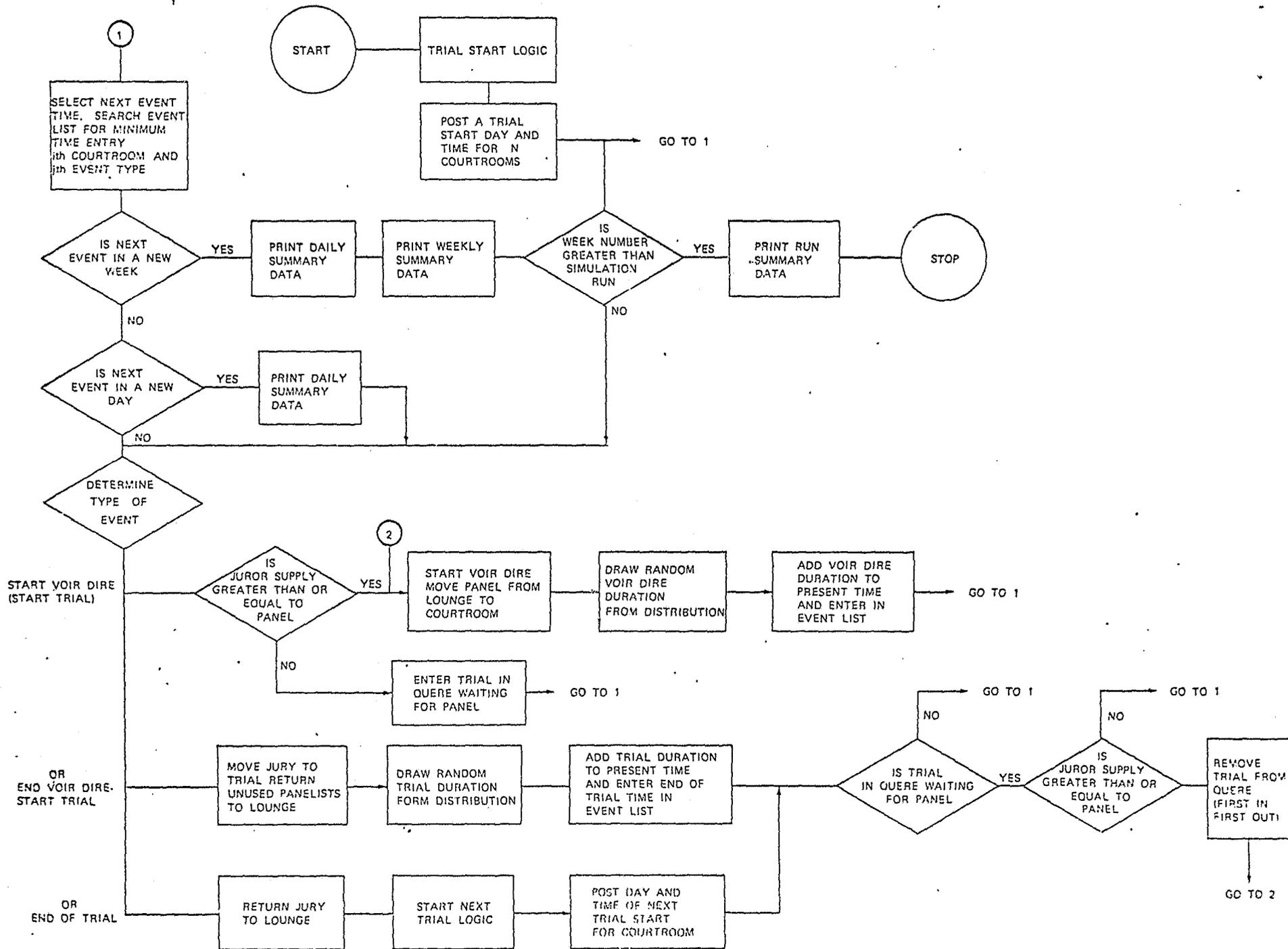


Figure 7. Simplified Simulation Logic

4.3.2 Duration of Voir Dire

Voir dire duration shows an excellent fit to a log-normal distribution. Figure 8 shows analytically derived log-normal curves from four jurisdictions. Also shown is a midrange curve which is representative of the combined data from all four jurisdictions. The midrange distribution is used in the simulation. For successive simulation runs, the mean voir dire duration was set at convenient values (for example, 45, 60, and 90 minutes) while holding the standard deviation (slope) constant. Computed log-normal distribution parameters are summarized in Table 2.

Table 2. Summary of Voir Dire Duration Characteristics
(Civil and Criminal Trials Combined)

Jurisdiction	Log Normal Distribution (minutes)		
	Mean	Median	Standard Deviation
Denver	153.2	101.5	2.48
Houston	116.5	69.5	2.76
Atlanta	80.2	72.6	1.56
P. G. County	20.3	17.6	1.72

4.3.3 Trial Duration

Trial duration is also represented by a log-normal distribution with a similarity among jurisdictions not observed for length of voir dire. Figure 9 shows the data points along with an analytical curve from Denver data. The upper 10% (longest trials) fell below the log-normal curve. This phenomenon, observed in all jurisdictions, indicates there are fewer long trials than expected from the theoretical log-normal curve. Fitted log-normal curves from all jurisdictions are shown in Figure 10. Parameters for these curves are summarized in Table 3.

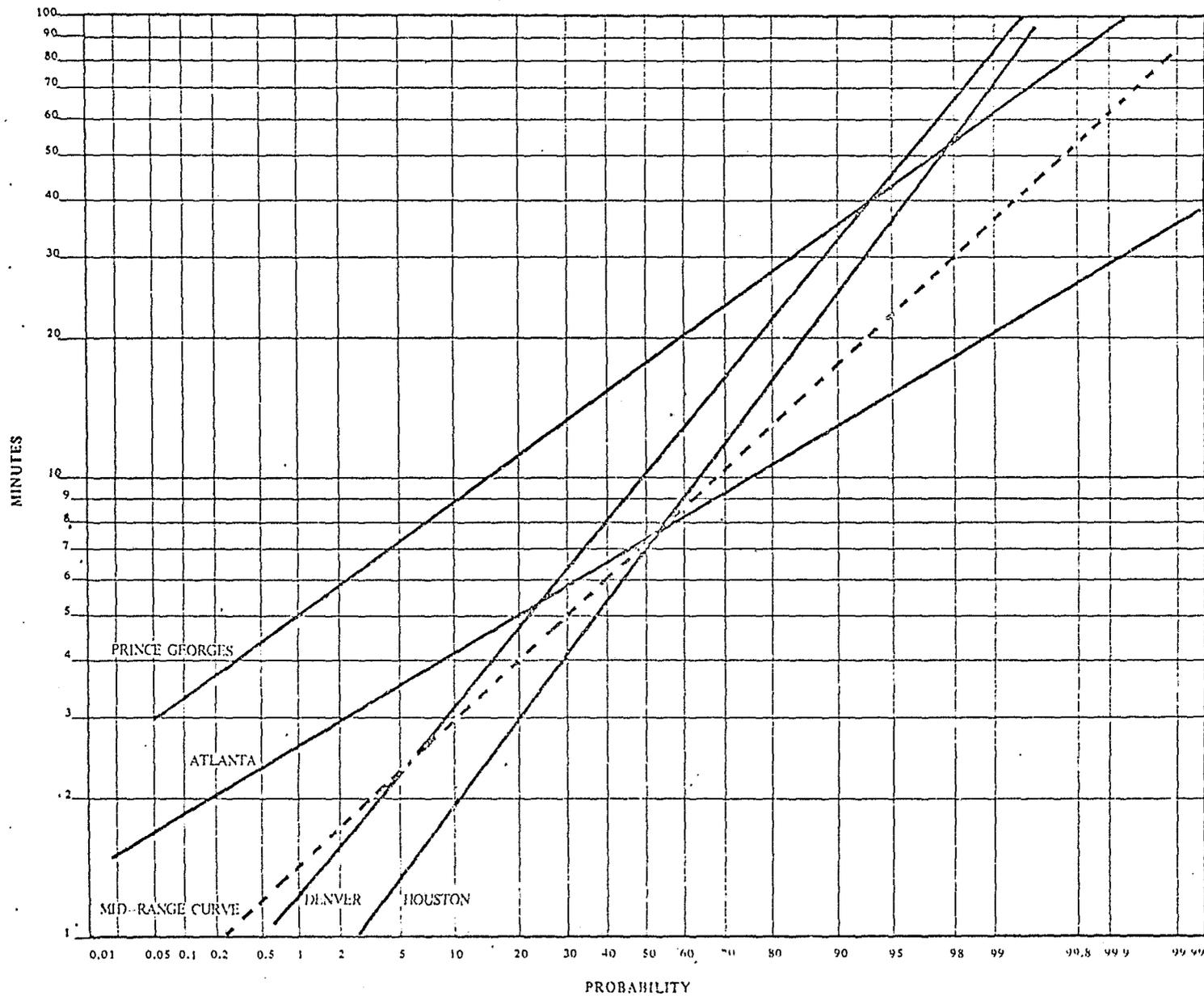


Figure 8. Log Normal Curves and Mid-Range Curve
(Four Jurisdictions)

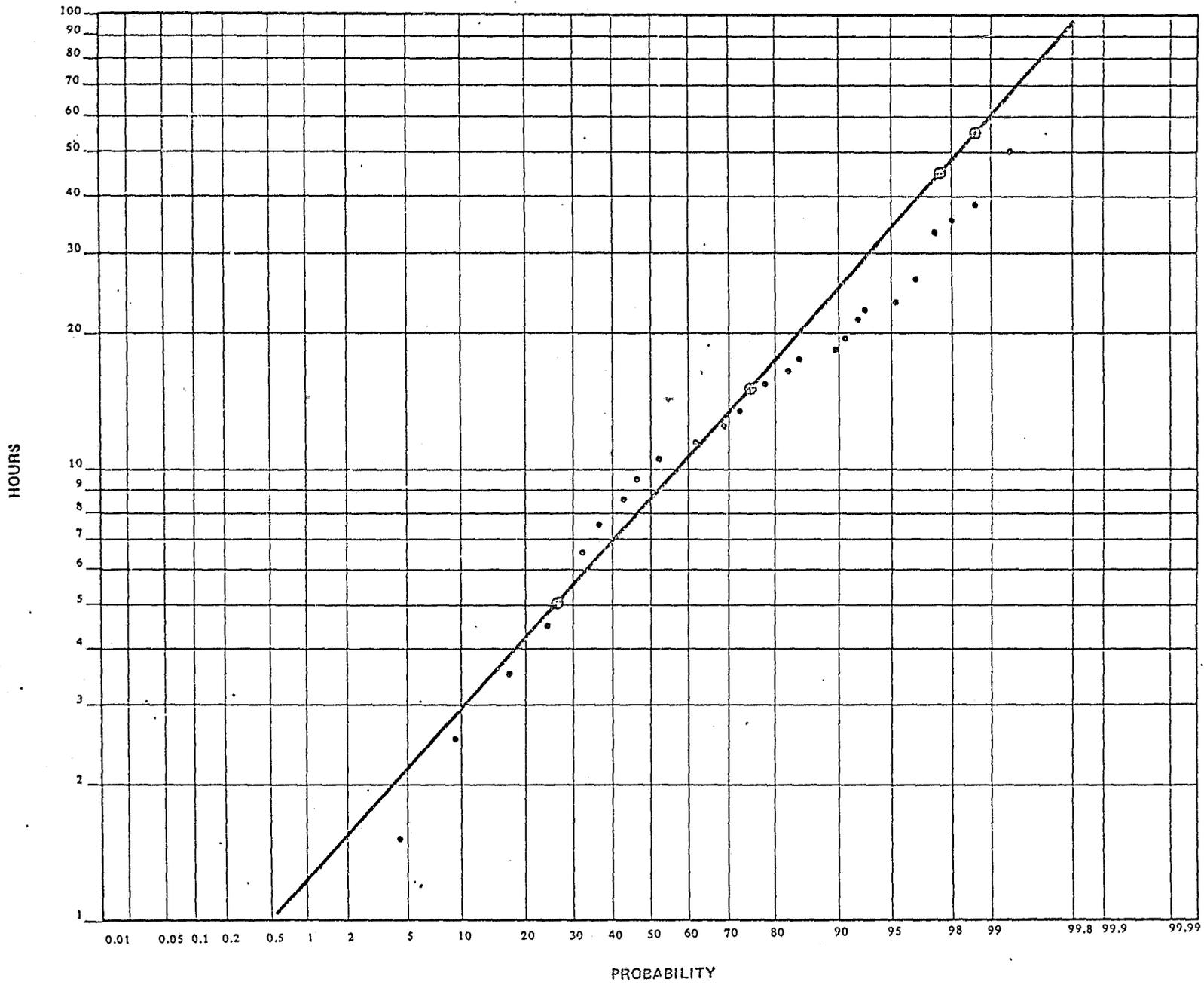


Figure 9. Trial Duration -- Denver

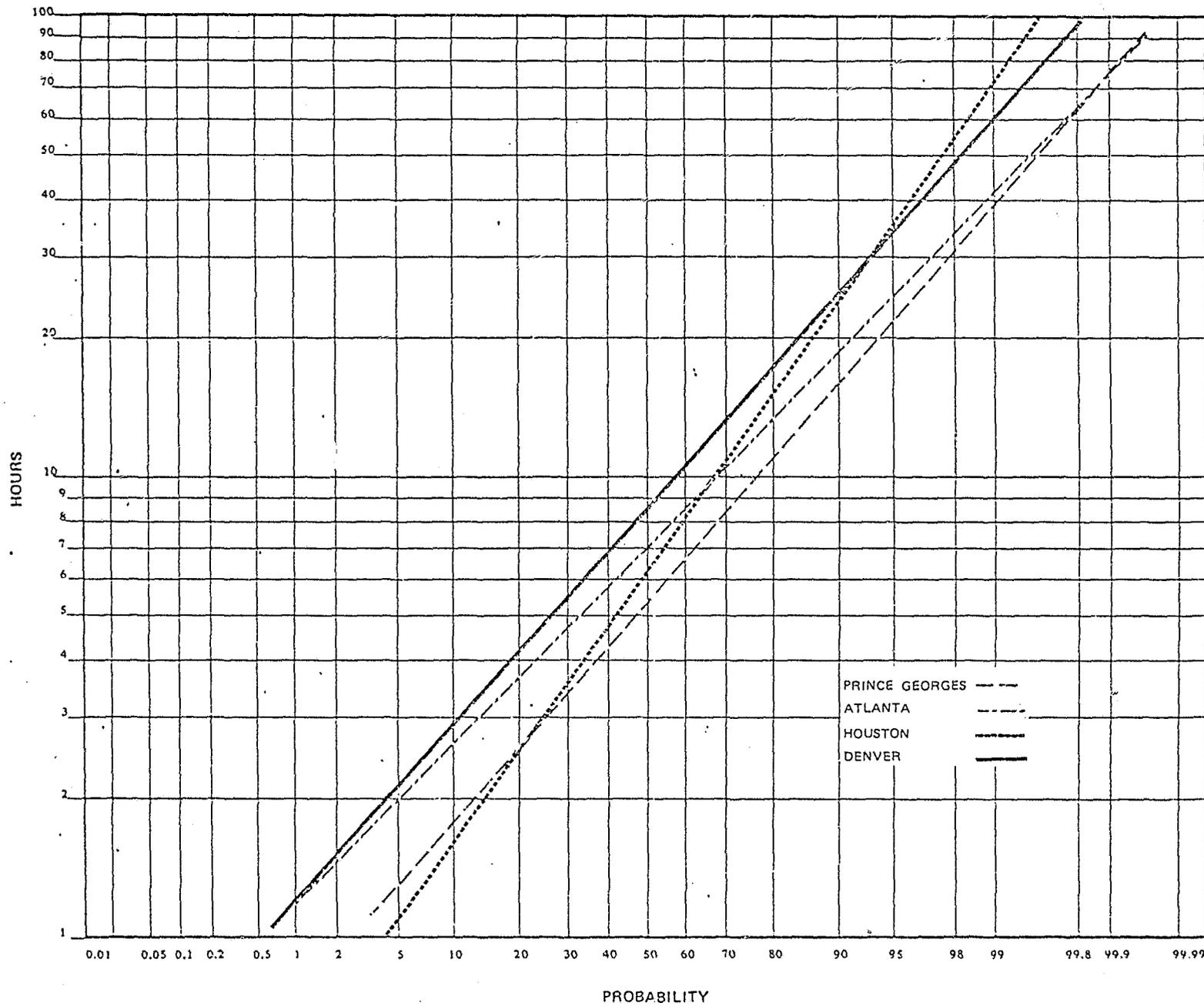


Figure 10. Trial Duration -- Four Jurisdictions

Table 3. Summary of Trial Duration Characteristics
(Civil and Criminal Trials Combined)

Jurisdiction	Log Normal Distribution (Hours)		
	Mean	Median	Standard Deviation
Denver	12.05	8.45	2.32
Houston	10.91	6.21	2.89
Atlanta	9.38	6.94	2.17
P.G. County	7.78	5.34	2.38

4.3.4 Voir Dire versus Trial Durations

Voir dire length and trial length were studied to assess the hypothesis that they are dependent. The hypothesis that long trials are expected to result from long voir dices and, conversely, short trials are expected from short voir dices, was not verified. Voir dire length was plotted against trial length for Houston and Denver and a least-squares linear fit calculated. The plotted points produced a scattergram with low correlation. The line fitted to the plot has a slope of 8.5% for Houston and 16% for Denver. However, the standard error is approximately one-half the mean, giving wide deviation of points about the curve with the result being that the curve is a very poor prediction of trial length, given voir dire length.

4.3.5 Trial Start Time

Trial start time is a variable in the simulation which accounts for the time between trials in a courtroom. It is the time from the end of a trial to the start of the next when no trial activities are in progress in the courtroom. After several abortive attempts to quantify the delay between trials, the present method was conceived where input values could be assessed from field data collected. This method has an implied delay between trials by setting the number of trial starts per day and the time of trial starts.

4.3.6 Trial Starts Per Day

The number of courtrooms is fixed for the duration of a simulation run. In most court systems studied, each judge operates from his own courtroom, thus the number of courtrooms and the number of judges may

be interchanged. Trial starts per day is related to the number of courtrooms through another measure developed -- trials per judge per week.

Analysis of observed data reveals that the range of values for trial starts per judge per week falls between 0.5 and 1.5. Using a midrange value of 1.0, the average trial starts per week is calculated as:

$$\lambda = \frac{(N_c)(T_w)}{D_w} = \frac{(15)(1.0)}{5} = 3.0 \text{ trials/day}$$

where: N_c = 15 courtrooms (judges)

T_w = 1.0 trials/judge/week

D_w = 5 court days/week

λ = average number of trial starts per day

This "activity index" is not a measure of court workload, since it only includes jury trials. This accounts for only a small percentage of the total case dispositions. However, the index provides a controllable input for the simulation which can be related to actual court systems, with supporting data relatively available from court records. Trial starts for each day of the simulation run are distributed according to the Poisson probability function:

$$f(X; \lambda) = \frac{\lambda^x e^{-\lambda}}{x!}$$

where: λ = average trial starts per day; and

x = integer trial starts per day

The Poisson function applied to the trial starts per day is reasonable from consideration of the nature of the problem and also by comparison with the observed data, as shown in Table 4. Table 4 evaluates the Poisson distribution with the λ computed from Denver data; results are compared with the actual trial starts per day observed in Denver.

Table 4. Distribution of Trial Starts Per Day

Trial Starts Per Day X	Expected Poisson Frequency of Trial Starts/Day $\lambda =$	Observed Trial Starts/Day (Denver) $\lambda =$
0	1.6	0
1	5.6	8
2	9.9	12
3	11.6	10
4	10.2	10
5	7.2	5
6	4.2	4
7	2.1	3
8	0.92	1
9	0.38	1
Totals	53.7	54

Figure 11 is a histogram of trial starts per day from a typical simulation run.

4.3.7 Time of Trial Start

Given the number of trial starts per day, a time of day is determined for the trial to start. Trial starts were first divided into morning and afternoon starts. Most trials start in the morning, as shown in Table 5. Random numbers are used to divide the simulated starts between morning and afternoon, simulation runs have been at a nominal division of 80% morning starts.

Table 5. Distribution of Trial Start Times

Jurisdiction	Percent of Trial Starts	
	Morning	Afternoon
Denver	89	11
Hennepin	63	37

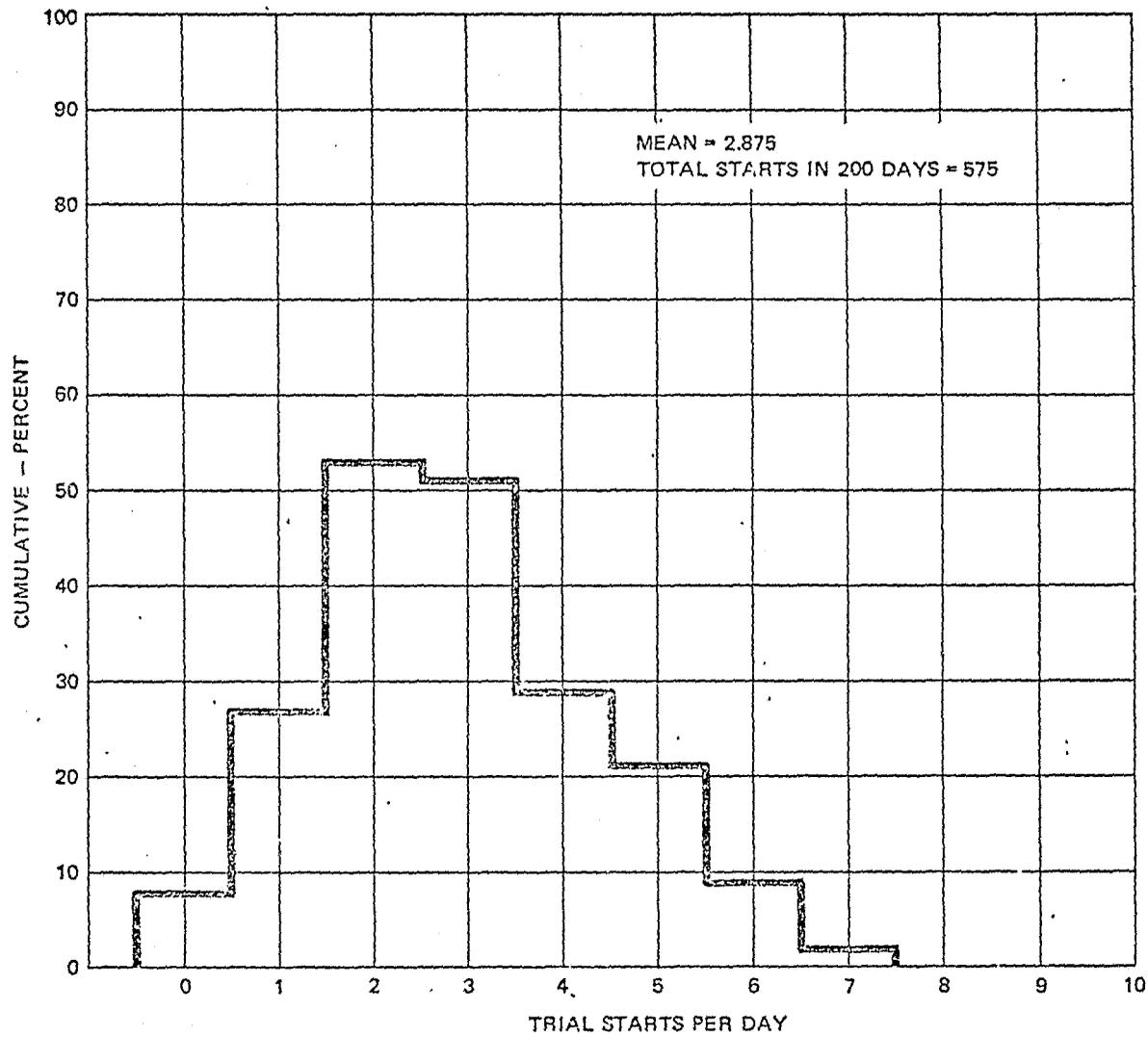


Figure 11. Trial Starts Per Day -- Simulation Run #5

Time of trial start has been assessed from court data. The distribution of morning trial starts is used to determine the time (hour and minute) of simulation trial start time. Field data shows this distribution to be a normal distribution with nearly identical distributional parameters for three jurisdictions studied. In each case, the mean trial start time is approximately 70 minutes after the daily starting time of court activities. Table 6 summarizes the morning trial start distributional parameters calculated from court data. The mean trial start time for Houston is shifted because a nominal one-half hour difference in their daily schedule.

Table 6. Distribution of Morning Trial Starts

Jurisdiction	Mean (Hrs.)	Standard Deviation (Hrs.)
Denver	10:36	0.59
Houston	11:00	0.59
Hennepin County	10:36	0.61

Random normal distributed times are generated in the simulation to fit the observed data with a mean 70 minutes after start of court activities and a standard deviation of 0.59 hours. The distribution is censored to eliminate trial start time earlier than the start of court day and later than the start of lunch. Afternoon trial start times are from the same distribution, but with the mean shifted, as shown in Figure 12, to 70 minutes after the lunch break.

4.3.8 Other Parameters in Simulation

The remaining input parameters are fixed values for a given simulation run. Table 7 presents the parameter, nominal value, and limits applicable to the simulation as presently programmed.

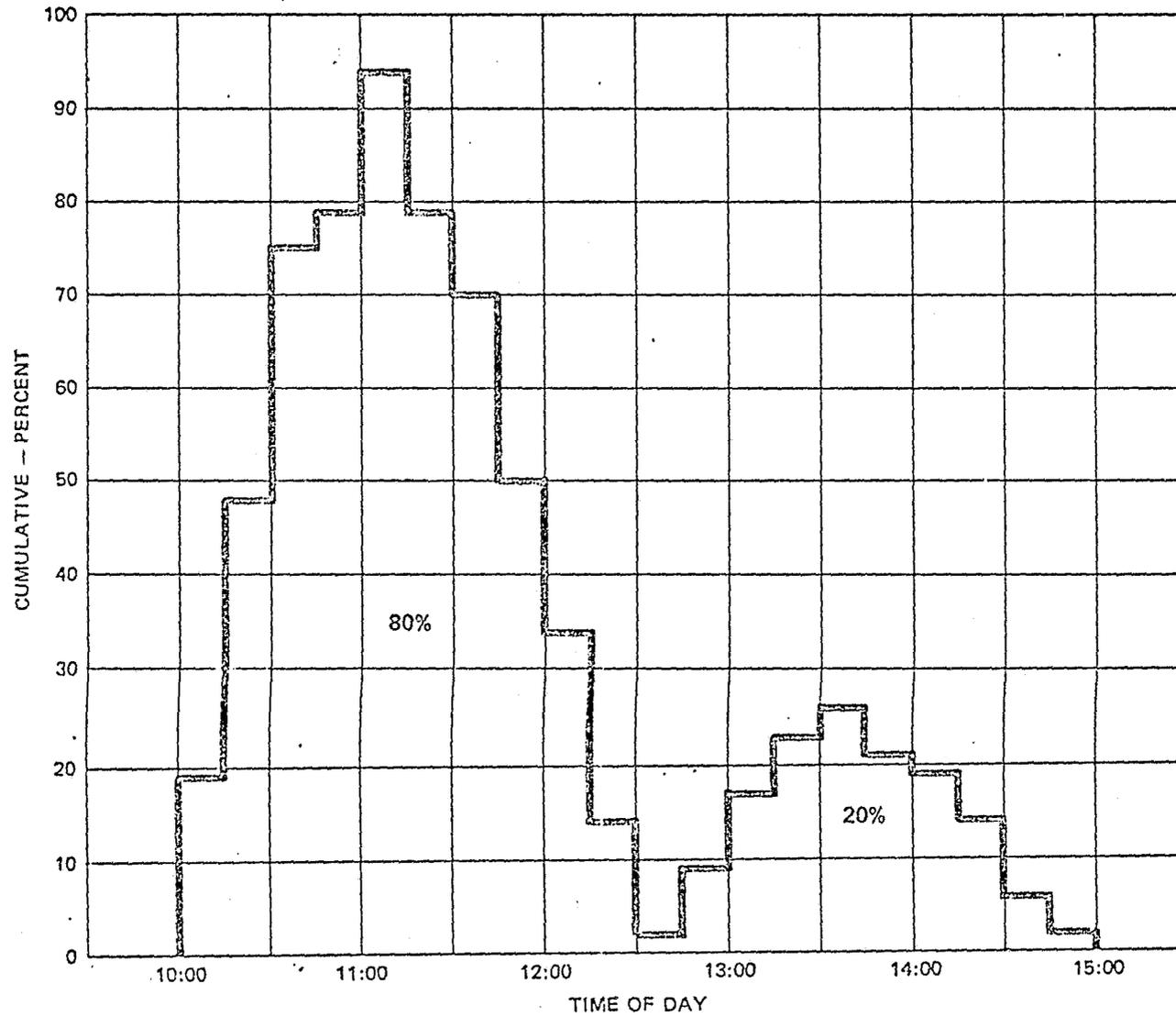


Figure 12. Simulation Run #2 -- Distribution of Trial Start Times

Table 7. Fixed Input Parameters

Parameter	Nominal Value	Range Limitation Run-to-Run
Number of Courts	None	1 to 32
Number in Pool	None	No practical limit
Number in Jury	6 and 12	No practical limit
Number in Panel	18 to 36	No practical limit
Trials Days per Week	5	No practical limit
Hours per Court Day	6	No practical limit
Simulation Run	250 days	No practical limit

4.4 Output Data

Typical output data is shown in Table 8. During the evaluation verification of the computer program, output statements were inserted at various points in the program to observe detailed workings of the simulation. Generally, outputs are available at the completion of each event, the end of a day, at the end of a week, and at the end of the run.

Table 8. Output Data

<u>Event Output</u>	
Time - (week, day, hour, minute)	
Number of voir dices in progress	
Number of trials in progress	
Number of jurors in voir dire	
Number of jurors in trials	
Number of trials in queue, waiting for panel	
<u>Daily Summary</u>	
Trial starts	
Peak jurors employed	
Time of peak	
Number of voir dices at peak	
Number of trials at peak	
Juror manhours utilized	
Number of trials carried over to next day	
Number of jurors in trials carried over	
<u>Weekly Summary</u>	
Trial starts	
Manhours available	
Manhours used	
Trial days	
Number of delays - waiting for panel	
Number of jurors in voir dire and trials at end of day	

4.5 Simulated Juror Demand

The primary direction of this investigation is toward understanding the daily peak juror demand, including identification of factors which affect peak demand and development of expected peak demand for a range of average court systems. A useful output from the simulation for evaluation of juror demand is the cumulative distribution of daily peak juror usage. This curve is called a daily peak demand curve. A typical example is shown in Figure 13.

The daily peak demand curve is generated from a simulation run with an unlimited jury pool, so there is never a shortage of jurors. At some time during each day of the simulation run, there is a maximum number of jurors utilized in the court system -- voir dire plus trials. This information is stored. At the end of the simulation run (all runs were approximately one court year) there is a peak value for each of 250 days. These data are formed into a cumulative density function (see Figure 13), allowing probabilistic conclusions. For example, 74 jurors were sufficient for 50% of the court days, or 124 jurors for 95% of the court days.

The demand curve in Figure 13 is replotted on a normal probability scale in Figure 14, where a normal distribution would appear as a straight line. The demand curve is approximately normal, as would be expected when the contributors are many small factors with no single dominating contributor. Similarly, demand curves from other simulation runs are described by a normal distribution function.

4.6 Utilization Improvement

Reducing the size of the pool to increase utilization of jurors is done at the expense of incurring an increased risk of delays caused by insufficient jurors. The daily demand curve allows setting the pool size for given court conditions with an expected delay rate. Based on experience from court systems, a reasonable pool size (versus delay risk) is at 95% of the daily peak demand curve. This means that 5% of the court days (1 in 20) will experience a shortage of jurors. With the pool at 95% of the daily peak demand, the frequency and length of delays are usually tolerable, however, with the pool reduced to 90% of the daily demand, delay interruption of the court process is judged to be excessive. Pool reduction to 90% versus 95% is discussed later.

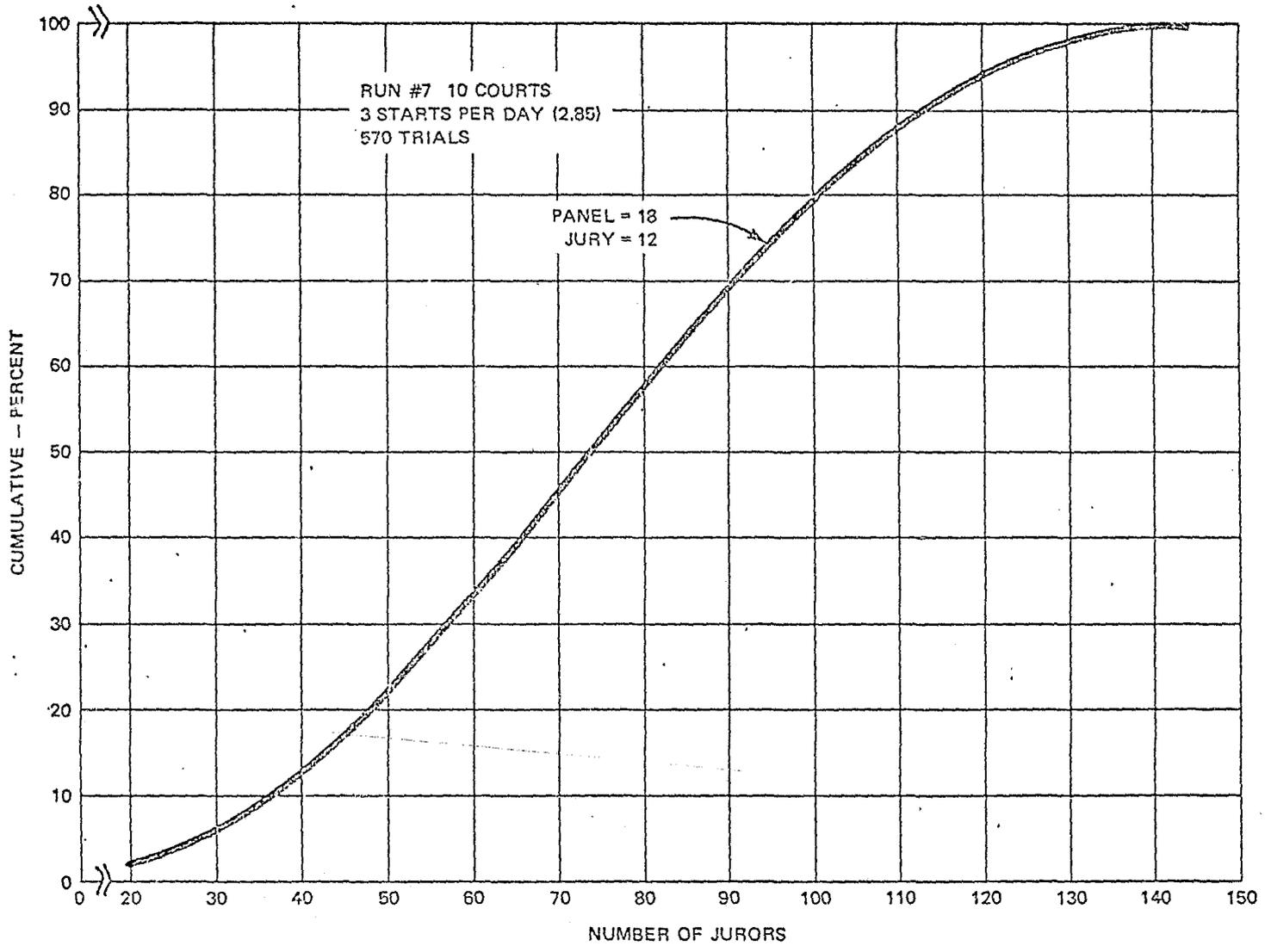


Figure 13. Daily Peak Demand Curve -- 200 Days

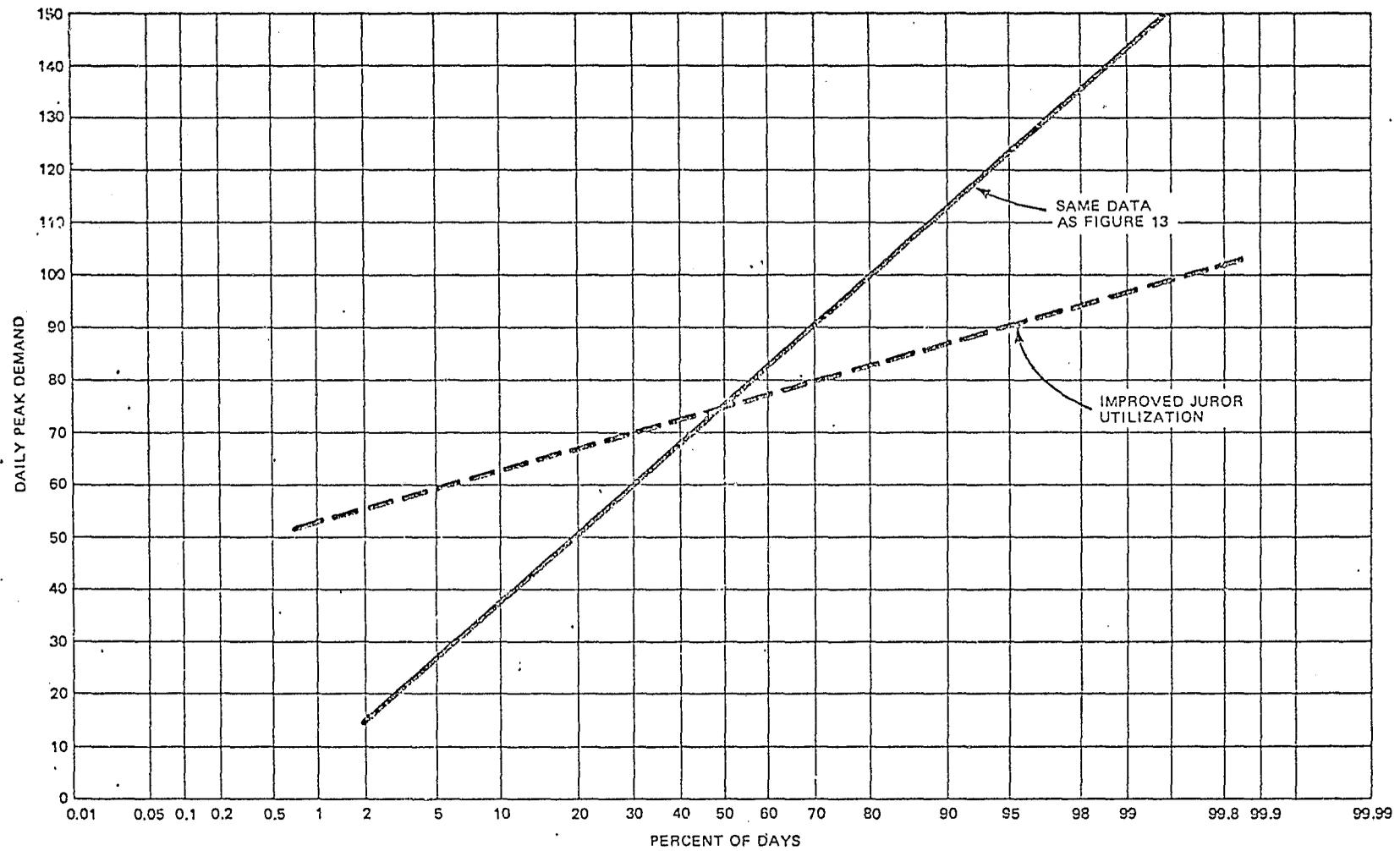


Figure 14. Demand Curve Plotted on Normal Probability Paper

Reduction of the pool to the 95% level of the demand curve yields an immediate improvement in juror utilization. However, further improvements may be highly desirable. Two additional methods of improvement are discussed with respect to the demand curve.

First, the random variation of juror demand may be related to a predictive indicator and the juror pool adjusted to track the demand curve. This requires a dependable predictor, such as the number of trial starts for a future day, and the mechanism to adjust the number of jurors reporting within the lead time of the prediction.

A second method of improving juror utilization is to reduce the variation of daily peak demand, i. e., equalize the daily peaks. This approach requires adjustment of court scheduling practices with the objective of spreading panel calls over the days of the week and over the hours of the working day to control the number of simultaneous voir dices. The allowable number of concurrent voir dices is dependent on other court operating parameters; for example, the size of panels and the number of trials in session. Reducing the variation of daily peak demand rotates the demand curve to a more horizontal position, as illustrated by the broken line in Figure 14.

4.7 Comparison of Simulation with Court Data

The ability of the simulation to represent an actual court system is assessed by comparing a simulation-generated demand curve with one developed from actual court data. Input parameters for the simulation run were calculated from data collected at Hennepin County, Minnesota. Case data from Hennepin County were reconstructed to generate a daily peak demand curve and both curves are plotted in Figure 15. The simulation curve is from 200 court days and shows a smoothing not available from the actual curve, which is constructed from 29 days of court data. The curves are similar in shape and variation, with the actual curve offset by 15 to 20 jurors. The cause of the offset may be explained by court operational complexities not included in the simulation model. For example, the simulation does not allow bunching of trial starts early in the week (all days are equal). Also, it is possible that trial starts for a particular day are closer together, leading to more concurrent voir dices than observed from long-term averages used for simulation trial start input data.

The simulated juror demand curve shows good agreement with actual courtroom experience, except the predicted juror peaks are optimistic (smaller) than the actual observed daily peaks.

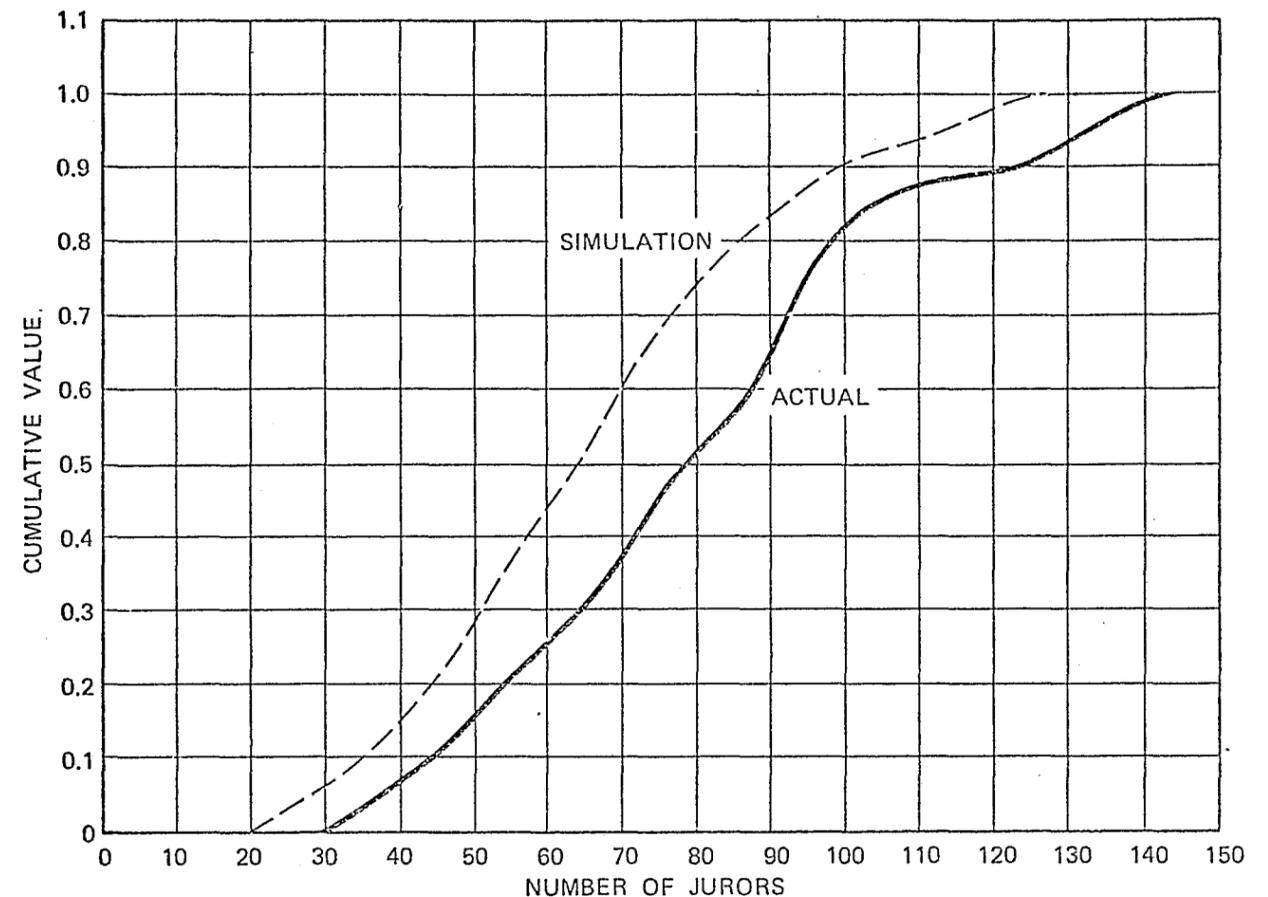


Figure 15. Comparing Simulation With Actual Data

4.8 Pool Size From Simulation

An objective of the simulation was to develop a matrix of values for pool size and number of jurors applicable to an average court system identified by very basic parameters. Some of the results of these simulations are given in Table 9. All simulations were run with an average trial time of 8.5 hours and respectively 80% and 20% morning and afternoon trial starts. Average trial starts per day was set at 2, 3, and 4. However, the final results differed slightly from these nominal values. The number of people in the pool is taken at the 95% point of the daily peak demand curve. As expected, increasing the panel, jury, trial starts per day, or duration of the voir dire all tended to increase the number required in the pool. Not anticipated was the relatively small pool increase suggested by doubling the duration of voir dire.

Table 9. Simulation Results

Average Trial Starts Per Day	Number on Panel	Number on Jury	Daily Peak Average	Juror Demand Std. Deviation	95% Value (Pool)
<u>6-Member Jury -- 45 Minute Voir Dire</u>					
2.0	12	6	34.4	13.7	57
2.0	18	6	41.7	17.2	70
2.9	12	6	43.6	16.8	71
2.9	18	6	53.5	22.1	90
2.9	24	6	63.4	27.8	109
<u>12-Member Jury -- 45 Minute Voir Dire</u>					
2.0	18	12	61.2	24.9	102
2.0	24	12	68.9	27.3	114
2.0	36	12	83.4	34.3	140
2.9	18	12	77.2	29.2	125
2.9	24	12	87.1	33.7	142
2.9	36	12	106.9	44.2	180
4.0	18	12	109.0	35.4	167
4.0	24	12	121.3	39.8	187
4.0	36	12	146.1	50.3	229
<u>12-Member Jury -- 90 Minute Voir Dire</u>					
2.0	18	12	63.6	23.4	102
2.0	36	12	91.3	36.9	152
2.9	18	12	88.9	26.6	133
2.9	36	12	124.2	41.1	192
4.1	18	12	116.9	35.8	176
4.1	36	12	165.3	57.2	259

4.9 Simulation With Induced Delay

Simulations were previously performed with an unlimited pool, and thus determination of the daily juror demand curve was unrestricted by insufficient jurors. Here, one court configuration is simulated with the pool reduced to 95%, then 90% of the demand curve. Comparative results are shown in Table 10.

Table 10. Comparative Results of Simulation With Induced Delay

Comparison Measure	Pool Set At:	
	95%	90%
Number of Jurors in Pool	102	90
Number of Court Days Simulated	250	250
Number of Trials Started	513	488
Number of Trials Delayed	15	46
Average Delay	41 Min.	95 Min.
50% Delayed less than:	40 Min.	50 Min.
90% Delayed less than:	65 Min.	3 Hrs. 45 Min.
Percent of Trials Delayed	3.0	9.0
Expected Delay per Trial	1.2 Min.	9.0 Min.
JUI	21.1	20.0
Percent Manhours Used	44	48

When the pool is reduced from 95% to the 90% level, both the frequency of delay and duration of delay increased threefold; the number of trial starts decreased 5%, and the expected delay per trial increased from 1.2 minutes to 9 minutes. Cumulative distributions of delays for the two pool sizes are shown in Figure 16.

Drawing conclusions based on one simulation is very tentative, but it appears that setting the pool size at the 95% level could be tolerated whereas the 90% level is unacceptable.

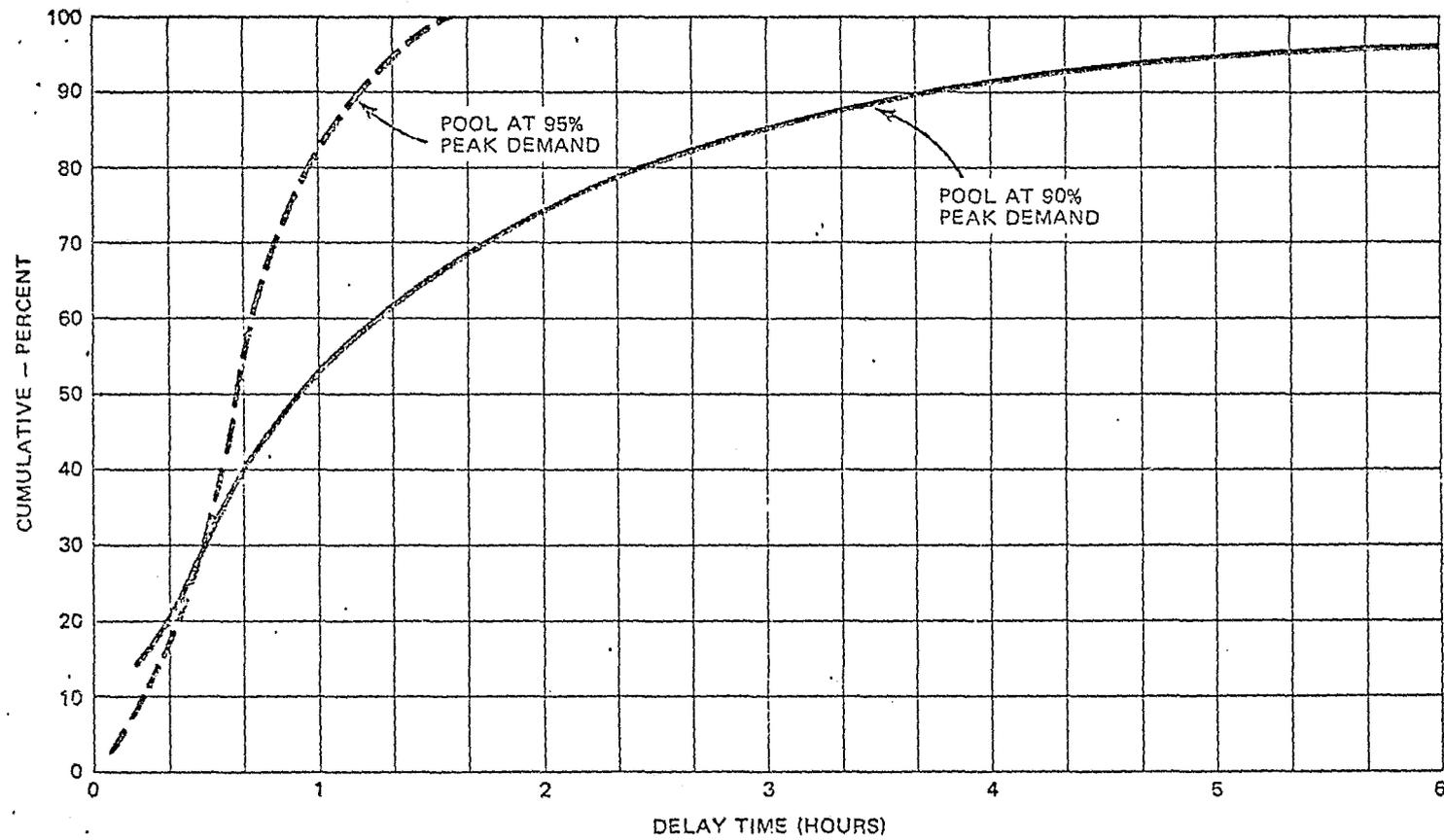


Figure 16. Cumulative Distribution of Delay Time

The questions asked can be broken up into two general categories -- questions of fact (objective) and opinion questions (subjective). The first group of objective questions established the respondent's general identification. The age and sex of the respondent was used to determine the profile of the respondents and to ensure that they were representative of the population of jurors. Other categories, such as income, education, or occupation could have been used as measures of the responding population, but age and sex were thought to be adequate. More detailed demographic information is usually available from the juror qualification forms. In circumstances where nearly 100% response could be assured, this type of question would be unnecessary.

The juror was then asked specific questions about his just-completed term of service. First, to put down the total number of days and hours which he served, and then to estimate the number of hours which he spent in the waiting room, in voir dire, sitting on juries, and in jury deliberation. The next three questions asked the number of times the juror has participated in a voir dire and trial, and when he had last served. The question concerned with the hours spent in the various capacities was aimed at determining the amount of time spent in useful functions. If this information could be reliably obtained from the jurors, it would be an easier way of determining juror usage than requiring jury clerks to keep detailed records. The number of times the juror participated in a voir dire or trial was intended to indicate how uniformly the service was distributed.

The next set of questions required subjective answers from the jurors on specific aspects of jury duty. These questions asked jurors to give a good, adequate, or poor rating to such factors as orientation, treatment by court personnel, physical comforts, personnel safety, parking and eating facilities, and the scheduling of the jurors' time. The purpose of listing these categories was to direct the jurors' attention to the areas where problems might exist. The results would give the court a view of general opinion, and hopefully the juror would make comments as to the specific complaints or compliments in these areas. The classifications were limited to three degrees in order to elicit only responses with definite deviations from the expected norm.

Jury duty takes people away from the normal routine of their lives, forcing them to leave their jobs or homes for a required amount of time. Some lose money because of their service. The next three questions attempted to get an indication of the adequacy of jury fees, how many actually lose money, and how long the jurors think their term of service

should be. If a court could learn from this information the percentage of people actually suffering a loss, they could possibly adjust the fees and terms of service.

The next two questions were very general and concern the jurors' overall view of jury duty. The first attempts to find out if their impression of jury service is favorable or unfavorable, and whether this impression has changed as a result of jury duty. The second question asks the juror whether he thinks jury service is a valid institution from which he has benefitted by participating. The final two questions ask for comments from the jurors: why people might be reluctant to serve, and what improvements could be made in the system.

In all, seventeen questions were asked, short enough so the questionnaire could be filled out quickly and easily, but long enough to collect useful information.

5.3 Results

The results of this initial use of the questionnaire were very interesting. They are given in Table 11, along with comparable figures from the New York study, The Juror in New York City. Perhaps the most useful conclusion for the clerk who wishes to collect data on utilization is that jurors seem to be fairly accurate in estimating how their time was spent. In Essex County, the jurors' estimate of waiting time coincided with the study-determined figure. In Denver and Hennepin Counties, the differences were eight and one percentage points, respectively. From these estimates of waiting time, it is easy to see why a frequent complaint by the jurors concerns the time wasted. The least percentage of time spent waiting was 26% in Boulder; in Essex County and Prince Georges County, jurors were idle about 35% of the time. But the jurors in Arapahoe County estimated about 60% of their time was spent waiting.

The time since last service (question 9) showed that in all jurisdictions except New York, about 85% of the people had never served before; in New York, the figure was 25%. This notable difference indicates a limited juror wheel and should be studied in detail to determine the exact cause. This high level of repeated service could also be reflected in the negative comments of the jurors found in the New York study.

In the questions concerning court facilities, jurors considered the orientation and treatment by the court personnel good; physical comforts, personal safety, and scheduling as adequate; and parking and eating facilities as either poor or adequate.

Ques. No.	Question Content	Colorado							Prince Georges Cty., Md.	Hennepin County Minn.	Essex County N. J.	New York City N. Y.
		Adams County	Arapahoe County	Boulder County	Denver County	El Paso County	Jefferson County	Pueblo County				
(2)*	Female	42	44	54	51	42	35	53	50	45	43	12
	Male	58	56	46	49	58	65	47	50	55	57	88
(3)	Days Reporting	6.2	4.7	2.7	7.2	4.2	3.9	2.2	25	8.2	10	N/A
(6)	Percent of Time Spent Waiting (Study Determined)	50	60	26	40 (48)	53	40	36	33	53 (54)	35 (35)	62
(7)	Chosen for Voir Dire	2.4	1.9	2.4	3.6	1.6	1.9	1.6	30	3.5	7	N/A
(8)	Chosen for Trial	0.9	0.5	0.5	1.1	0.5	0.6	0.3	14	1.5	3	N/A
(9)*	Percent Never Served Before	76	74	78	77	85	83	88	89	90	77	25
(10)*	Courtroom Facilities:											
	Initial Orientation	+	+	+	+	+	+	+	+	+	+	+
	Treatment by Court Personnel	+	+	+	+	+	+	+	+	+	+	+
	Physical Comforts	0	0	+	+ , 0	+	+	+	0	0	+	-
	Personal Safety	+	+	+	+	+	+	+	0		+	+
	Parking	+ to 0	-	-	-	-	+	-	+		+	N/A
	Eating	-	0	+ , 0	0	0	+ , 0	-	-		0	N/A
	Scheduling	0	0	0	-	0	+	+	0	+	+	N/A
(11)*	Payments to Juror:											
	Adequate	20	23	31	12	12	18	31	33	23	14	50
	Inadequate	41	24	17	50	46	35	27	50	36	60	} 50
	Not Important	39	53	52	37	41	48	42	17	41	26	
(12)*	Lost Income (Percent Yes)	31	17	9	28	37	18	12	27	22	24	
(14)*	Impression:											
	Same - Favorable	50	68	53	36	54	59	60	37	57	50	} 48
	Same - Unfavorable	11	2	6	9	14	3	13	3	4	0	
	More Favorable Than Before	27	14	41	39	24	34	13	50	37	44	32
	Less Favorable Than Before	11	16	0	15	8	4	13	10	2	6	20
(15)*	Jury Service (Percent Yes)											
	Important Community Contribution	82	89	80	86	76	91	90	91		94	N/A
	Worthwhile Personal Experience	79	79	68	86	78	88	80	97	N/A	100	
	Waste of Time	14	14	6	17	25	8	18	3		6	
Number of Questionnaires Returned		137	67	37	181	166	200	63	75	200	71	5079

NOTES:

- * = Percent of Total Answers Received
- N/A = Not Available
- + = Good
- 0 = Adequate
- = Poor

Table 11. Results of Initial Use of Questionnaire

Responses to the questions concerning jury fees and lost income showed that about 25% of the jurors lost money because of their service, and 40% of the jurors considered the fees inadequate.

As to the term of service, most jurors felt that it should be left as is. This was the expected response since most people have never served on jury duty before and therefore have no basis for comparison.

About 75% of the jurors who responded to the questionnaire made comments about their service. Many people said that their experience as a juror was pleasant and rewarding. The most frequent complaint concerned the great amount of time which the juror spent waiting. A positive correlation was found between the amount of time a juror spent waiting and whether his impression of the jury system after having served was less favorable than it had been before his term of service. While his attitude is generally favorable, a juror's impression of his service is definitely influenced by the amount of time he had spent waiting.

Courthouse facilities were also criticized, and suggestions for improvements were usually made. Most frequently criticized were food quality, waiting room comfort, and parking facilities. Specific recommendations were made, such as for the improved installation of televisions in the lounge or better ventilation when non-smokers and smokers were together in the same room. Serving of the jury summons was criticized by one woman juror who said she was awakened early one Saturday morning by a loud banging on the door (they had a bell), followed by a long exchange before the nature of the sheriff's visit was revealed. She said she was frightened, accused him of gestapo tactics, and yet had high praise for the court and the people there after her jury service was completed. Fortunately, this court has since changed from sheriff service of the jury summons to a mail service. Other complaints involve orientation procedures and the revealing of jurors' addresses and telephone numbers to the defendant in a criminal trial. Many other very practical suggestions were made which court administrators could find very useful in making facilities more comfortable and procedures more understandable for the jurors.

5.4 Final Questionnaire Design

Based on these preliminary results, a shortened questionnaire was designed and is given in A Guide to Juror Usage and reproduced here as Figure 18. Eliminated from this form are some of the questions

which had poor response, were not understood, or were found to be inconsequential in forming the picture of the jurors' attitude. The recommended use of the questionnaire is to obtain several hundred responses and establish from these a profile of the juror and his attitudes. Then when changes are introduced or when a sufficient time has passed (e.g., one year), sample attitudes again to determine possible trends or effectiveness of changes.

JURY SERVICE EXIT QUESTIONNAIRE

Your answers to the following questions will help improve jury service. All responses are voluntary and confidential.

1. Approximately how many hours did you spend at the courthouse? _____
2. Of these hours in the courthouse, what percent was spent in the jury waiting room? _____
3. How many times were you chosen to report to a courtroom for the jury selection process? _____
4. How many times were you actually selected to be a juror? _____
5. Have you ever served on jury duty before? _____ How many times? _____
6. How would you rate the following factors? (Answer all)

	Good	Adequate	Poor
A. Initial orientation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Treatment by court personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Physical comforts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Personal safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Parking facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Eating facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Scheduling of your time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Did you lose income as a result of jury service? Yes
 No
8. After having served, what is your impression of jury service? (Answer one)
 - A. The same as before -- favorable?
 - B. The same as before -- unfavorable?
 - C. More favorable than before?
 - D. Less favorable than before?
9. In what ways do you think jury service can be improved?

The following information will help evaluate the results and responses to this questionnaire:

10. Age: 18-20 21-24 25-34 35-44 45-54 55-64 65-over
11. Sex: Female
 Male

Figure 18. Exit Questionnaire

APPENDIX A

PAPERS COMPLETED BY BIRD ASSOCIATES
UNDER LEAA GRANT 73-NI-99-0012-G

Papers Completed by
Bird Engineering-Research Associates, Inc.,
Under LEAA Grant 73-NI-99-0012-G

Baird, C. B.; Broadhurst, R. H.; Munsterman, G. T.;
Pabst, W. R., Jr.; Stevens, J. P. "A Standard of Juror Usage."
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Colorado, July 16 through October 31, 1973." 1974

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APPENDIX C
OTHER PUBLICATIONS

THE JURY USAGE INDEX
VERSUS
PERCENTAGE OF JURORS NOT SERVING

by

G. Thomas Munsterman
William R. Pabst, Jr.
Julian P. Stevens

Prepared Under Grant Number 73N1-99-0012-G
of the Law Enforcement Assistance Administration
of the Department of Justice

28 August 1973

BIRD ENGINEERING-RESEARCH ASSOCIATES, INC.
Post Office Box 37, Vienna, Virginia 22180

THE JURY USAGE INDEX
VERSUS
PERCENTAGE OF JURORS NOT SERVING

INTRODUCTION

The publication Management Statistics for United States Courts presents a statistical profile on each of the 93 federal district courts for each year.¹ In each statistical profile, juror usage is indicated by two different measures. The first is the juror usage index (JUI); the second is the percent of jurors not serving (PNS). This paper proposes to show that these measures are closely correlated and that only one of these is necessary to convey the necessary information.

JUROR USAGE INDEX

The juror usage index is defined as the number of jurors on hand and paid per jury trial day during the year. This number is obtained by the Administrative Office from the JS-11 report entitled "Petit Jurors Used", a copy of which is attached. This report is prepared monthly by each district. For each report, the JUI is computed by summing column B, "Total Available To Serve", and dividing this by the sum of column A, "Juries In Trial". Instructions for these columns, quoted from the JS-11 form, are as follows:

- (3) Column A -- Show the number of separate jury trials in process, whether or not the trial is completed that day. Also, if two trials occur in same courtroom within the day count these as two.

¹ Management Statistics for United States Courts, published by the Director of the Administrative Office of the United States Courts, February 1972.

- (4) Column B -- Show total number reporting as available to serve, whether or not put on a panel or a jury. Exclude any excused jurors if they were not paid an attendance fee (per instruction No. (2) of Summons Form AO-222).

The JUI is rather easy to calculate using the JS-11 and is essentially the summation of all the jurors paid divided by the product of the number of trials and the average length of trials. The multiple trials in a single day in a single courtroom, a fairly rare occurrence, provide the only bias to this interpretation.

PERCENT OF JURORS NOT SERVING

The percent of jurors not serving is also calculated from the JS-11 form, using column E, "Not Used", divided by column B, "Total Available To Serve". Form JS-11 instructions for column E are:

- (7) Column E -- Show jurors neither challenged nor sworn for any specific trial. Include jurors reporting for instruction and orientation day.

This definition of "Not Used" may be subject to interpretation by individuals since column D also is entitled "Challenged and Not Used". The "not used" in column D are supposedly those who have been sent to a voir dire and not reached on the list. Furthermore, according to accounts, the number "not used" in column E in some courts does include orientation, whereas in others it does not.

The assignment method within the pool can also vary the value for column E. If panels are preassigned or an effort is made to use all available prospective jurors before any are used twice, the number not used is lower than would result from a random drawing of those available in the pool.

Thus, the PNS is a rougher measure than the JUI, and does not take into account any difference in the average length of trials among the various courts.

CORRELATION CHARTS

Correlation charts were prepared showing the relationship of the JUI to the PNS for large districts, middlesized districts, and small districts. The large districts were those with seven or more judges; middlesized, those with four to six judges; small, those with three or fewer judges. The lines of relationship for each court size, however, prove to be independent of the size of court, and therefore only one chart, Figure 1, is shown for all. The scores for all the large districts fall neatly on this correlation line, with the exception of New York Eastern and New York Southern. All the middlesized districts fall close to this line, with the exception that Colorado and Texas Western have a lower JUI than might be expected on the basis of the reported percentage of jurors not serving. Each reports a JUI of about 15 and a PNS of 35%, where one would expect a PNS in the neighborhood of 20% for a JUI of 15.

Among the small districts, most fall close to the line of relationship except Guam and Nevada. Iowa South shows the lowest PNS, but has a higher JUI than might be expected relative to it. Guam and Nevada have the highest PNS, with a JUI much higher than might be expected in either case. The reason for the high JUI in Nevada is supposedly attributed to the very large annual orientation program, which is included in the JUI, and to the very wide difference between the index in the two divisions of that district. With these three exceptions, then, all small districts appear to have a fairly close relationship between the JUI and the PNS.

MATHEMATICAL RELATIONSHIP

The relationship between the JUI and the PNS can be written as:

$$JUI = 7/20PNS + 8$$

This is the equation of the straight line relating these two measures of jury usage. This shows that if the PNS is 20%, the JUI would be 15; if the PNS is 40%, the JUI would be 22; if the PNS is 60%, the JUI would be 29. However, the JUI is more tightly distributed than the PNS, for with few exceptions the JUI varies from 15 to 30; the PNS, also with a few exceptions, varies from 20% to over 60%. The JUI is biased by the average length of trials and by the proportion of six-member jury trials. A single, long trial contributes daily to the JUI only the number of jurors and alternates sitting in the box -- either twelve, or six, plus alternates. Contribution to the JUI of a six-member jury is only half that of a twelve-member jury. Districts with a high proportion of long six-member jury trials would thus have a lower JUI than others. Possibly these characteristics might account for the disparity between the JUI and the PNS in some of the exceptional courts indicated above.

DISTRIBUTION OF JUI

Figure 2 presents a frequency distribution of the JUI. The JUI is mostly concentrated between the values of 15 and 30, with the exception of two small districts and two large districts, as indicated above. The distribution, however, does not appear to be regular, but rather bi-modal. One mode is shown in the area of 15 to 22; the other, in the area of 24 to 30. This appearance of bi-modality, although it may happen by chance, suggests that there are two distinct situations -- one influencing small, large, and middlesized districts that are relatively good with respect to the JUI; and the other among the districts that are relatively bad. Possibly the districts in the range

of 15 to 22 have started to use innovative methods of some kind and to varying degrees, where those 23 and above generally have not started to use such methods. The distribution shows that no large districts fall below 18; a good many of the small and middlesized districts are in the range 14 to 17. However, the bi-modality appears to be a phenomenon not associated with the size of the districts because the small, middlesized, and large courts reflect the two groupings -- the good side covering about two-thirds of the districts, and the poor side covering roughly the other one-third.

A recent telephone survey contacted seven districts in the good usage range and seven in the poor usage range. The survey showed that all of the good usage courts were using innovative methods including staggered trial starts, multiple voir dire, and code-a-phone, whereas the poor usage courts were generally not using these methods. However, there seemed to be no sharp separation between those using the six-member jury in civil trials. From this, it is concluded that little of the apparent bi-modality arises from the bias of six-member juries.

COST PER UNIT OF JUI

The JUI can be converted easily into a dollar value, and thus the payoff arising from a reduction in the JUI can also be easily calculated. The simplest way to observe this is that the number of jury days in trial, as shown in column A of the JS-11 form, times the average daily juror fee, is the amount of money per month represented by the change in the JUI of one point. Thus, a reduction in the JUI from 25 to 24, where a district had 100 jury trial days and a juror fee of \$20 a day, would be a reduction of \$2,000 per month, or \$24,000 per year. The number of jury days in trial is approximately

the product of the number of trials per month, times the average number of days per trial. Thus, a district with 10 jury trials per month which last for three days each would have 30 trial days per month. A reduction of one point on the JUI for a district of this size would amount of \$600 a month, or \$7,200 per year.

If the districts in the upper mode of the JUI distribution could be brought down to the lower mode of the distribution, from a JUI averaging 26-27 to a JUI averaging 17 or 18, this reduction of 9 points per district might be as much as \$50,000 saved in annual jury expenses for a middlesized district, and as much as \$100,000 saved in jury expenses for a large district.

SUMMARY

The JUI is shown to be closely correlated with the PNS. With respect to having a tighter distribution and being more simply calculated, the JUI is considered to be preferable to the PNS as a measure showing the relative effectiveness of juror usage among the districts. Were it not for the bias introduced by the different proportions of six-member juries used in the various districts, one might suggest that the JS-11 form might be simplified to show only columns A and B, since only these two columns are used to compute the JUI. This would eliminate reporting of column C and difficult decisions between columns D and E.

One way of avoiding the bias is to count a six-member jury as a half jury and a twelve-member jury as a whole jury in trial in column A. This would free the JUI as a measure of juror usage from any effect of whether a six or twelve were used.

One other way of avoiding the bias is to use column C, "Served on Trial Juries", which takes into account the size of juries including alternates. Column C can be considered the average size of juries times the number of "Juries in Trial" shown in column A. Column C divided by column B (that is, the number serving on trial juries as a proportion of total available to serve) might be called percent of jurors serving (PJS). The PJS would be a sensible measure of juror usage for the closer it 100% it was, the better the score would be. Except for panel information, the PJS is basically one minus the PNS and might be expected now to have the same wide range.

In summary, only one measure of juror usage need be reported in the statistical profile, but that measure should be meaningful to people in the courts and free from the bias introduced by the six-member jury. A study of the alternative ways to achieve this from the JS-11 type data is considered important and should be undertaken. Similar data from state and local courts might also be collected, possibly on a sampling basis, by some appropriate activity to show the standards of juror usage actually achieved in these courts. Information collected to a comparable standard by federal, state, and local courts might lead to great improvement in juror usage throughout the system.

An index that could be translated easily into dollar savings -- for instance, that a five-point reduction in the JUI would mean an annual \$36,000 reduction in jury fees to a 10-trials-per-month court -- might be most effective, especially if the specific steps that might be taken to achieve that five-point reduction could be specifically outlined and costed for the appropriate authority.

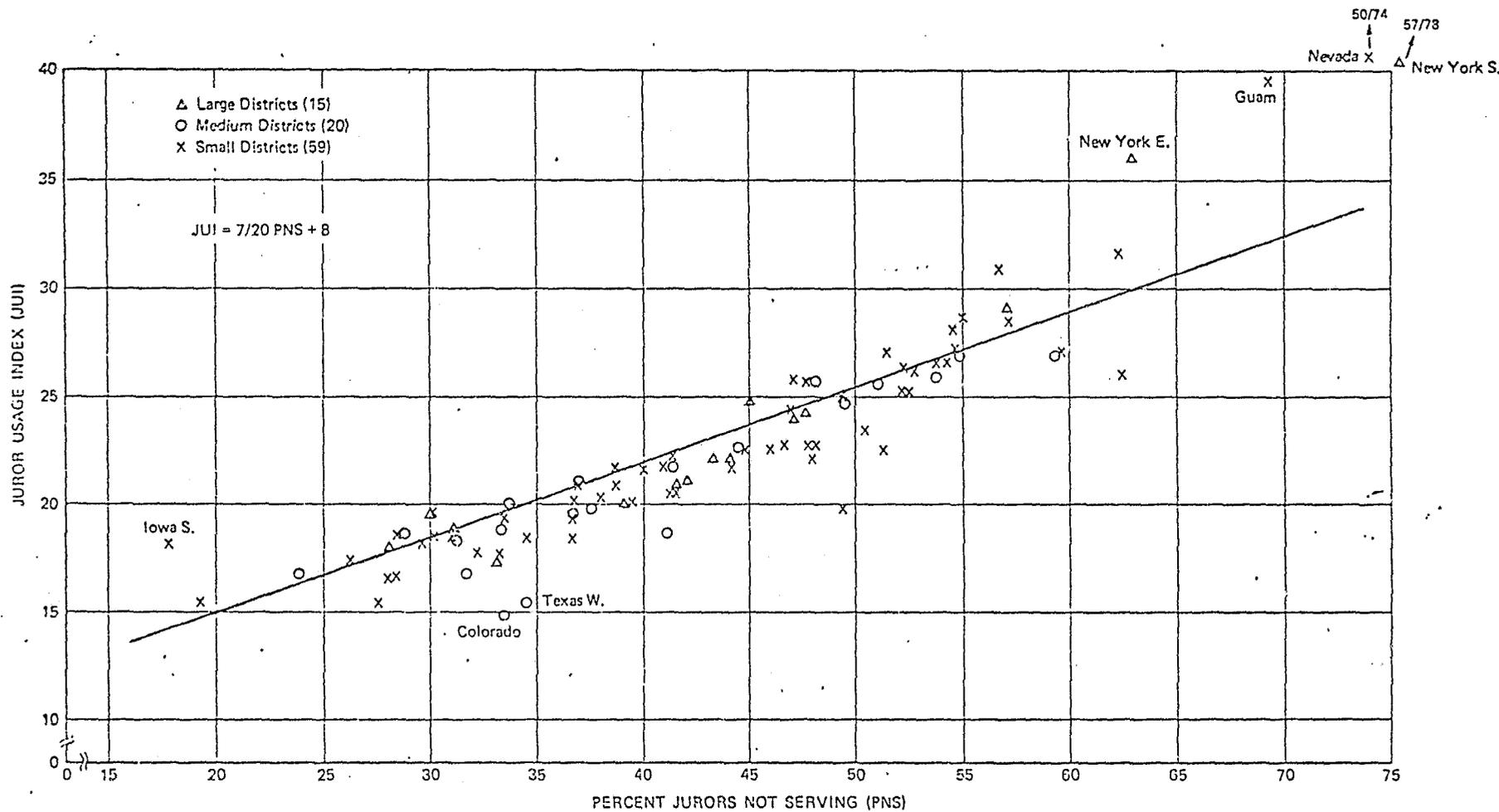


Figure 1. Correlation of Juror Usage Index (JUI) With Percent Jurors Not Serving (PNS)

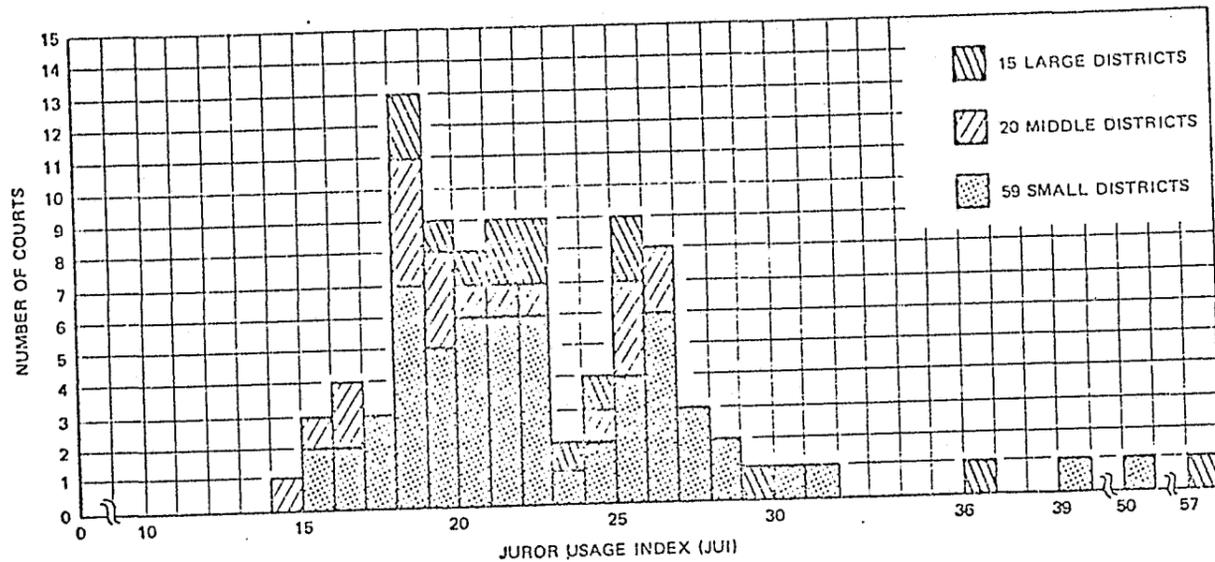


Figure 2. Distribution of Juror Usage Index (JUI) for 1971

PETIT JURORS USED

A MONTHLY REPORT TO THE
ADMINISTRATIVE OFFICE OF U.S. COURTS

JS-11

DISTRICT

DISTRICT NUMBER

Central District
of California

06301

MONTH OF

YEAR

April

1973

PLACE OF HOLDING COURT

Los Angeles, California

F. OPTIONAL

In this space each District court may record such facts about daily juror situations as it finds helpful for later usage analysis (*see examples)

Russo, Ellsberg jury of 18 jurors met 21 days this month.

DATE	A		NUMBER OF JURORS			
	JURIES IN TRIAL		Total Available To Serve	Served on Trial Juries	Challenged And Not Used	Not Used
	Civil	Criminal				
1	2	B	C	D	E	
April 2	2	2	45	45		
3	2	4	187	67	31	89
4	1	4	84	67		17
5	1	4	65	65		
6	1	3	81	52	11	18
9		2	31	31		
10		6	160	84	30	46
11		5	71	71		
12		6	100	84	10	6
13		5	68	68		
16		1	18	18		
17		8	192	112	29	51
18		8	136	112	9	15
19		6	86	86		
20		5	70	70		
23		2	32	32		
24		7	150	100	20	30
25		5	73	73		
26		4	59	59		
27		4	59	59		
30		3	44	44		
TOTAL	6	94		1399	140	272
TOTAL COLS. 1 & 2	100		1811			
	A		B			

*e.g. Number of jurors requested by each judge vs. number actually used, times when same juror serves on more than one trial on given day, identity of capital offense cases, etc.

INSTRUCTIONS

- Use at least one line for each day.
- Column B, rows C, D, equals Col. E.
- Column A - Show the number of jurors in process, whether or not the trial is complete that day. If two trials occur in same courtroom within the day count the jurors as two.
- Column B - Show total number reporting as available to serve, whether or not put on a panel or a jury. Exclude any excused jurors if they were not paid an attendance fee (per Instruction No. 17 of Superior Form 60-221).
- Column C - Show number served in any part of the day as a sworn juror for any specific case trial, even if case settled before evidence is introduced.
- Column D - Show number actually used for any trial service that day. Persons excused or not sworn are not included in this column.
- Column E - Show number of jurors who were challenged for any specific trial. Include jurors

WRITE "A" INTO "B" FOR

1811

JUROR USAGE

WHY SOME FEDERAL COURTS HAVE
BETTER JUROR USAGE INDEXES THAN OTHERS

by

G. Thomas Munsterman
William R. Pabst, Jr.
Julian P. Stevens

Prepared under Grant Number 73N1-99-0012-G
of the Law Enforcement Assistance Administration
of the Department of Justice

WHY SOME FEDERAL COURTS HAVE
BETTER JUROR USAGE INDEXES THAN OTHERS

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INTRODUCTION

Some federal courts enjoy better juror utilization than others,^{1/} and the question is why? Do they use better techniques, have more interest, or differ in their reporting? A recent telephone survey of fourteen federal courts, half with good juror usage and half with poor juror usage, attempted to answer this question.

The survey showed that all seven good-usage courts used innovative methods, either staggered trial starts, multiple voir dices, code-a-phone, and predicted jurors needed daily. The most suitable methods are apparently related to the size of the court. All of these good-usage courts evidenced close cooperation among the judges and with their administrative staffs. In the seven poor-usage courts, these innovation techniques were strikingly absent. Only one mentioned the use of multiple voir dire in one of its divisions, this being overshadowed by the inclusion of a large annual orientation program in its index. These courts evidenced little, if any, cooperation among the judges and their staffs and appeared to bring in jurors to the pools as if each judge were isolated from the others.

^{1/} As shown by the Juror Usage Index (JUI), published in the Statistical Profiles by the Administrative Office of the United States Courts.

The results of this small sample survey are admittedly sketchy, but they are presented in this form more to raise the question for discussion than to pose a definitive answer.

BACKGROUND OF THE STUDY

Appendix A of the Guidelines for Improving Juror Utilization in the United States District Court^{2/} compares jury utilization in the districts from 1961 to 1971 and shows the percent of available jurors used in those years and the percent of change. Attention first centered on why certain districts had changed so much, some increasing by as much as 30% and others falling off by an almost equal amount. Because of the possible difficulty of going back ten years to discover the changes that had taken place, this approach was changed to comparing those courts with good juror usage to those with poor juror usage, as shown by the JUIs of 1971. The sample design was selected to include large districts (those with seven or more judges), middle-sized districts (those with four to six judges), and small districts (those with one to three judges). The original plan was to contact three good-usage and three poor-usage courts in each size class. Only fourteen of the eighteen intended courts were reached, but seven good-usage and seven poor-usage were included. The good-usage courts had JUIs of 14.83 to 19.70, whereas the poor-usage courts had JUIs of 22.88 to 26.81, plus one small court standing at 50.13. The selection of the sample was influenced not only by the JUI but also by its correlation with the percentage of jurors not used.

^{2/} Published by the Federal Judicial Center, October 1972, p. 62-4.

In the fourteen courts reached, the district clerks were queried by telephone according to a provisional questionnaire. The questions led to a general discussion of whether they knew their JUI was good or bad and what they had tried to do about it. It is difficult to frame a sensible question to cover this without much discussion. Some district clerks referred some questions to their jury clerks. All of them evidenced strong interest and cooperation, and many were anxious to know of additional material on the subject.

GENERAL OBSERVATION

The telephone survey to the fourteen courts revealed many common characteristics of the district clerks. Some of these are:

- (1) Most of the district clerks knew their JUI and the standing of their district among other federal districts. Some of them also clearly explained why their index was high or low.
- (2) The clerks stated that the JUI varies widely within their districts because some of the divisions within districts resemble independent one- or two-judge courts. Some of the clerks knew which divisions are responsible for the high usage index, but feel virtually incapable of doing anything about it.
- (3) All of the clerks indicate that the juror usage, admittedly a small aspect of the total business of the court, depends upon the direct interest of a judge or a group of judges. The clerks feel that improvements in jury usage can be made only through the cooperation of the judges.

- (4) The jury terms vary widely through the U. S. Districts, some covering two weeks, others three weeks, and some four months. The terms exceeding one month are usually not continuous terms, and in most the jurors are excused after serving on four or five juries. Some courts encourage the reuse of jurors both in successive panels and trials. Other courts hesitate to use jurors for more than one trial.
- (5) Panel sizes vary widely, some districts using panels of 24 or even less in criminal trials, and other districts using up to 75. These larger panels are usually found in connection with pool operations and they incur extraordinarily poor JUIs. In most of these cases, the individual judge determines the size of the panel. By contrast, in the good-usage courts, the panel sizes appear to be very standardized for both the criminal and civil trials, usually at 30 in the criminal trials, and 18 in the six-man civil trials.
- (6) Six-man juries are used for civil trials in both the good-usage and the poor-usage courts, but it is unlikely that this had much effect upon the 1971 JUIs used as the basis for comparison.
- (7) All clerks indicated their interest and willingness to learn better juror usage techniques, but all reiterated that their individual judges had to take the initiating steps.

COURTS WITH GOOD JUROR USAGE INDEXES

- In the seven low-index courts, rank-ordered from the large courts to the smaller courts, the following practices were used:
- Court No. 1 -- Code-A-Phone^{3/} used; staggering of trial starts; small panels; no six-member juries; close cooperation among judges.
- Court No. 2 -- Code-A-Phone used; staggering of trial starts, although some are long; Monday used for empanelment; close cooperation among judges.
- Court No. 3 -- Multiple voir dire; a noticeable variation among divisions of the district; one division with high usage; relatively small panels; telephone alert.
- Court No. 4 -- Multiple voir dire by each judge setting as many as six to eight juries in advance.
- Court No. 5 -- Staggered starts with one day per week used for empanelment; jurors excused when not needed; short voir dices.
- Court No. 6 -- Multiple voir dire; unusually small panels; extreme cooperation of one judge with another.
- Court No. 7 -- Small panels; few challenges; no multiple voir dire; jury panel called only for the initiation of a trial; telephone alert.

^{3/} Code-a-phone costs \$32 per month for a simple installation and provides a recorded message to all callers similar to the time and weather service. Its use implies some prediction of the number of jurors needed on the next day. One court uses a within-state toll-free number.

COURTS WITH POOR
JUROR USAGE INDEXES

In the seven high index courts, again going from large to small, the following practices were used:

- Court No. 1 -- No staggering; no multiple voir dire; wide difference in utilization among divisions of the district; judges seldom communicate settlements so that jurors can be notified.
- Court No. 2 -- No multiple voir dire; few staggered starts; one division mostly responsible through non-cooperation among judges.
- Court No. 3 -- Very large panel called for each trial; no staggering; no multiple voir dire; some judges lack cooperation with others; jury service most unpopular.
- Court No. 4 -- No innovations; jurors called in for each case; a large number summoned for the first day panel; some telephone alert, but no Code-A-Phone.
- Court No. 5 -- Some staggering in part of the district; lack of cooperation among judges in other part of district; calibre of jurors considered low because of excuses of professional people.
- Court No. 6 -- Very large panels for criminal cases; no multiple voir dire; no innovative techniques.
- Court No. 7 -- Multiple voir dire sometimes used in one division, but not in the other; very large orientation programs included in index.

CONTINUED

1 OF 3

CONCLUSIONS

This comparison between the good and poor juror usage districts, although far from complete, does suggest a nearly complete dichotomy between them in the form of innovative methods. Those good-usage courts have come up with many ways to economize on jurors' time, including staggered trial starts, code-a-phone, prediction of jurors needed, multiple voir dices, and possibly improved or omnibus pre-trial procedures. None of these were found to impede the work of the courts, but rather to accelerate it.

The clerks in the good-usage courts feel they have the support, cooperation, and some gentle prodding from their judges, who themselves are interested in making jury service a useful civil participation rather than a boring servitude. The clerks in the poor-usage courts envied the others, for they attributed their inaction in reaching better juror utilization not to their lack of knowledge of what to do, but to the absence of interest on the part of their judges in doing it.

A STANDARD OF JUROR USAGE *

by

C. Bruce Baird
Ronald H. Broadhurst
G. Thomas Munsterman
Julian P. Stevens

of

Bird Engineering-Research Associates, Inc.
Post Office Box 37, Vienna, Virginia 22180

and

William R. Pabst, Jr.
Consultant

The authors constitute the research team engaged in the operational and statistical study of jury utilization under Grant Number 73N1-99-0012-G of the Law Enforcement Assistance Administration of the Department of Justice. All have been associated with quality control and reliability research and in studies of the alternatives to litigation of medical malpractice disputes. Dr. Pabst has played an active part in ASQC and is a Fellow of the Society.

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A STANDARD OF JUROR USAGE

ABSTRACT

This paper describes the development of a standard measure of juror usage in the 94 United States District Courts and explains how this measure is becoming a recognized quality standard through the self-enforcement of many court administrators and judges. The effect of the standard is to cut expenditures by reducing the number of jurors called while ensuring those called will be effectively utilized. Of all those called to jury duty, the federal courts use only a small percentage, whereas the state and local courts use the great majority. The problem, therefore, is how to get this standard of juror usage recognized and used by the thousands of state and local courts.

Background

Jurors are citizens who have been selected more or less at random from voter or other registration lists as temporary conscripts for public service. Approximately 100,000 people are serving on jury duty every court day in our federal, state, and local courts. Each year about 2 million people are called for jury duty and each year they provide about 20 million days of juror service. Their terms of jury service are most frequently two weeks to a month, but they vary from one day in the Texas courts to a year or more in some federal courts. Jury service is generally considered a public service, for their fees are small -- in the state courts, fees vary from \$3.00 a day in Colorado to \$22.00 under some conditions in Massachusetts. Federal courts pay a uniform fee of \$20.00 a day. Most salaried people and many wage earners continue to receive their usual incomes while on

jury duty, resulting in the real cost being hidden. Whether or not a loss of income is involved, many people resent the interruption of their normal activities. Moreover, their possible desire to support a democratic institution is somewhat diminished by the fear, in some cases well-founded, that their conscripted services will not be used effectively. For instance, they read news stories that some jurors spend two-thirds of their time waiting in the jury lounge.¹ One New York study reported almost twice as many comments about "inefficient use of time" as any other aspect of jury service.²

Generally, jurors who take part in actual trials find the experience rewarding and educational. They witness the process of law enforcement and they take part in an important event in the lives of people involved in criminal or civil litigation. Alexis de Tocqueville remarked about the educational importance of the jury when he wrote about this country 150 years ago. His remarks may still have currency.

The jury contributes most powerfully to form the judgment, and to increase the natural intelligence of a people; and this is, in my opinion, its greatest advantage. It may be regarded as a gratuitous public school ever open, in which every juror learns to exercise his rights, enters into daily communication with the most learned and enlightened members of the upper classes, and becomes practically acquainted with the laws of his country, which are brought within the reach of his capacity by the efforts of the bar, the advice of the judge, and even by the passions of the parties. I think that the practical intelligence and political good sense of the Americans are mainly attributable to the long use which they have made of the jury in civil causes.³

One of the problems facing the courts is to effectively use jurors' time. A related problem, although it sometimes receives more attention, is to keep down the cost of the jury system in view of the generally low but rising fees. This problem of juror utilization is being studied at length by a research team at Bird Engineering-Research Associates under a grant from the United States Department of Justice. The study consists of collecting information on juror usage, fitting analytical and mathematical models to it, and simulating the operational procedure under various alternative conditions. The expected outcome of this research is to develop theory and methods for optimizing juror utilization practices.

The typical operation of a jury system is to establish a pool of prospective jurors at the start of a jury trial and to draw from that pool when a judge indicates that a trial is to start. Some uncertainty is introduced because many cases scheduled for jury trial are settled by agreement among the parties or by a defendant's change of plea (usually to a guilty one). If the trial is conducted as scheduled, a panel of 18 to 60 prospective jurors is released from the pool to take part in the "voir dire", an opportunity "to see and speak", during which some prospective jurors may be disqualified for cause or challenged by counsel. The voir dire can vary in time from 10 minutes to hours, or to days in publicized cases, but the average length is about an hour. From this voir dire panel, the final jury of 6 or 12 (as the case may be) plus alternates is selected and sworn in. Trial length also varies both within a court and between courts; the average is at least a day. The operational feature that complicates jury operation is the relatively short-time large start-up panel, and the relatively long-time small jury maintained for the trial. This individual trial

profile is intensified when many judges in one court attempt to start trials simultaneously, for this produces very high short-time peak demands for jurors. The pool set in advance must be large enough to accommodate the highest daily peaks lest the absence of jurors delay the start of a trial and impede the work of a court. In the past in many courts, the pool had been set large enough (usually by guess or past practices) so there was never a danger of running out of jurors. Consequently, great overcalls of jurors resulted, and some still continue.

An Emerging Standard

Within the past three years, a standard measure relating to juror usage has emerged in the United States District Courts as an attempt to get valid information on the cost and utilization of jurors. Some years ago, the Administrative Office of the United States District Courts prepared a relatively simple form (Figure 1) to record for each court day the number of jurors called to service and the number used as actual jurors or in the jury selection process. The form also indicates the number of jury trials in process each day. From this information, a monthly Juror Usage Index (JUI) is derived for each court as the total number of jurors available divided by the number of court days.

PETIT JURORS USED

JS-11

A MONTHLY REPORT TO THE ADMINISTRATIVE OFFICE OF U.S. COURTS

DISTRICT DISTRICT NUMBER

1 4 5 0 2

ILLUSTRATION, SOUTH

PLACE OF HOLDING COURT

Sample, Illustration

FOR MONTH OF December	YEAR 1971
--------------------------	--------------

DATE	A JURIES IN TRIAL		NUMBER OF JURORS				F. OPTIONAL In this space each District court may record such facts about daily juror situations as it finds helpful for later usage analysis (*see examples)
	Civil 1	Criminal 2	Total Available To Serve B	Served on Trial Juries C	Challenged And Not Used D	Not Used E	
1	0	0	49	0	0	49	Reported for Instruction.
6	1	2	49	38	9	2	
10	5	0	45	35	7	3	Six Man Juries.
17	0	1	25	14	8	3	
20	0	1	14	14	0	0	Continued from 12/17/71.
21	0	1	14	14	0	0	Continued.
TOTAL COLS. 1 And 2		6	5	115	24	57	e.g. Number of jurors requested by each judge vs number actually used, times when same juror serves on more than one trial on given day, identity of capital offense cases, etc.

SAMPLE

NO ACTIVITY FOR:
14501, 14503
and 14504

DIVIDE "A" INTO "B" FOR

17.82 JUROR USAGE INDEX

JUIs have been calculated and published for each of the 94 United States District Courts for the past three years in the annual reports of the Administrative Office.⁴ The average JUI for each court for each of the three years is shown in the frequency distributions of Figure 2. These distributions show the average JUI for all 94 courts has decreased about 13% from 23.31 to 20.16. The distribution for 1973 shows a tendency to greater normality. Some of the decrease in the average JUI during this period can be attributed to the adoption and increasing use of six-member juries in civil trials to replace the normal 12-member juries. The effect of this on the JUI of each court depends to a large extent on the mix of civil and criminal cases, which is by no means uniform among federal courts. Most of the decrease in the average JUI, however, is attributable to the regression toward the norm of the initially outlying courts. About one-fifth of the units actually did increase slightly, mostly due to chance factors.

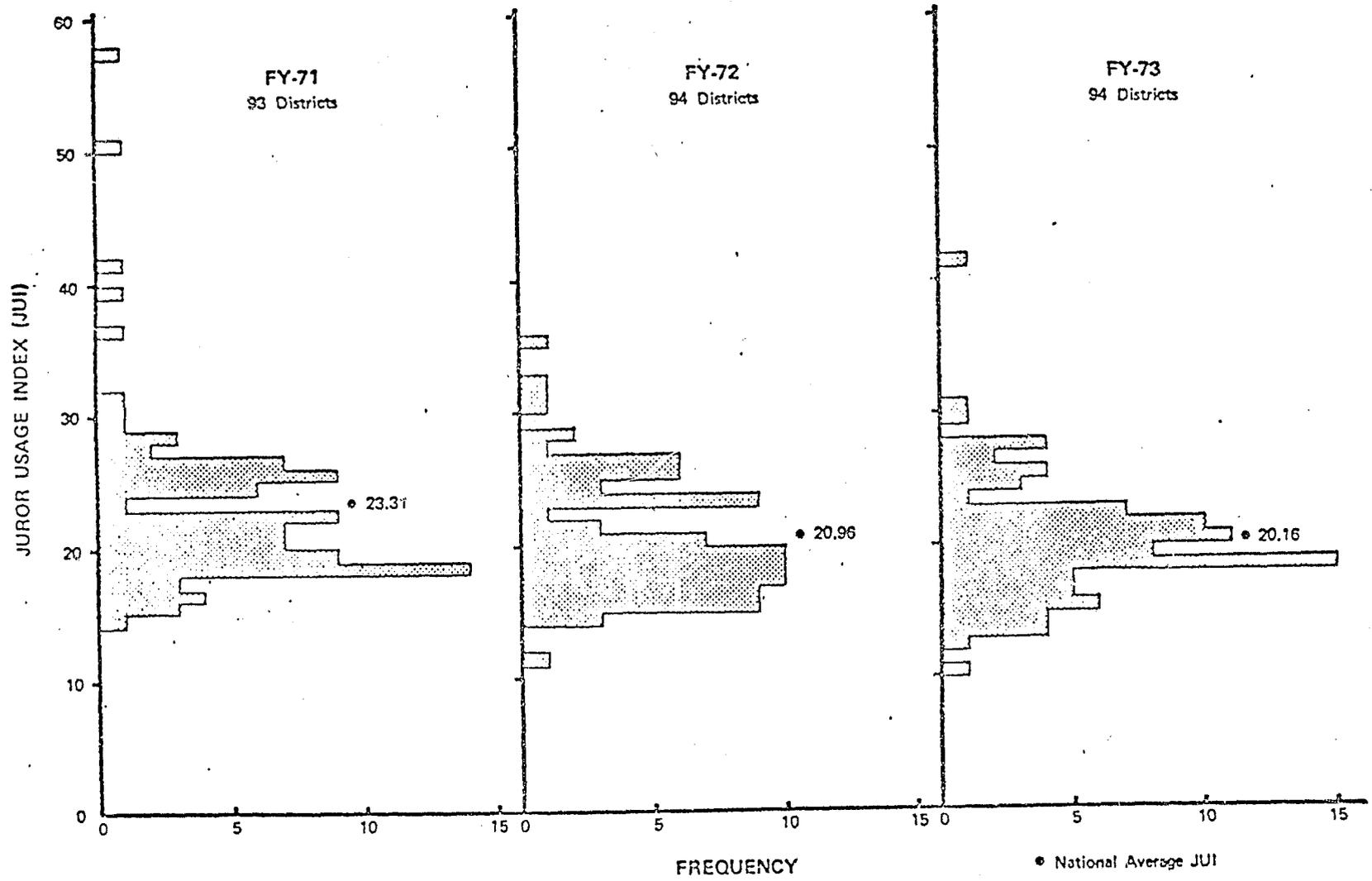
There is a tendency for the JUI to become a measured standard rather than a standard of measure. This tendency was confirmed by surveying a number of courts, some with relatively low JUIs and some with high. This survey revealed that the administrators of each court were conscious of their JUI standing, and were taking whatever steps were in their power to bring it within the lower ranges of the others.

Notwithstanding that other measures of juror usage (such as first day usage) may appeal to some, the JUI is becoming a standard measure to which the administrative clerks of the courts pay attention. They know their relative standing and they try to improve it. Their work and interest in this respect is not necessarily decisive, for it is the judges of the courts either singly or in concert who effectively

Figure 1. Administrative Office of the United States District Courts JS-11 Form

determine policies and procedures of juror usage. When judges also become interested in the standing and support administrative clerks in their improvement activities, improvement follows. The Federal Judicial Center, especially through the efforts of Joseph Ebersole, has also endeavored to focus attention on the subject, mainly by holding seminars on juror utilization for districts falling below the average. This tends to support the concept of management through exception, or improvement through exception, which appears to have been in progress over the three-year interval. The Center has also published guidelines explaining methods that can be used by individual courts to improve their juror utilization.⁵

Figure 2. Average JUI Frequency Distribution



Methods of Improving JUI

The methods to reduce the JUI depend on many factors inherent in the particular court situation. United States District Court sizes vary as measured by the number of judges; 59 have from one to three judges; 20 have four to six judges; and the remaining 15 have seven or more judges. In some of the middle and larger courts, judges sit in different cities within the district and have the effect of small courts. Actions taken by large courts tend to differ from those found effective in the small. All the actions either reduce the supply of jurors (the number called) or change the demand for jurors by spreading out the daily peaks. Any actions taken regarding jurors must not interfere with the basic work of the courts. Some practices found useful are:

- Multiple voir dire. A single judge, or possibly two judges, calls a relatively large pool of jurors for a single day, then selects successive panels from the pool to establish a number of trial juries to start in future days. This obviates the need for a large pool of jurors waiting from day to day to be selected for some future trial. Jurors selected for a future trial are excused until the judge is ready to start their assigned trial.
- Single day empanelment. This is similar to the multiple voir dire in which all judges of a court use a given day of the week to select jurors for expected trials of that week. Its effectiveness depends on the length of trial; it works fairly well if the judges average one trial per week. If judges do many more than one, this practice requires many jurors to appear on empanelment day, in some cases enough to overburden available facilities.

- Staggered trial starts. The judges of a court avoid starting all their trials at approximately the same time since simultaneous starts tend to create high daily peaks. This is enhanced if some judges are willing to schedule afternoon or off-peak-hour starts, or if an assignment judge can plan the most useful time-spaced schedule for the judges. Staggered trial starts smooths out the demand for jurors by avoiding the large peaks caused by many simultaneous voir dres. The importance of this practice depends on the average length of voir dire, which varies widely from court to court. If the voir dire time is short enough, the probability of encountering simultaneous voir dres is greatly reduced.
- Continuous operation. In some courts, jury utilization is maintained at high levels throughout a week or court term by assignment practices that create reasonable continuous operations; a new trial starts soon after the previous trial is finished. In effect, the court operation automatically provides staggered starts. In other courts, a weekly or monthly pattern shows that most starts come on a single day; other starts are lightly spread over the rest of the period. High juror utilization cannot be maintained under this rhythmic situation unless the need for jurors can be predicted accurately from day to day. Any practice that tends to promote continuous operation tends, in effect, to improve juror utilization.

- Cooperation with large panels. This involves sharing large panels. Large panels may be necessary for trials involving many defendants and highly publicized issues. These cases tend to disrupt the whole system if large panels are selected from the normal pool of jurors. When a large panel is required for one trial, other large-panel trials can be scheduled in sequence so the jurors called can be used several times.
- Prediction of juror needs. A formula is used to determine the number of jurors needed on a given day based on a number of related factors. Sometimes the number of courtrooms or the number of judges expected to be sitting is used. Day-to-day and week-to-week patterns of the past are also considered. In some courts, the judges or their calendar clerks notify the jury room of their anticipated juror needs for the following day. Prediction methods have not been precise because of the great and varying number of guilty pleas or settlements just before trial. To avoid this instant uncertainty, some courts actively discourage pleas or settlements unless they are announced at least 48 hours before the expected trial start.
- Code-a-phone. This device affords multiple access telephone messages (similar to weather or time reports) to keep jurors abreast of after-hours changes in schedules.

In all these practices, there is no substitute for alert and knowledgeable jury and scheduling clerks who work with the judges and their assistance to know precisely what is going on throughout the courthouse and to assure the availability of jurors as they are needed. They also have a high regard for the individual juror's time.

State and Local Courts

Many state and local courts are not aware of the problem, even though they use some 30 times as many jurors as federal courts. State and local courts vary widely in size, number of judges on the bench, type of cases and jury trials handled, length of jury terms, and trial characteristics. Most courts do not retain day to day juror utilization records except for the fiscal records of payments to jurors. In these courts, it is not possible to tell how much of the juror's time was actually used in the business of the courts and how much was wasted in useless waiting.

State and local courts are generally quite independent and there are few central coordinating activities within the states. Some states have shown an interest in acquiring information on juror utilization, but very few states (if any) are acquiring systematic juror information on a statewide basis. None of them are known to be using an organized and standardized data collection method like the federal form to provide a relative measure of juror usage among state courts.

Certain states, for instance, Colorado, Massachusetts, and Michigan, are instituting statewide procedures which will probably incorporate the centralized collection of juror usage information, but most state and local systems are still untouched by these developing standards. The problem is thus to translate the standard of juror usage found effective in federal courts to the many different state and local courts. What is needed for this translation is an awareness of the problem, a recognition that a measure of juror usage is available and widely used, and that this measure predicates a standard which can be a gauge to all court systems. Possibly the standard can be

self-enforced. The first step for any court is to record the necessary information and to compare its standing with other courts, preferably with the federal results, to determine if corrective action is needed. If corrective action is needed, responsibility for achieving necessary changes must be placed within the court system. The effect of changes must be monitored until the desired result is obtained.

If self-enforcement within the administrative structure of the courts is not possible, informed public opinion may come into play. People called to jury duty may ask for the court's relative standing and, if such information is unavailable, attempt to develop initial information from their own observations. If public opinion is developed, the action cycle may take place as above or may be extended through the political and elective processes. As elected officers, many state judges are sensitive to informed public reaction. Citizens knowledgeable about the existence of these usage standards can play a useful quality control role of monitoring to see that the standards are enforced.

Conclusion

What has been shown is part of the classic development of a quality standard in the public service field, in this case, a standard of effective utilization of people conscripted for public service. Costs to the court are involved, but these are secondary to the esprit and good will of citizens brought in to serve the courts. The study shows that, first, a measured value is developed that has common properties throughout the courts. Then it is shown that this measured value, recognized in the courts, takes on the form of a self-imposed and common standard to which all can adhere. Self-enforcement is generally found effective, but action by exception is provided through

training seminars for courts found below standard. Thus, in federal courts, the concept of a standard emerges from the recognition of the problem, the collection and dissemination of information, and the self-imposed or centrally-directed corrective action.

With state and local courts, however, an awareness that juror utilization is an important problem is still to be created. Once this awareness grows, the quantitative measures and the standard of excellence developed in federal courts can be applied. Thus, in the field of public service, a classic quality control standard applied to a measurable aspect of conscripted service may help to extend the life of a very important part of our democratic heritage, the jury system.

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³de Tocqueville, Alexis, Democracy in America, Schocken Books, New York, Volume I, 1961, p. 337.

⁴Annual Report of the Director, Administrative Office of the United States Courts, Washington, D. C., 1973.

⁵Guidelines for Improving Juror Utilization in the United States Courts, The Federal Judicial Center, Washington, D. C., October 1972.

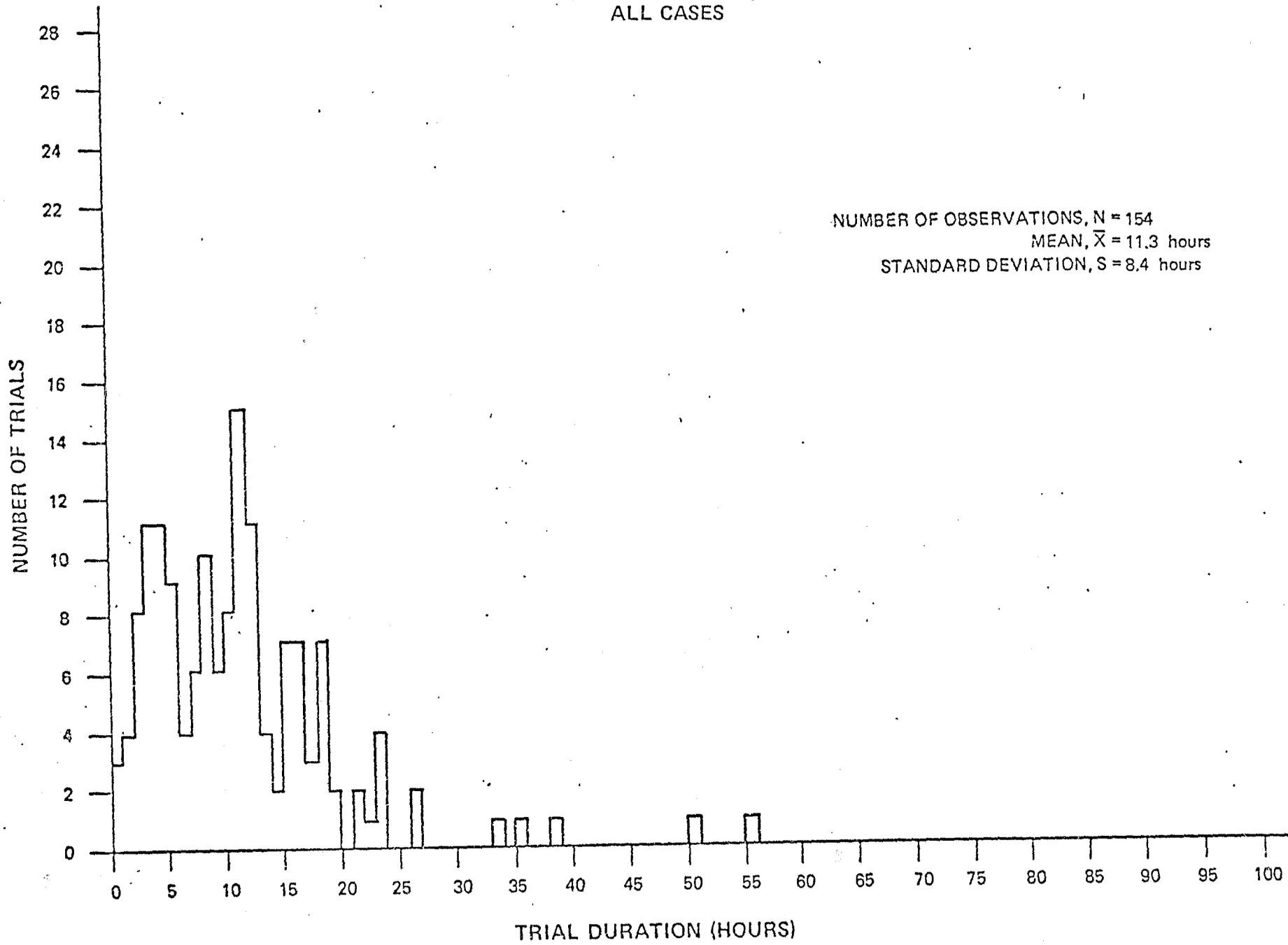
APPENDIX D

DETAILED DISTRIBUTIONS OF SELECTED COURT DATA

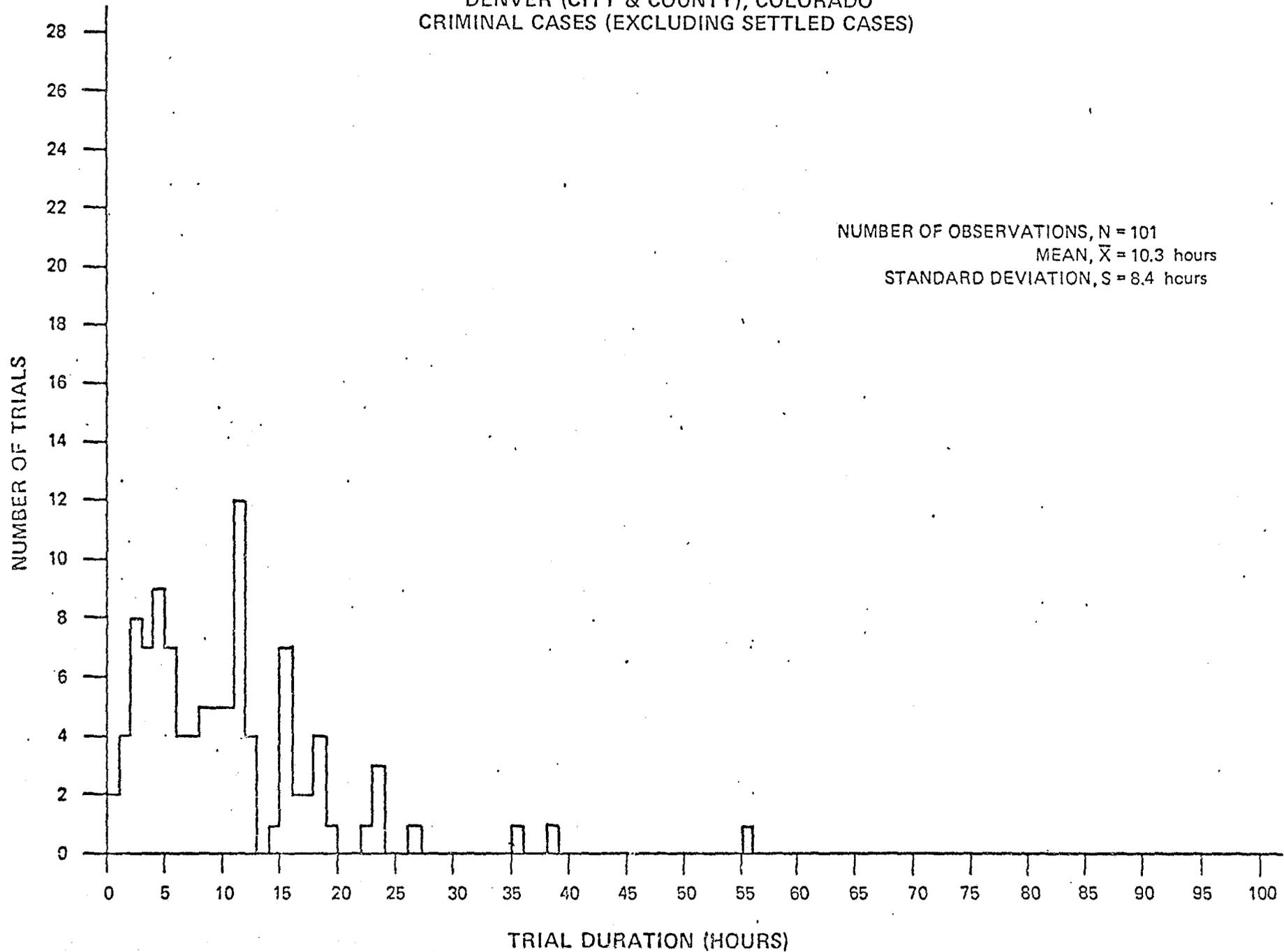
DISTRIBUTIONS OF TRIAL DURATION

DENVER (CITY & COUNTY), COLORADO
ALL CASES

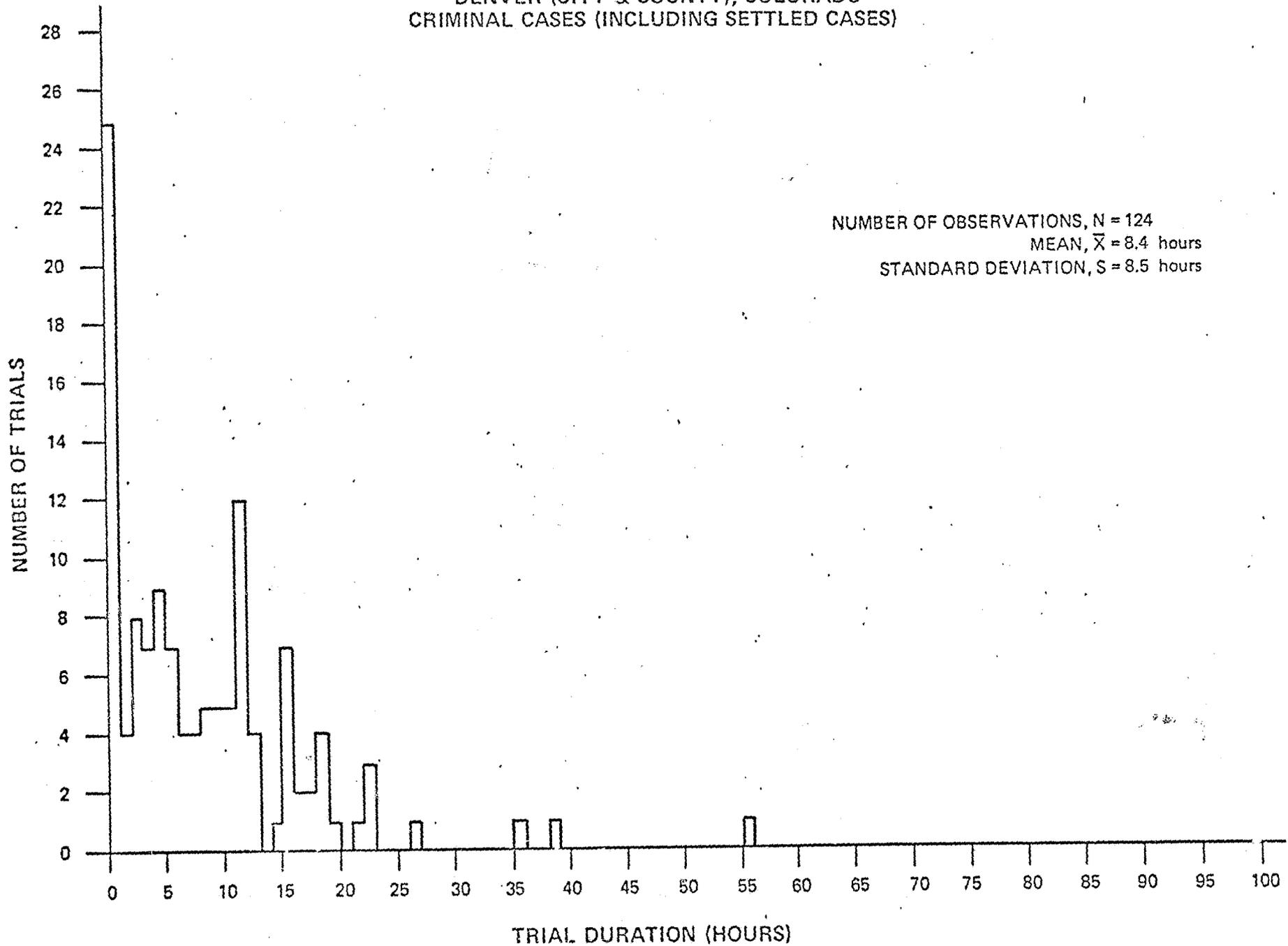
NUMBER OF OBSERVATIONS, N = 154
MEAN, \bar{X} = 11.3 hours
STANDARD DEVIATION, S = 8.4 hours



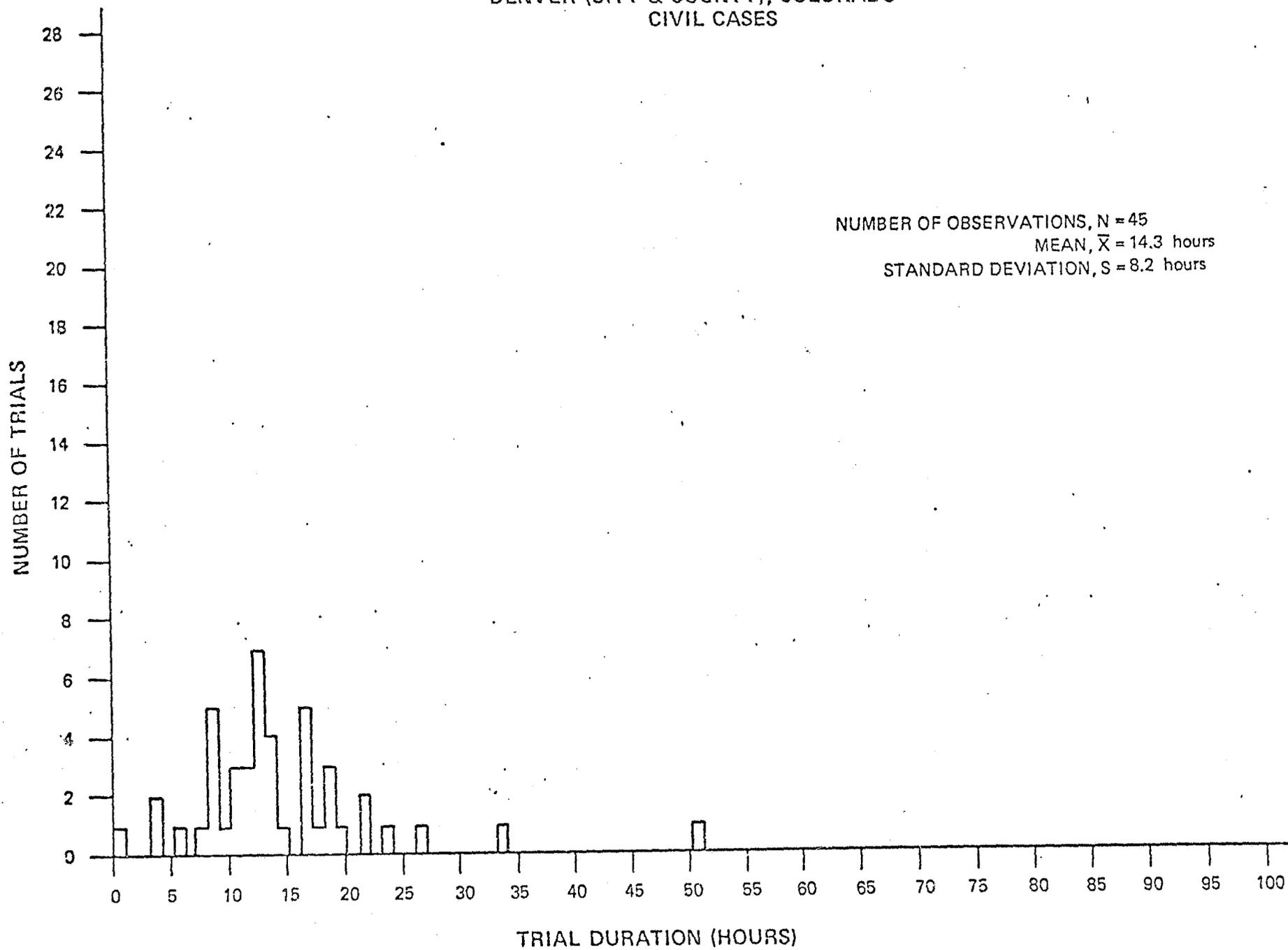
DENVER (CITY & COUNTY), COLORADO
CRIMINAL CASES (EXCLUDING SETTLED CASES)



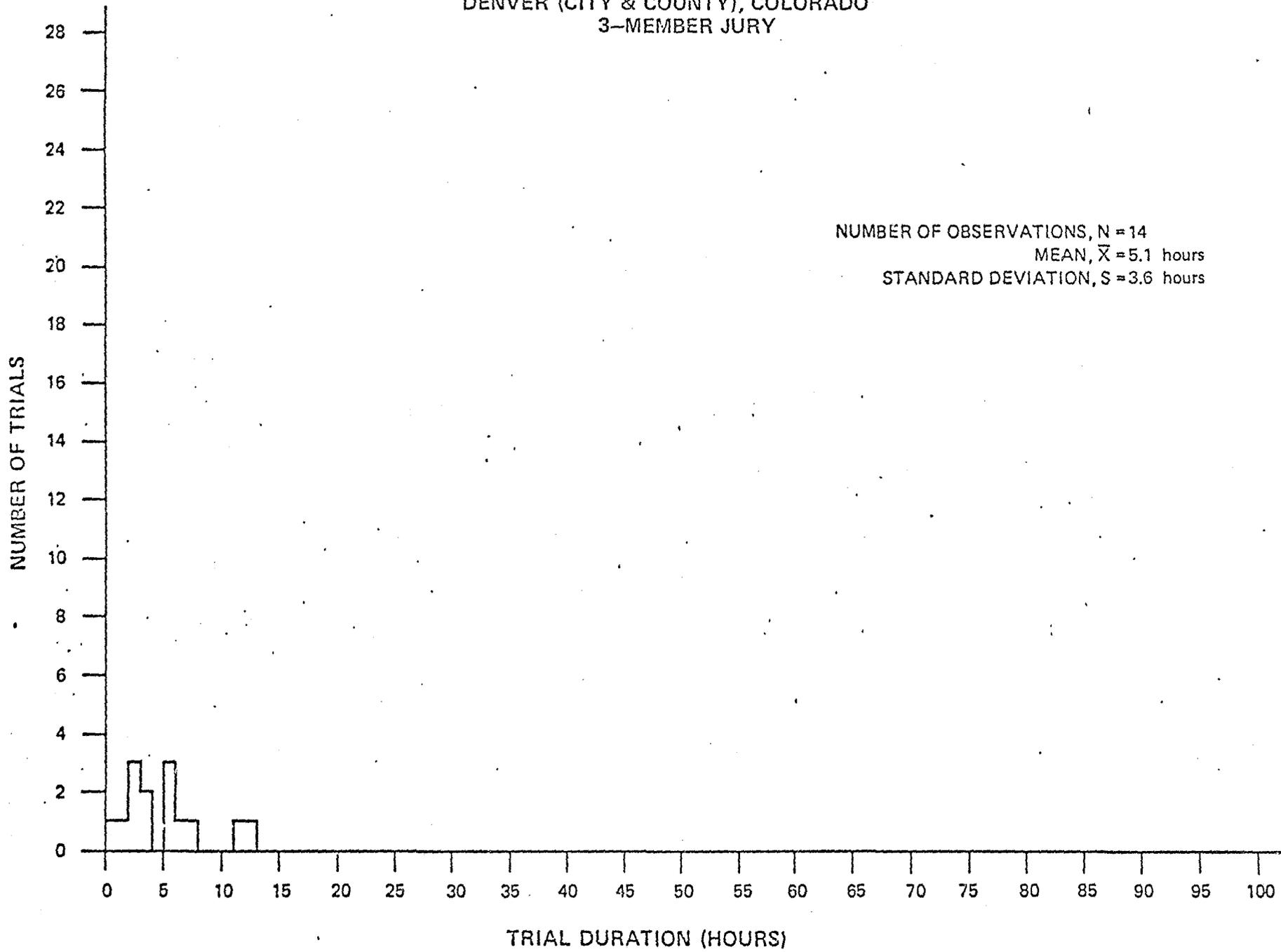
DENVER (CITY & COUNTY), COLORADO
CRIMINAL CASES (INCLUDING SETTLED CASES)



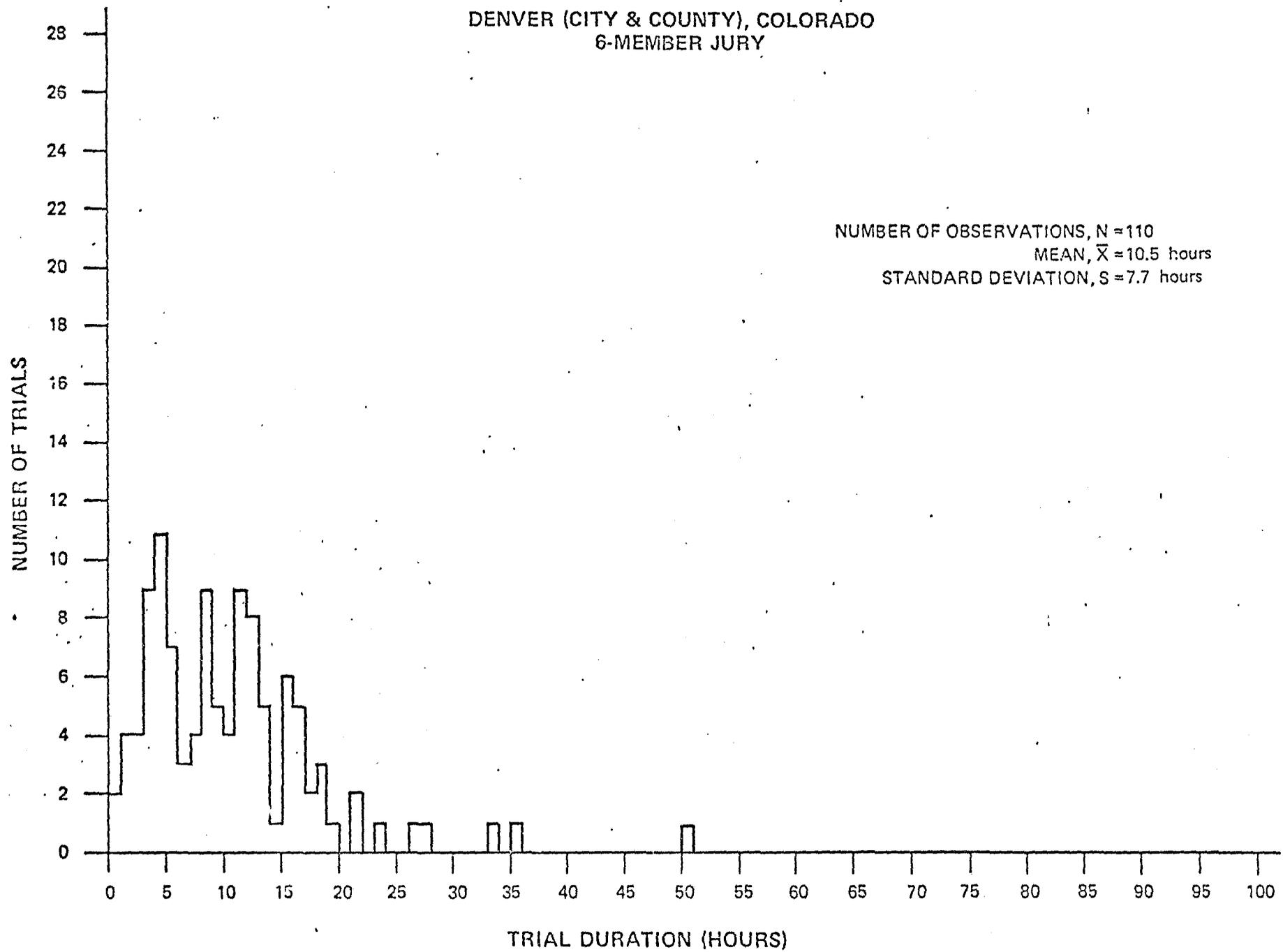
DENVER (CITY & COUNTY), COLORADO
CIVIL CASES



DENVER (CITY & COUNTY), COLORADO
3-MEMBER JURY

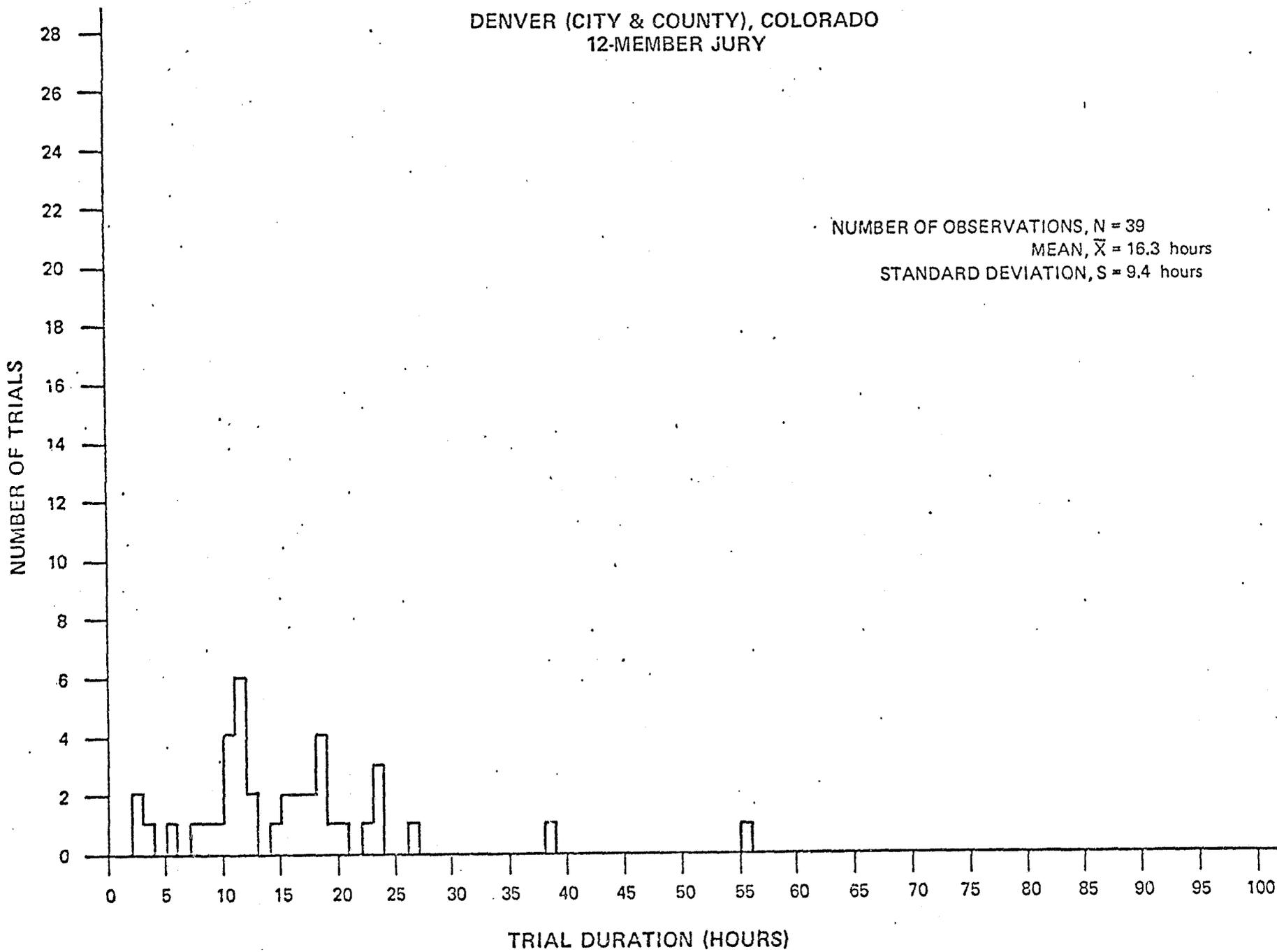


DENVER (CITY & COUNTY), COLORADO
6-MEMBER JURY

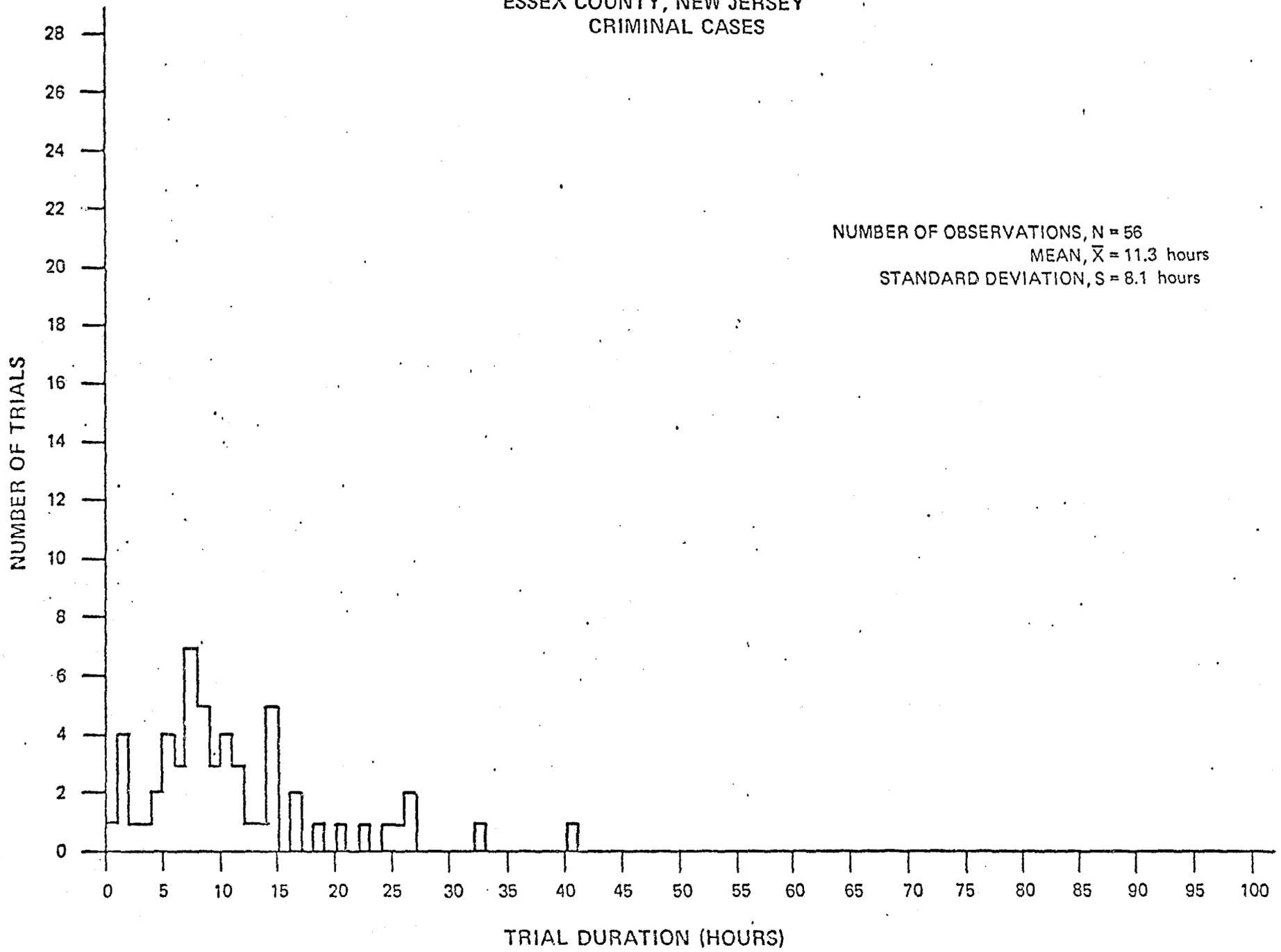


DENVER (CITY & COUNTY), COLORADO
12-MEMBER JURY

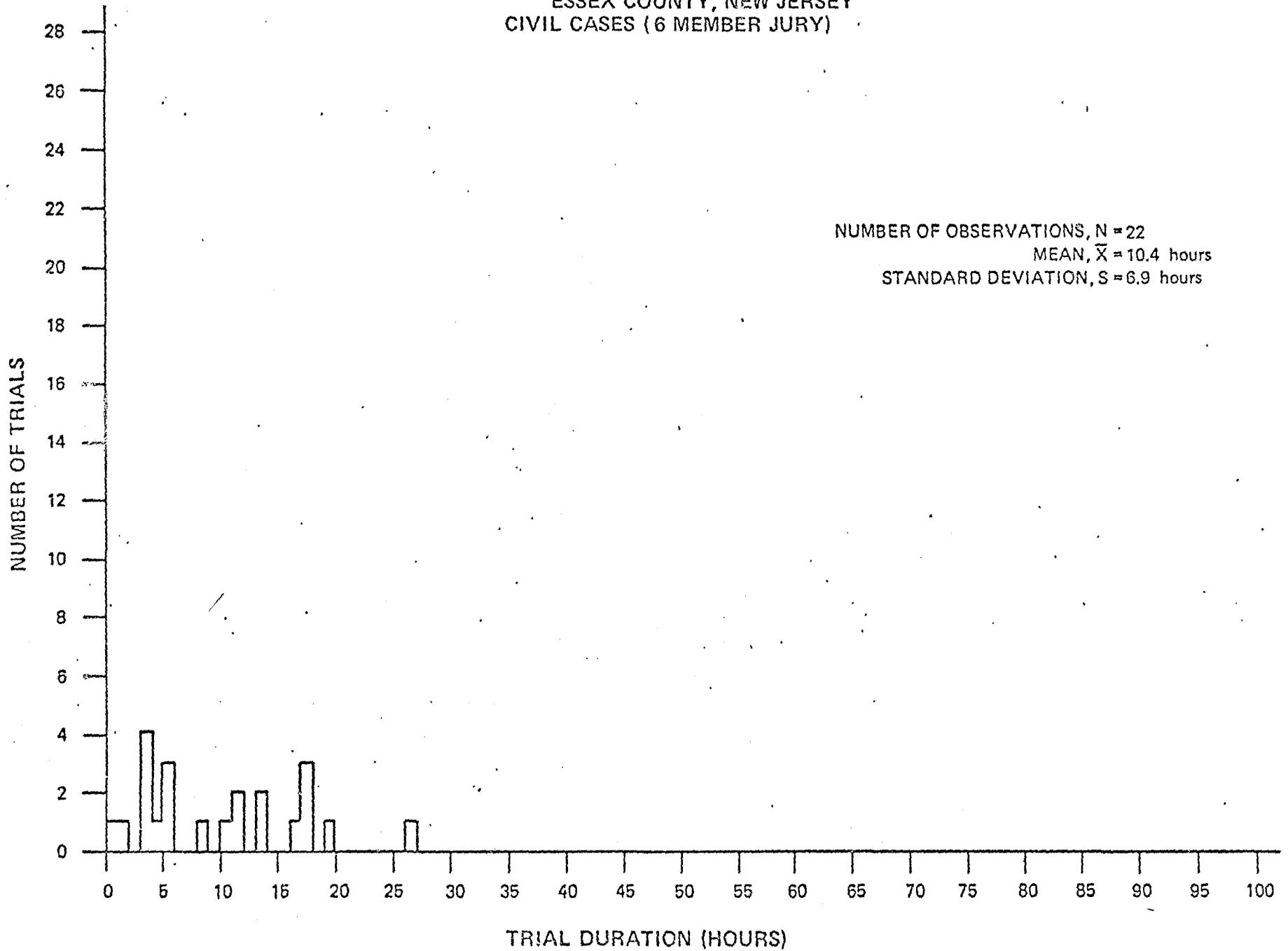
NUMBER OF OBSERVATIONS, $N = 39$
MEAN, $\bar{X} = 16.3$ hours
STANDARD DEVIATION, $S = 9.4$ hours



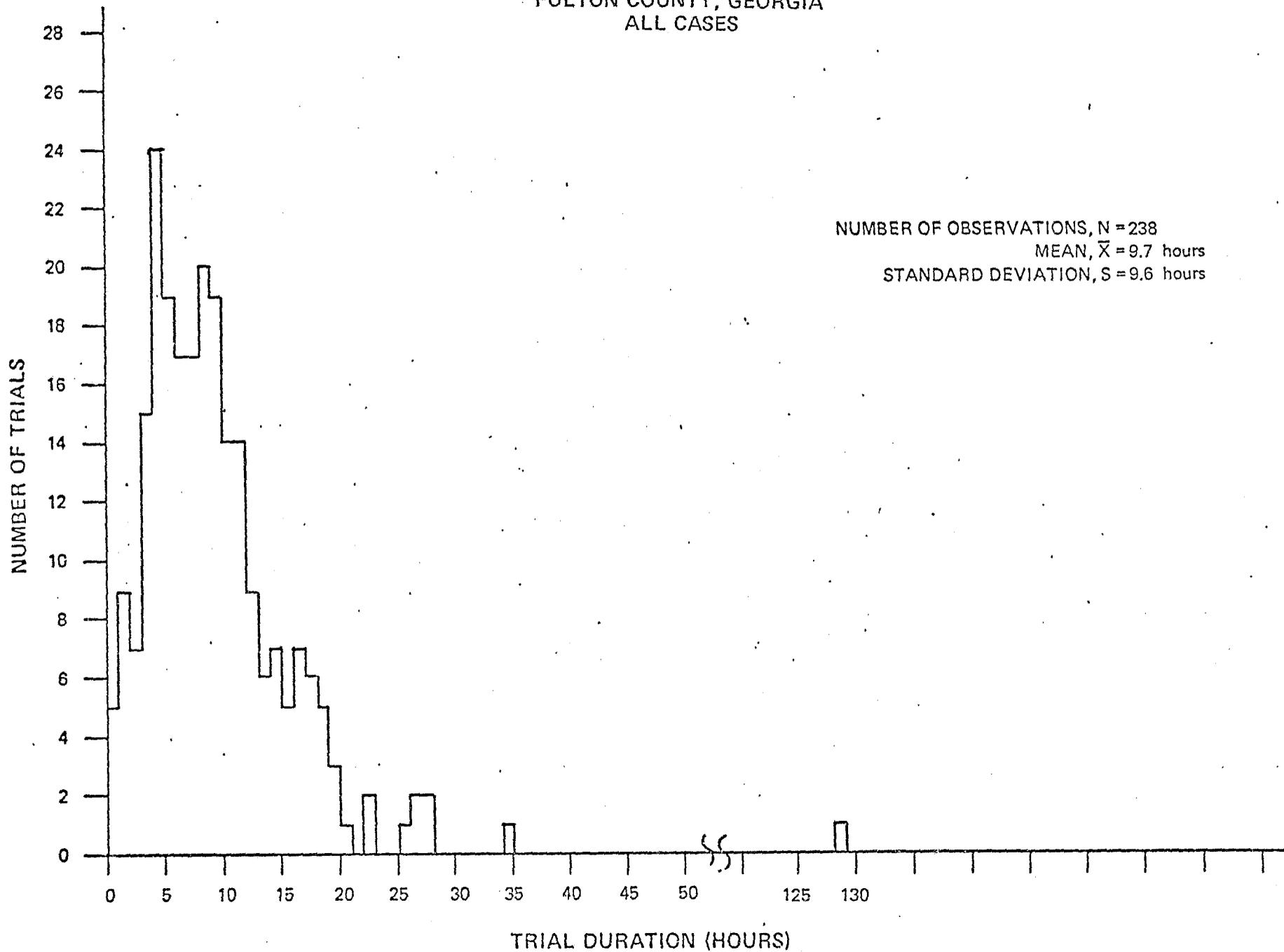
ESSEX COUNTY, NEW JERSEY
CRIMINAL CASES



ESSEX COUNTY, NEW JERSEY
CIVIL CASES (6 MEMBER JURY)

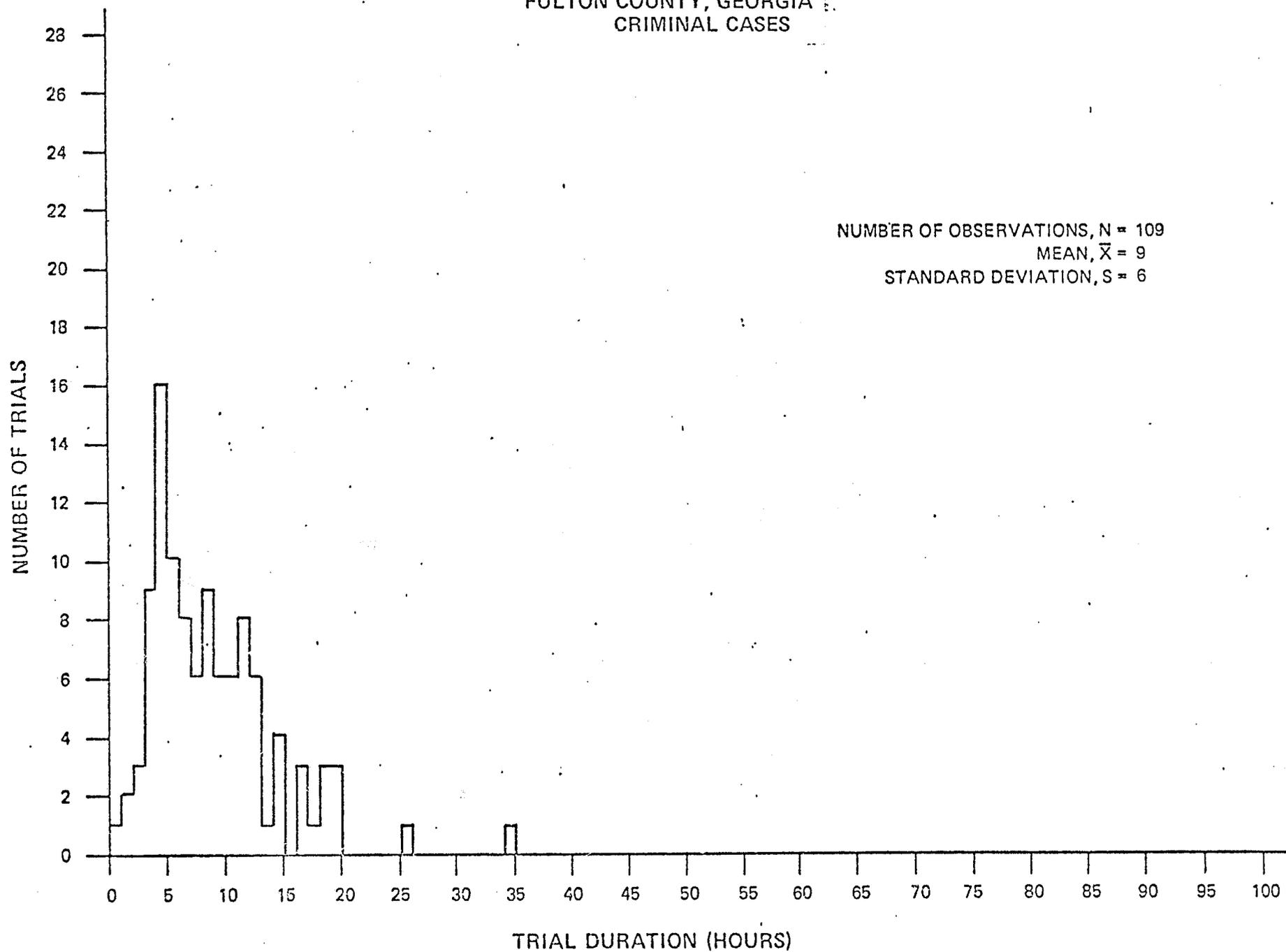


FULTON COUNTY, GEORGIA
ALL CASES



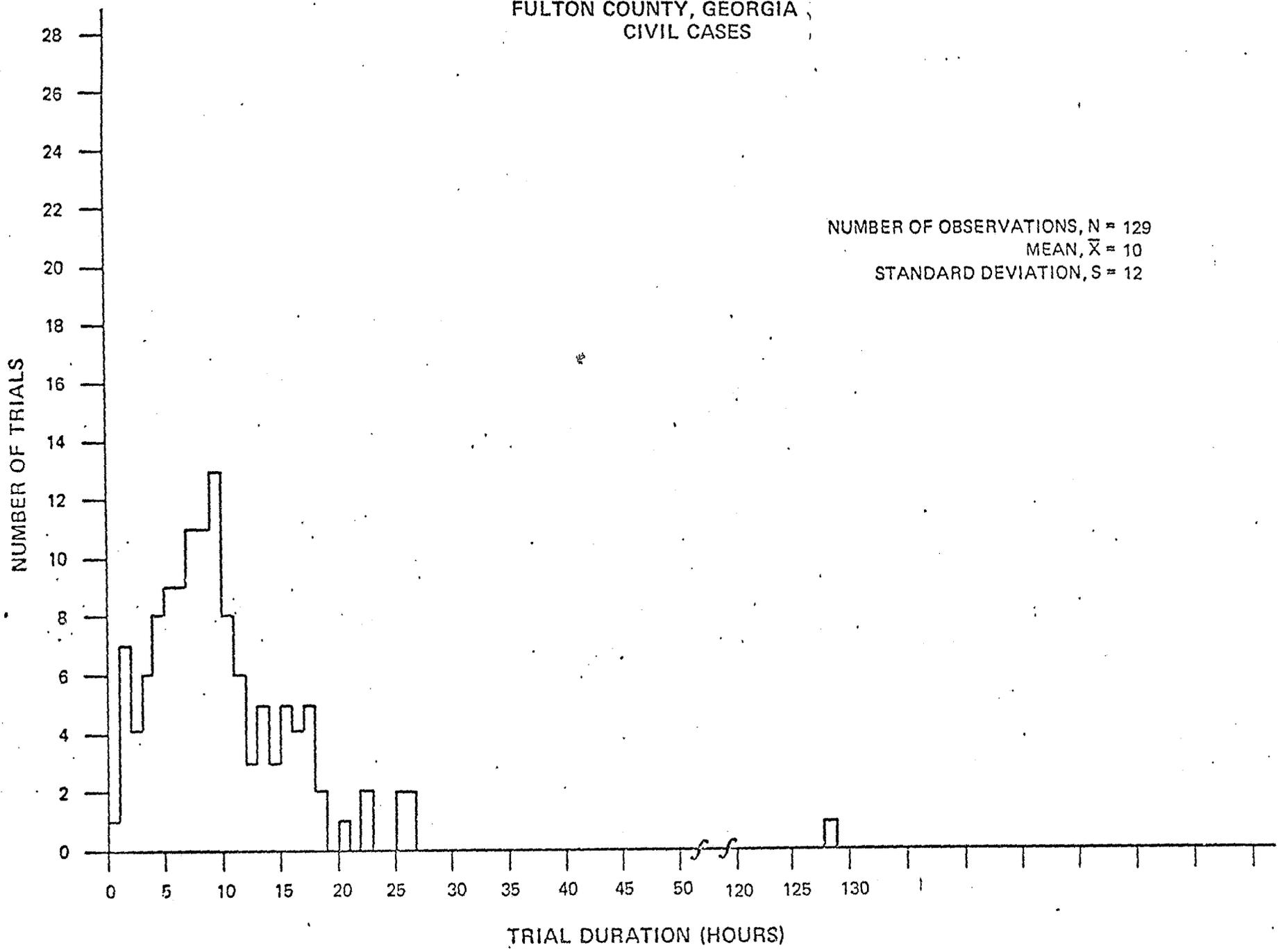
FULTON COUNTY, GEORGIA
CRIMINAL CASES

NUMBER OF OBSERVATIONS, $N = 109$
MEAN, $\bar{X} = 9$
STANDARD DEVIATION, $S = 6$



FULTON COUNTY, GEORGIA
CIVIL CASES

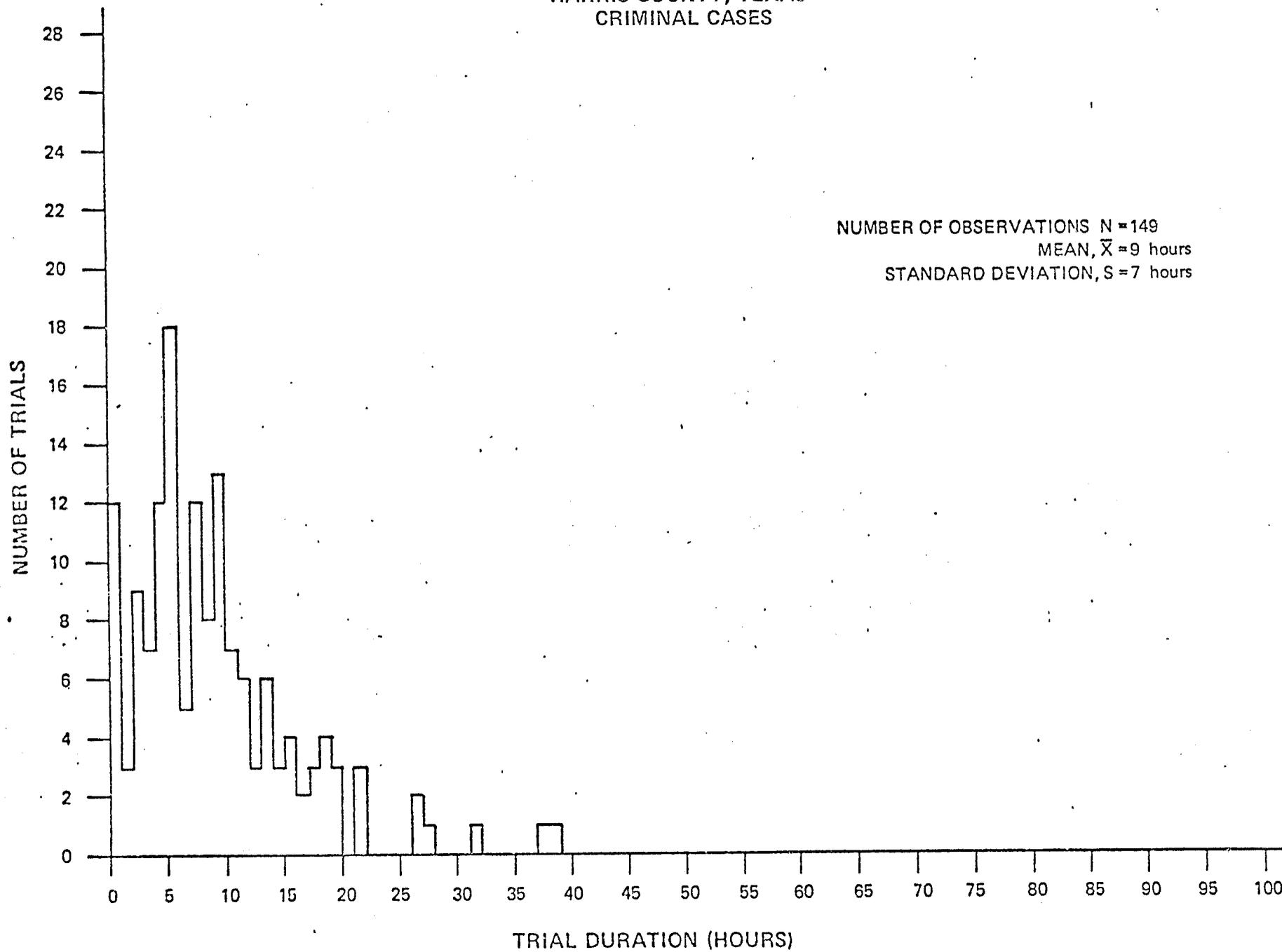
NUMBER OF OBSERVATIONS, $N = 129$
MEAN, $\bar{X} = 10$
STANDARD DEVIATION, $S = 12$



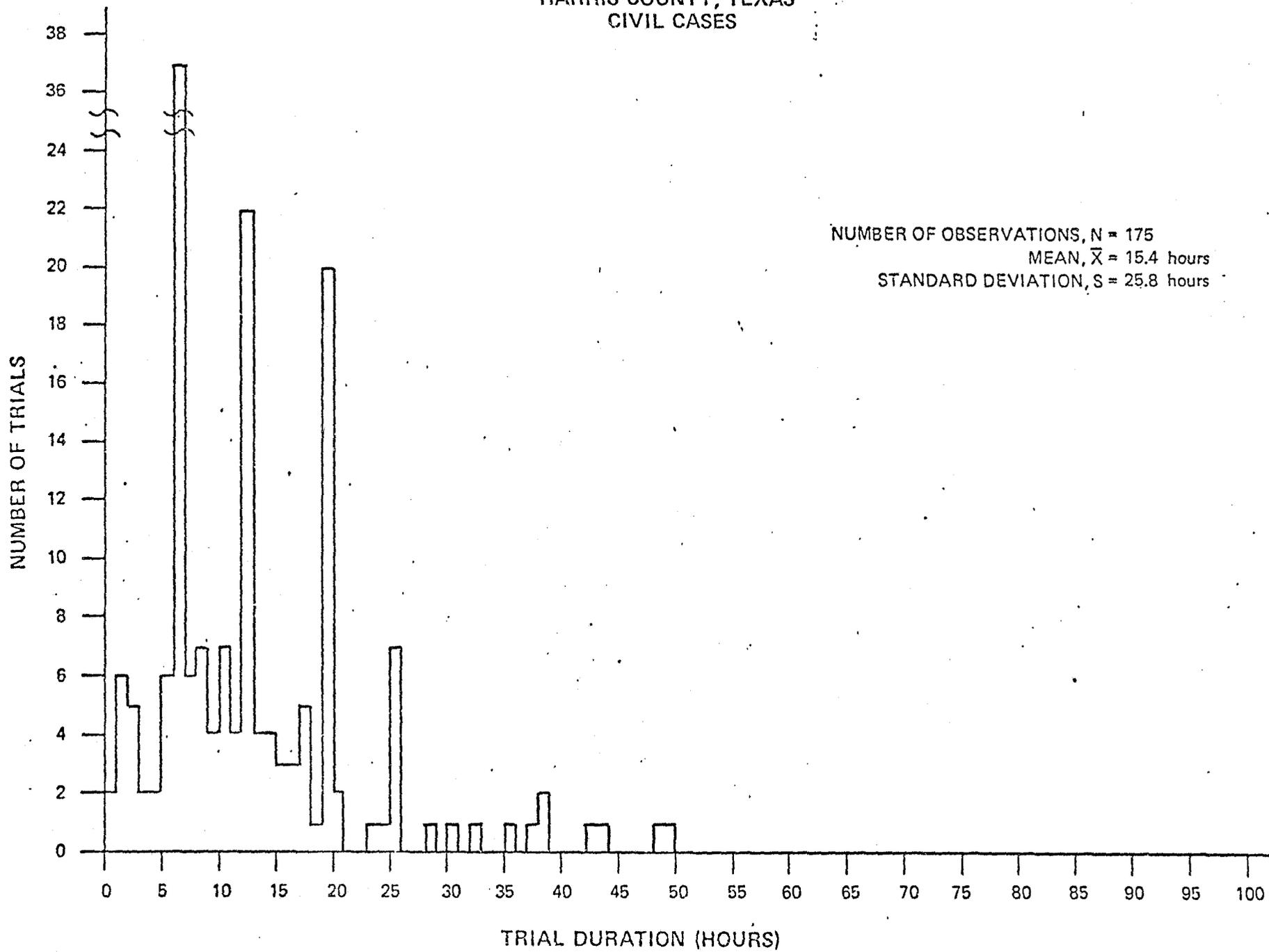
103

HARRIS COUNTY, TEXAS
CRIMINAL CASES

NUMBER OF OBSERVATIONS $N = 149$
MEAN, $\bar{X} = 9$ hours
STANDARD DEVIATION, $S = 7$ hours

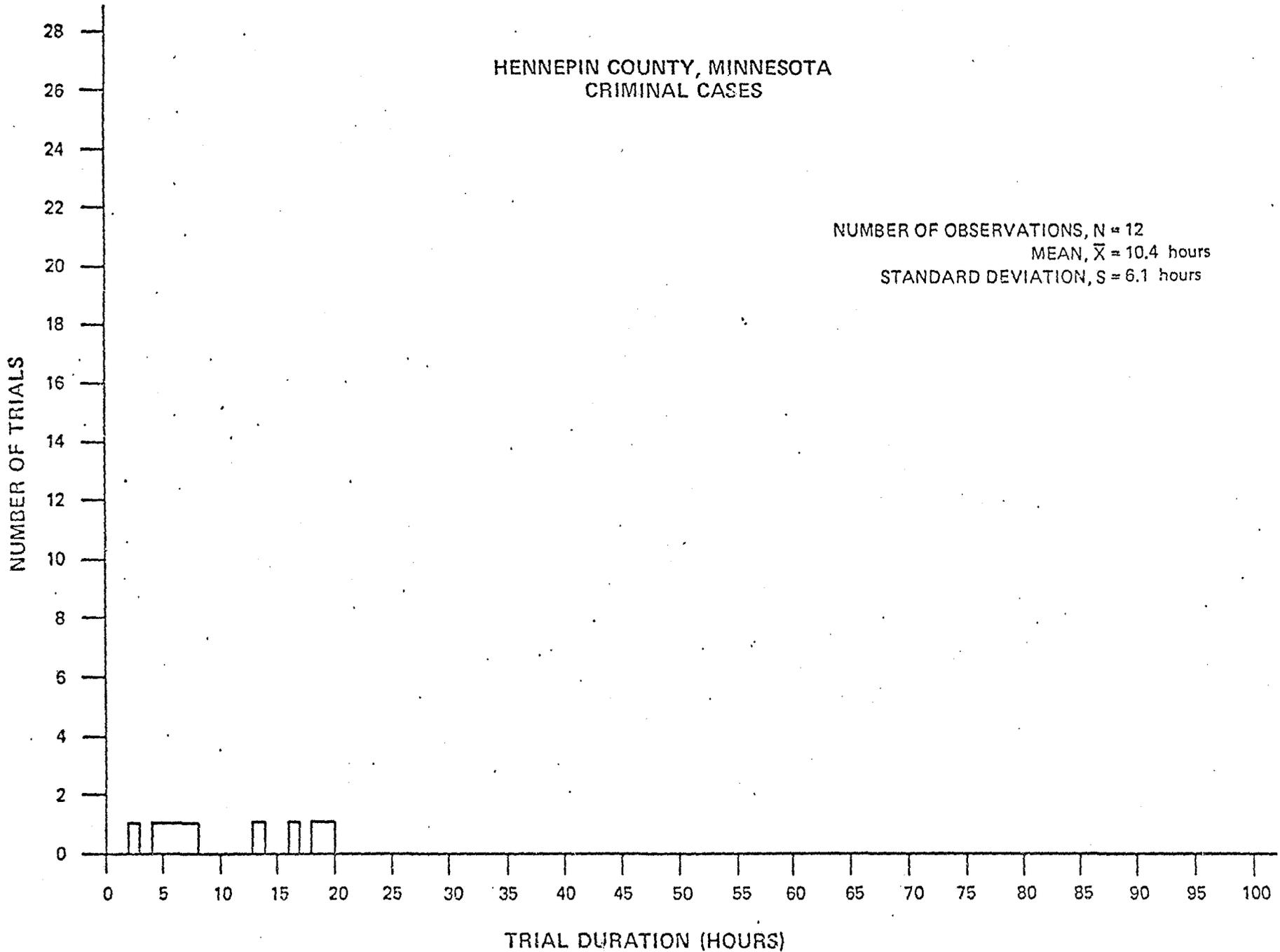


HARRIS COUNTY, TEXAS
CIVIL CASES



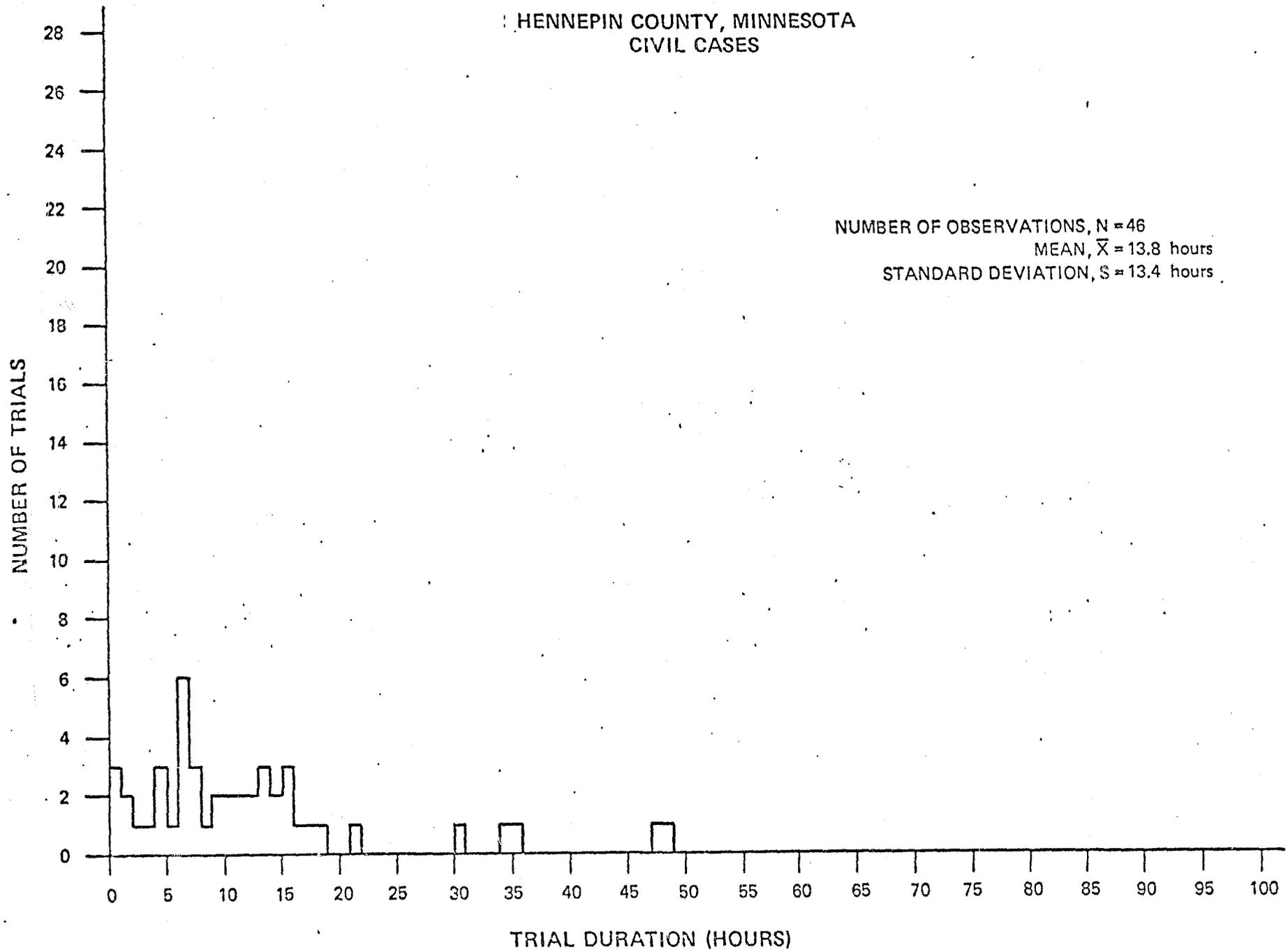
HENNEPIN COUNTY, MINNESOTA CRIMINAL CASES

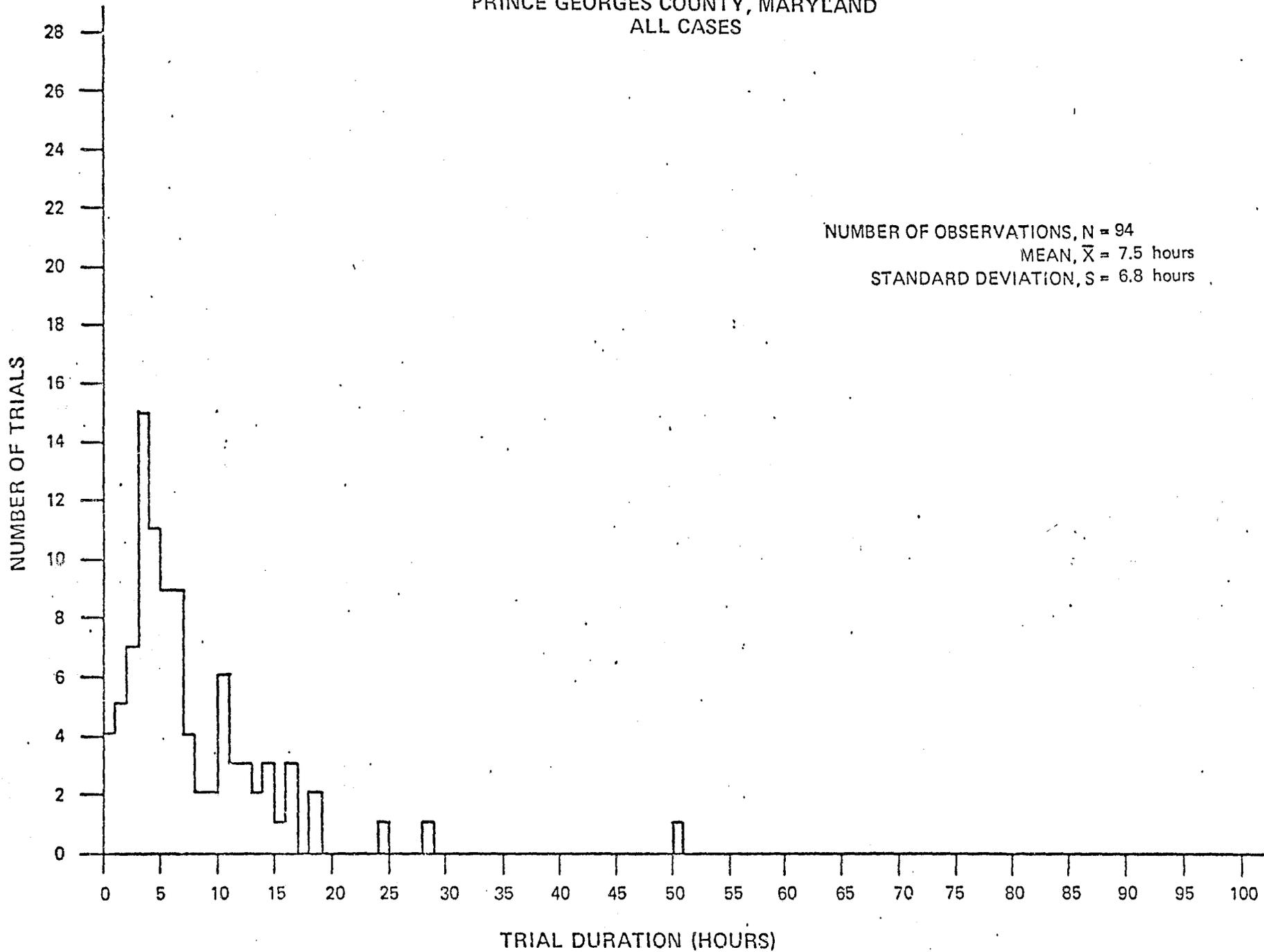
NUMBER OF OBSERVATIONS, $N = 12$
MEAN, $\bar{X} = 10.4$ hours
STANDARD DEVIATION, $S = 6.1$ hours



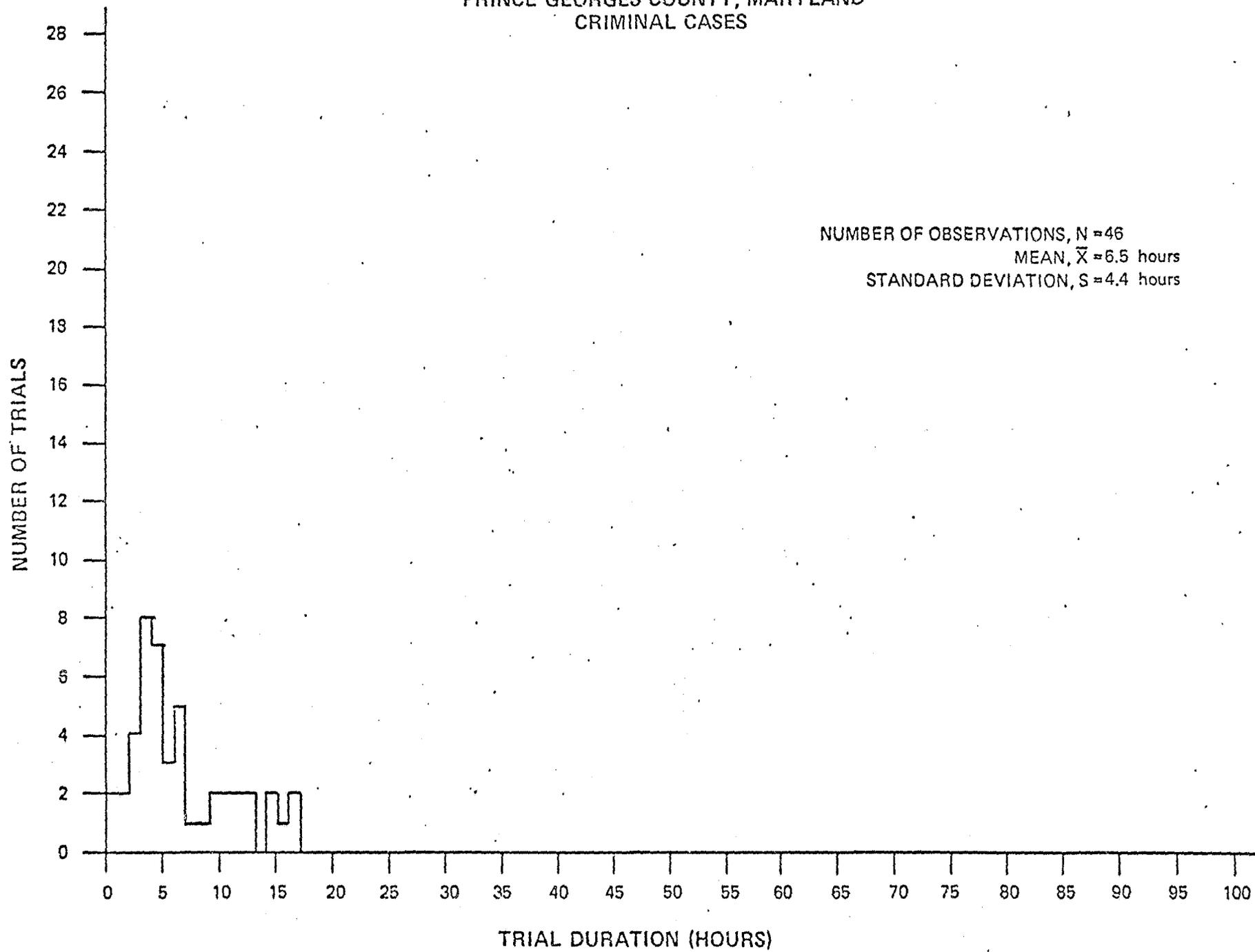
HENNEPIN COUNTY, MINNESOTA
CIVIL CASES

NUMBER OF OBSERVATIONS, $N = 46$
MEAN, $\bar{X} = 13.8$ hours
STANDARD DEVIATION, $S = 13.4$ hours

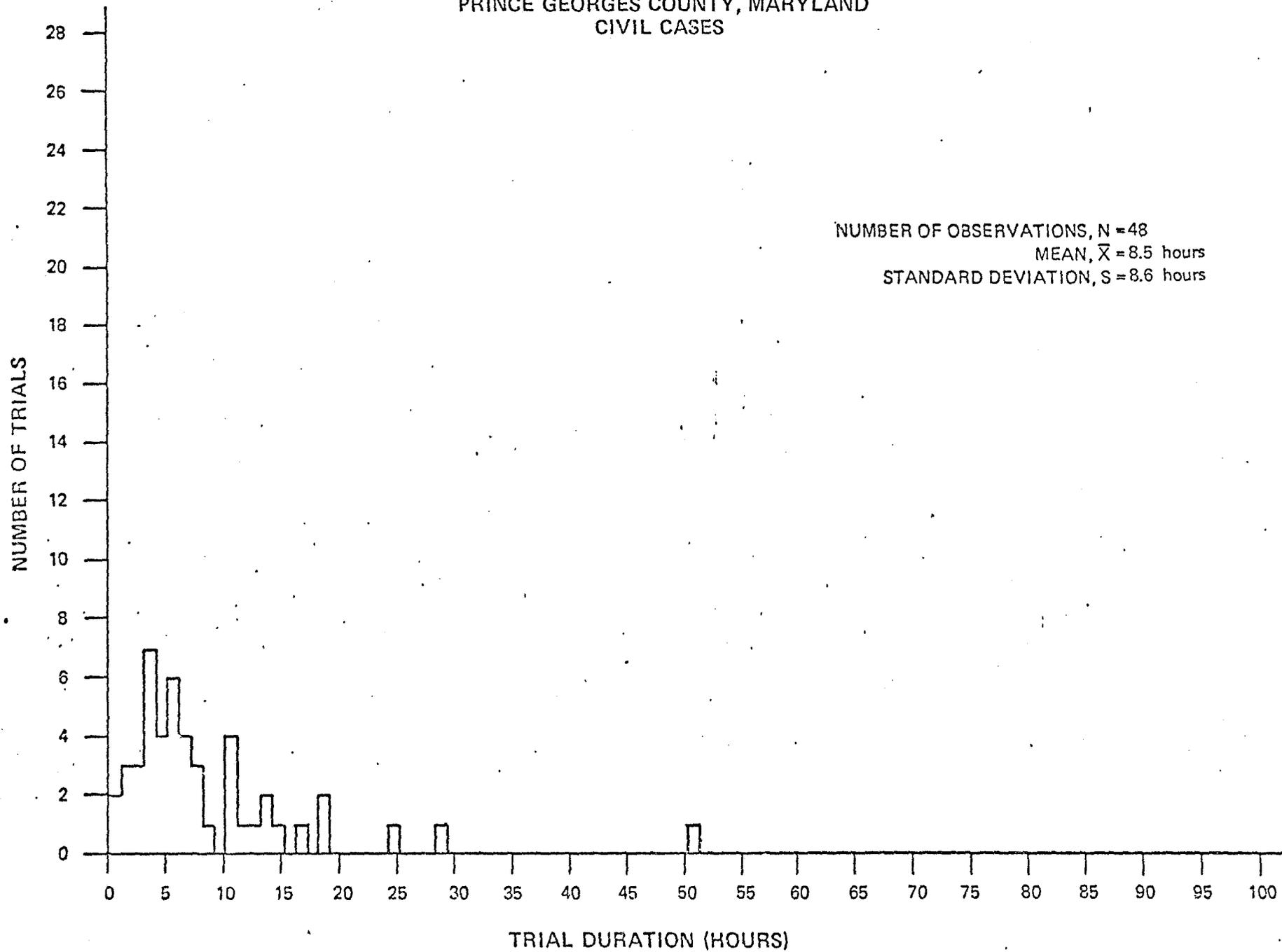


PRINCE GEORGES COUNTY, MARYLAND
ALL CASES

PRINCE GEORGES COUNTY, MARYLAND
CRIMINAL CASES

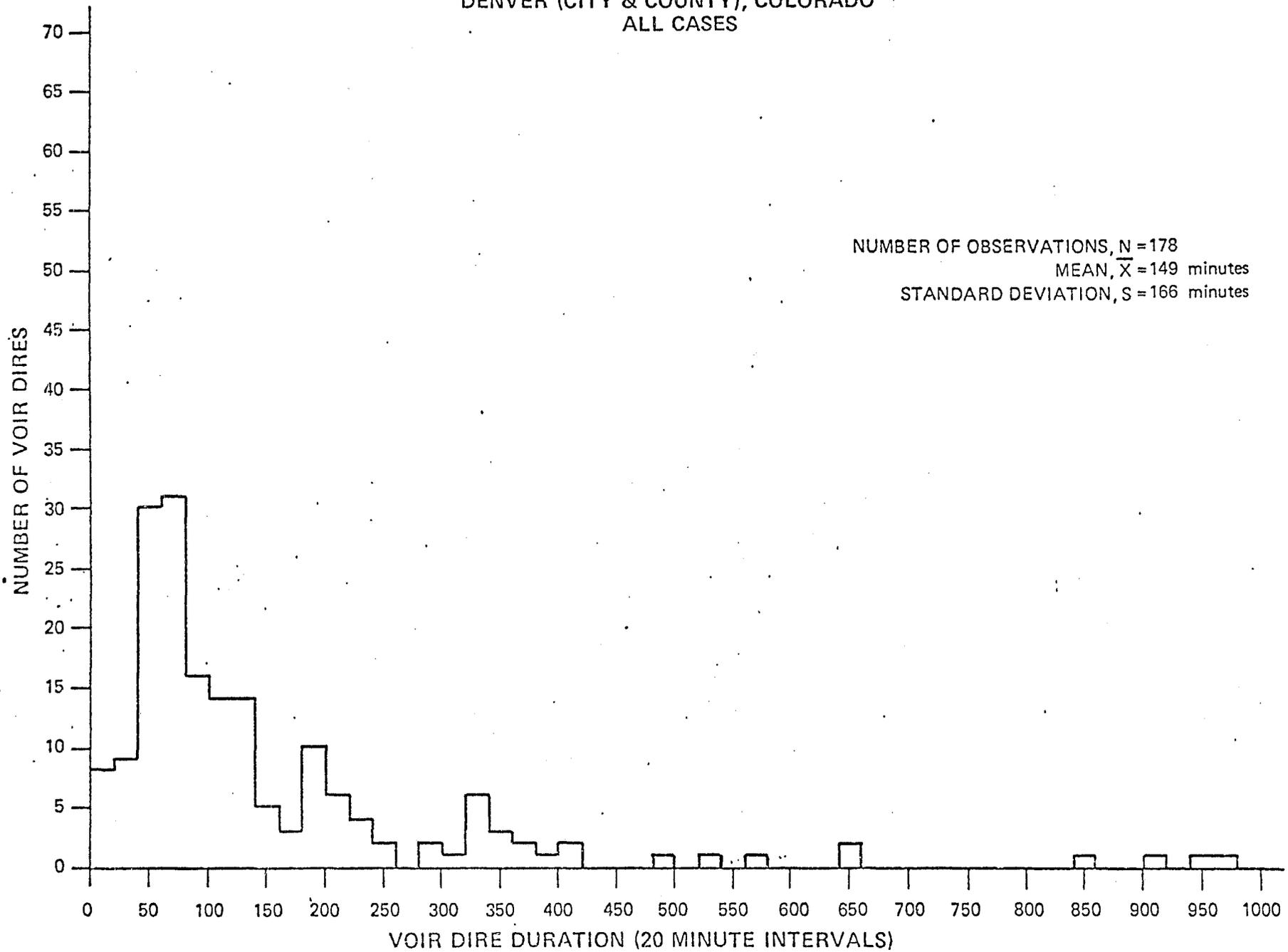


PRINCE GEORGES COUNTY, MARYLAND
CIVIL CASES

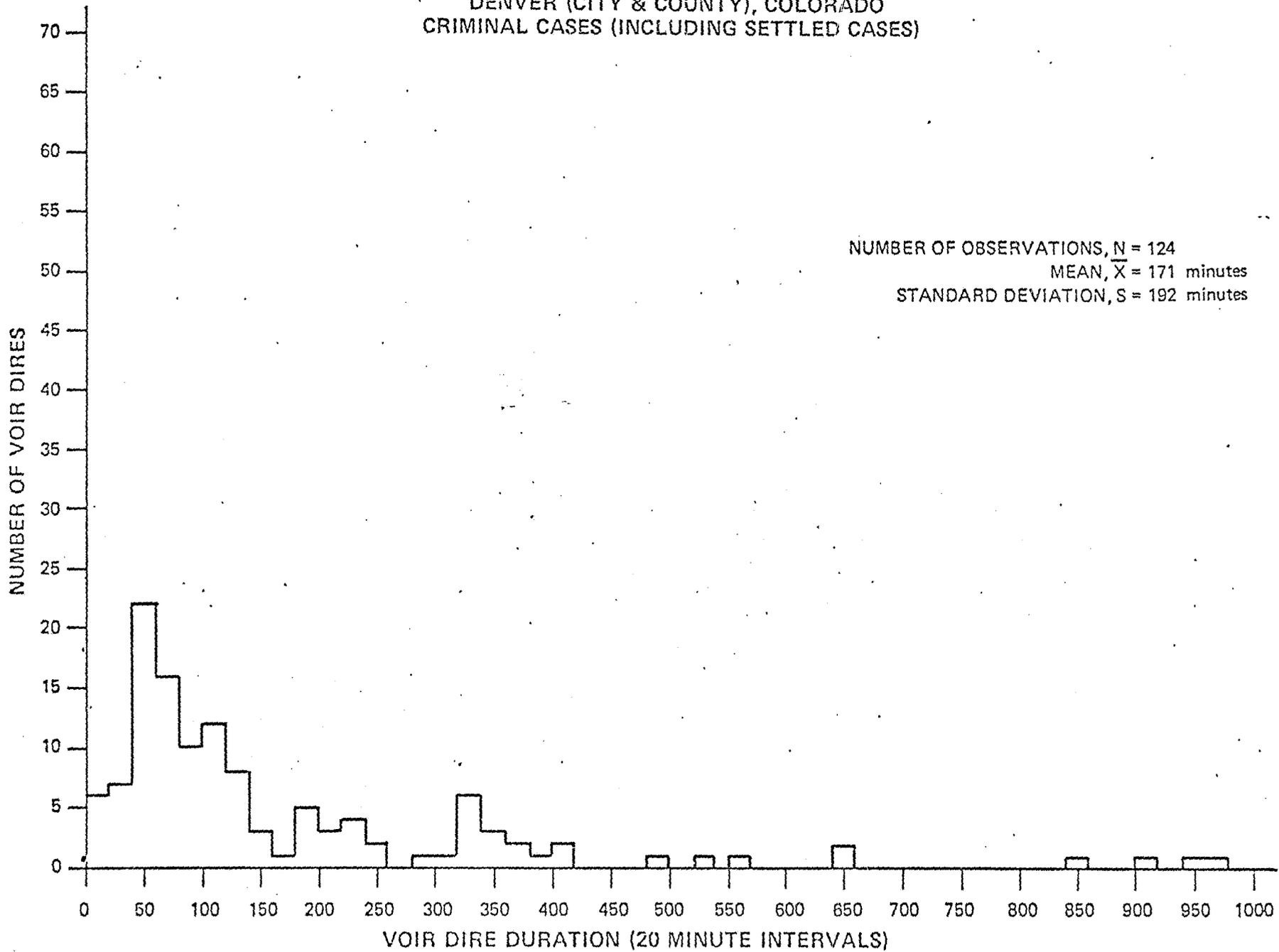


DISTRIBUTIONS OF VOIR DIRE DURATION

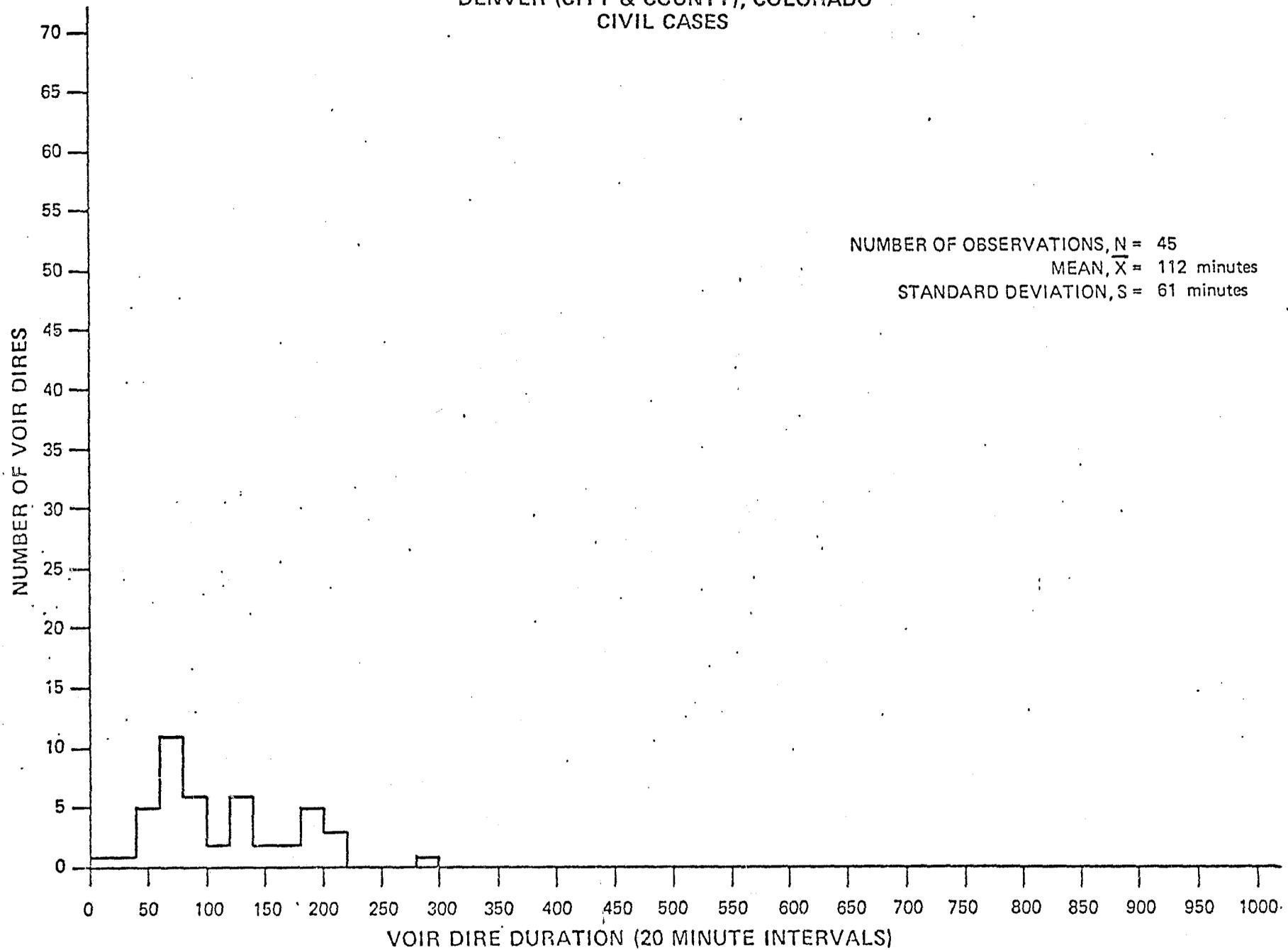
DENVER (CITY & COUNTY), COLORADO
ALL CASES



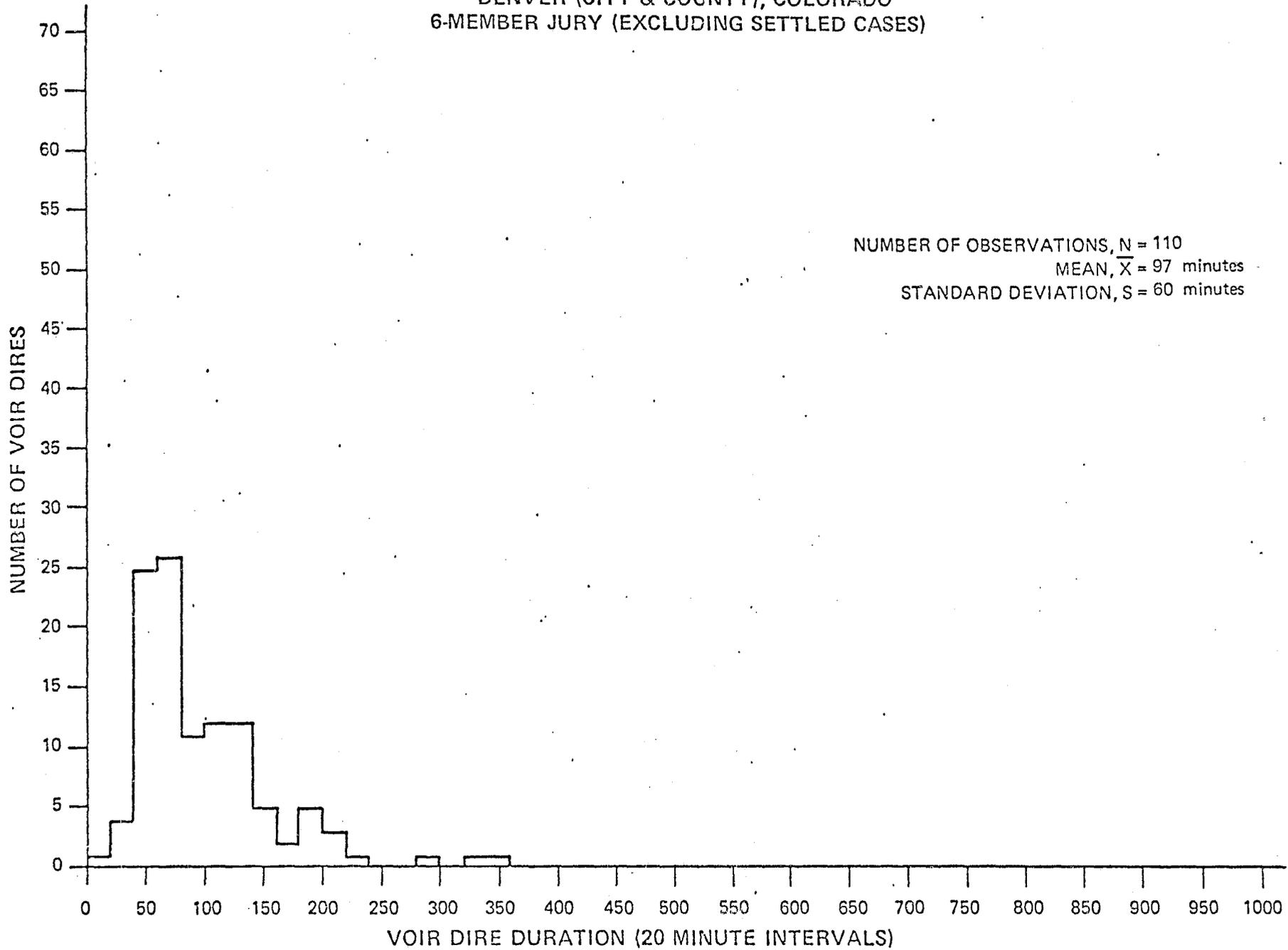
DENVER (CITY & COUNTY), COLORADO
CRIMINAL CASES (INCLUDING SETTLED CASES)



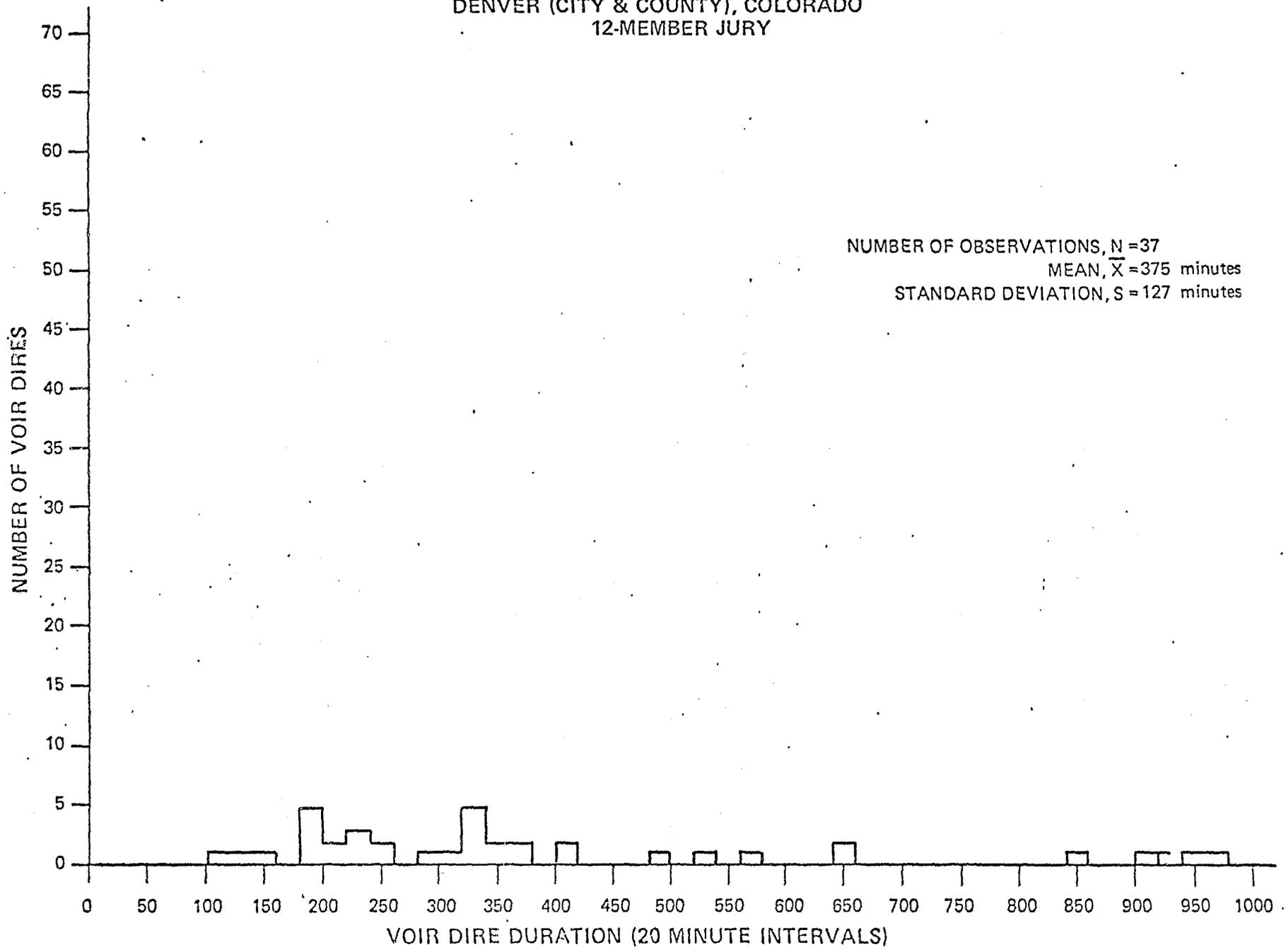
DENVER (CITY & COUNTY), COLORADO
CIVIL CASES



DENVER (CITY & COUNTY), COLORADO
6-MEMBER JURY (EXCLUDING SETTLED CASES)

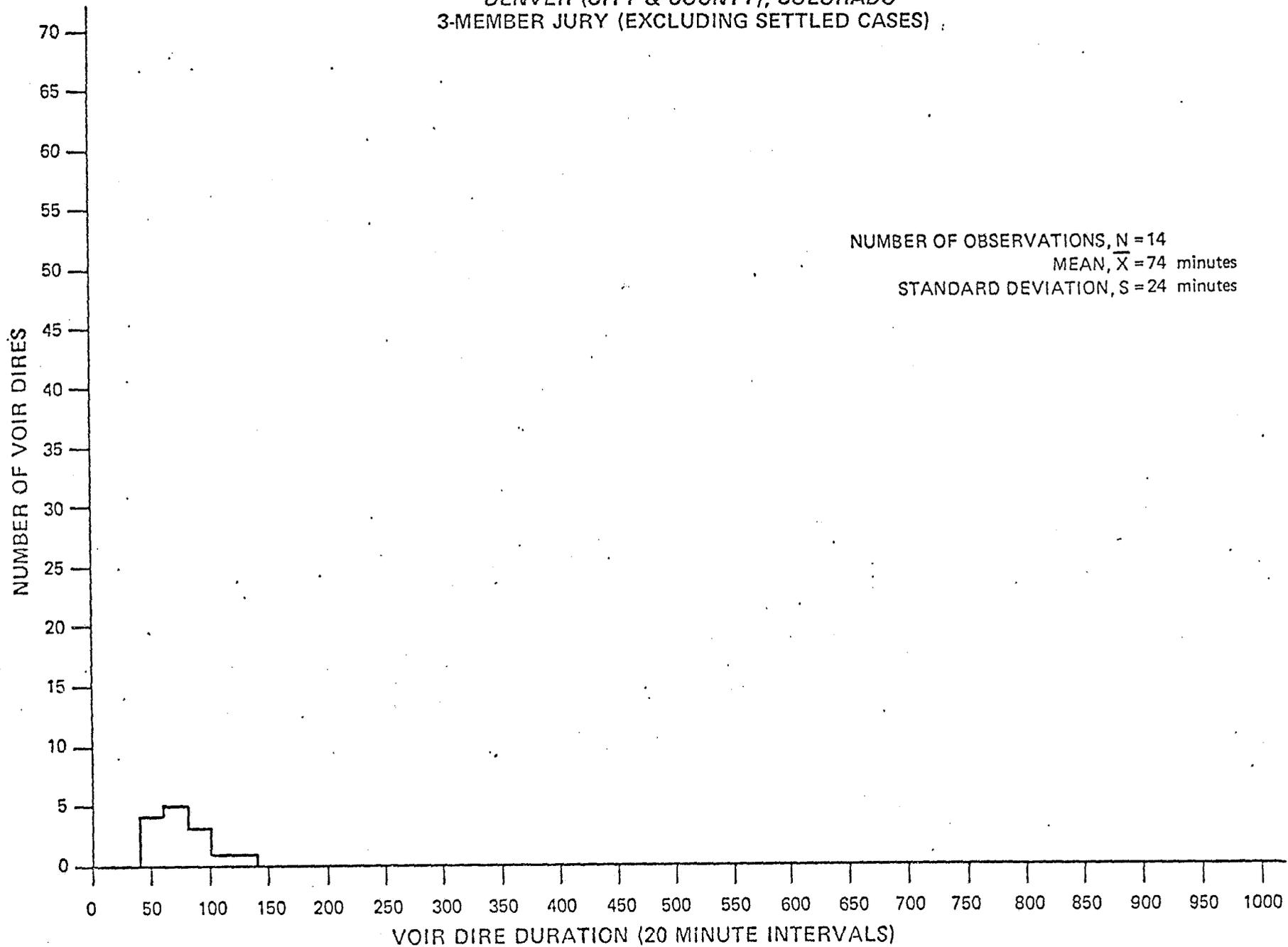


DENVER (CITY & COUNTY), COLORADO
12-MEMBER JURY

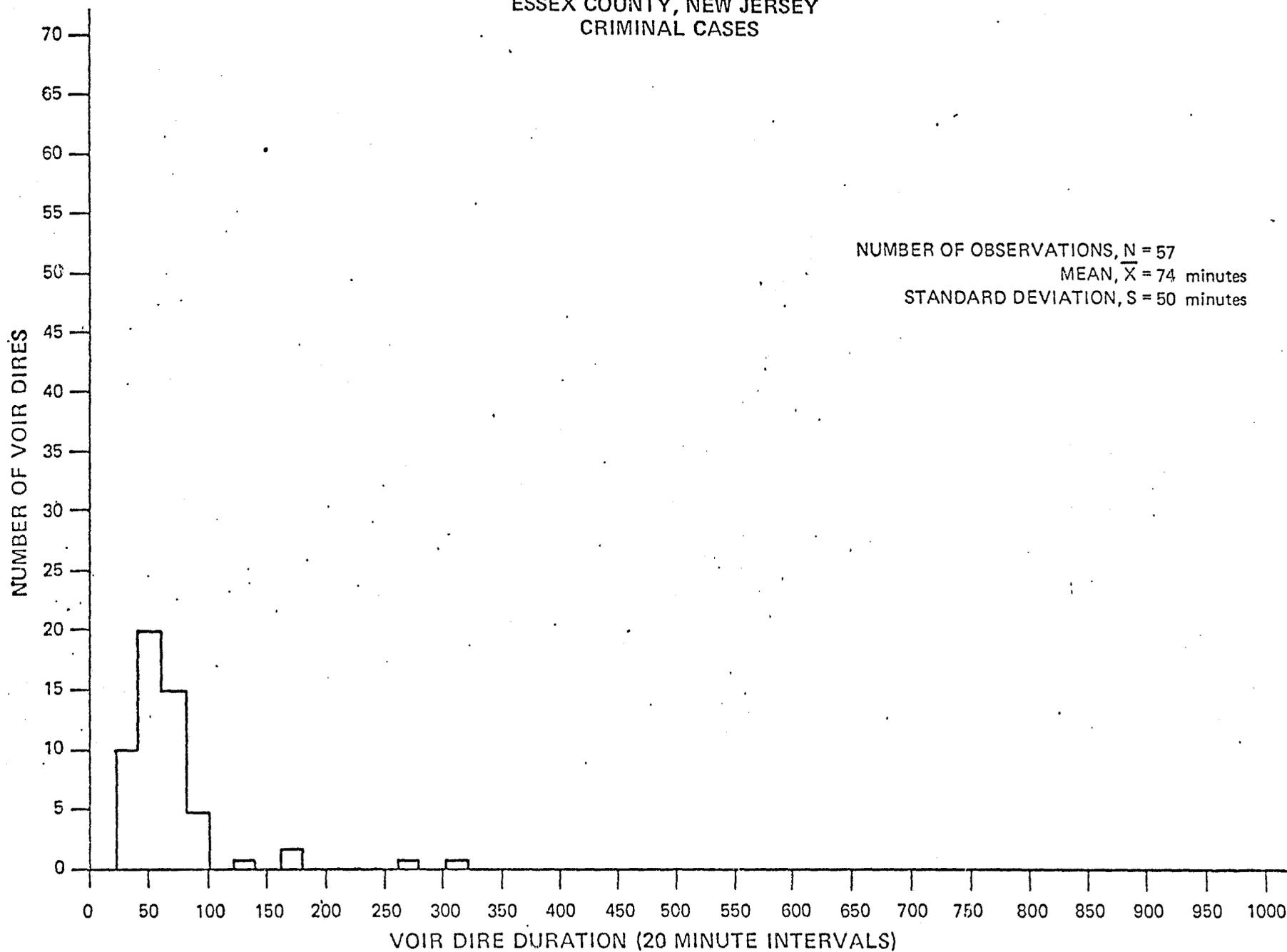


DENVER (CITY & COUNTY), COLORADO
3-MEMBER JURY (EXCLUDING SETTLED CASES)

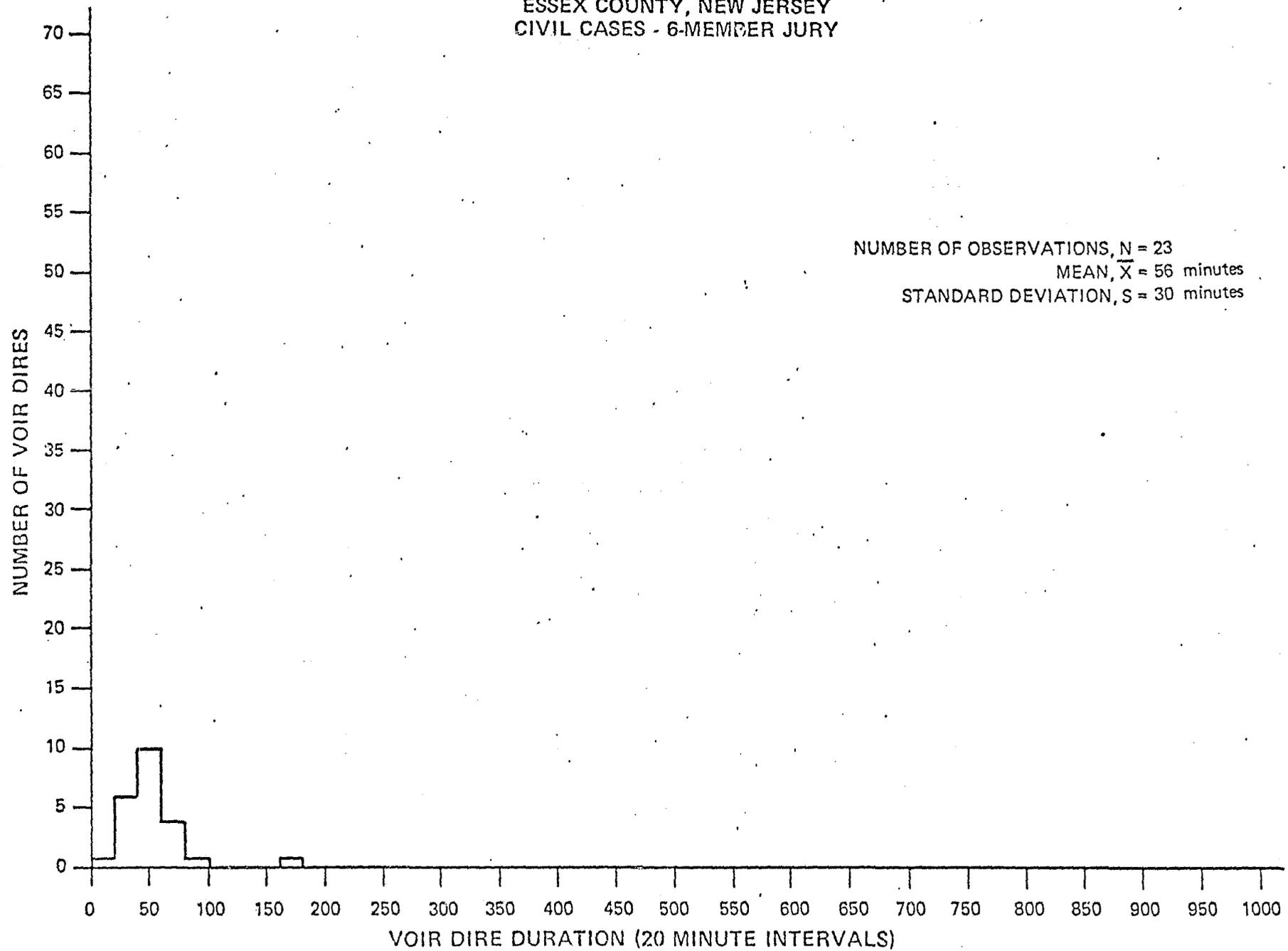
NUMBER OF OBSERVATIONS, $N = 14$
MEAN, $\bar{X} = 74$ minutes
STANDARD DEVIATION, $S = 24$ minutes



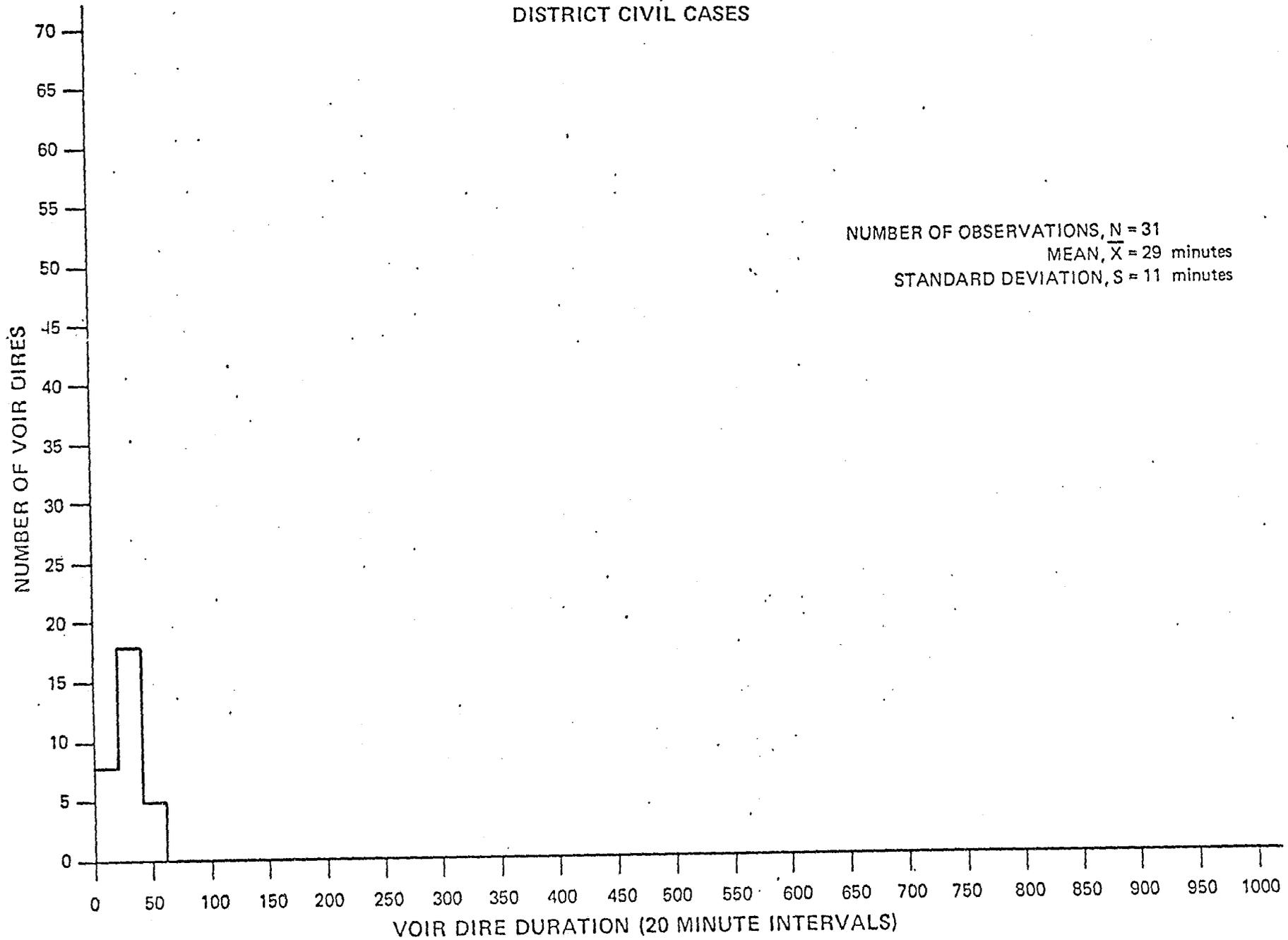
ESSEX COUNTY, NEW JERSEY
CRIMINAL CASES



ESSEX COUNTY, NEW JERSEY
CIVIL CASES - 6-MEMBER JURY

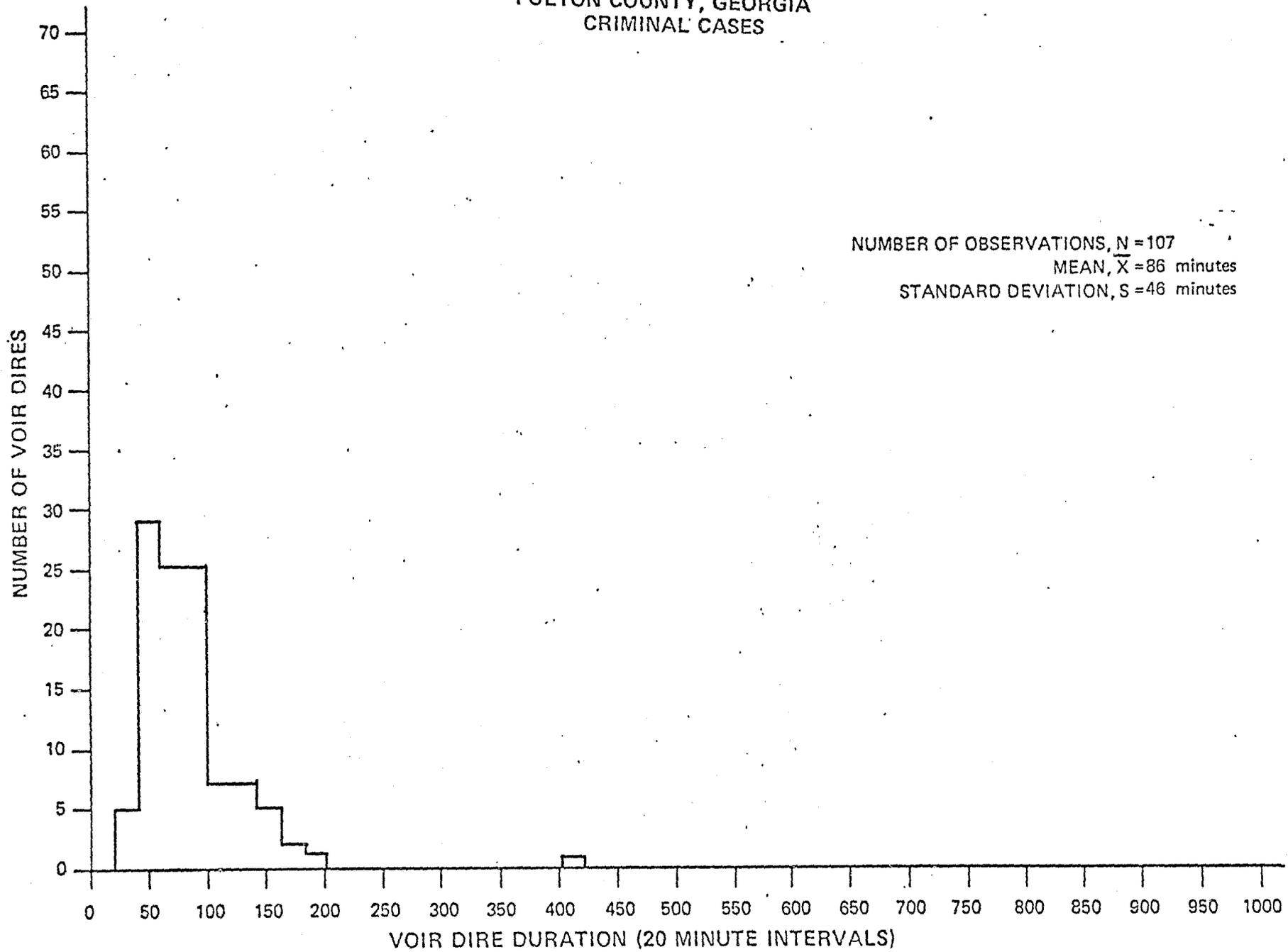


ESSEX COUNTY, NEW JERSEY
DISTRICT CIVIL CASES

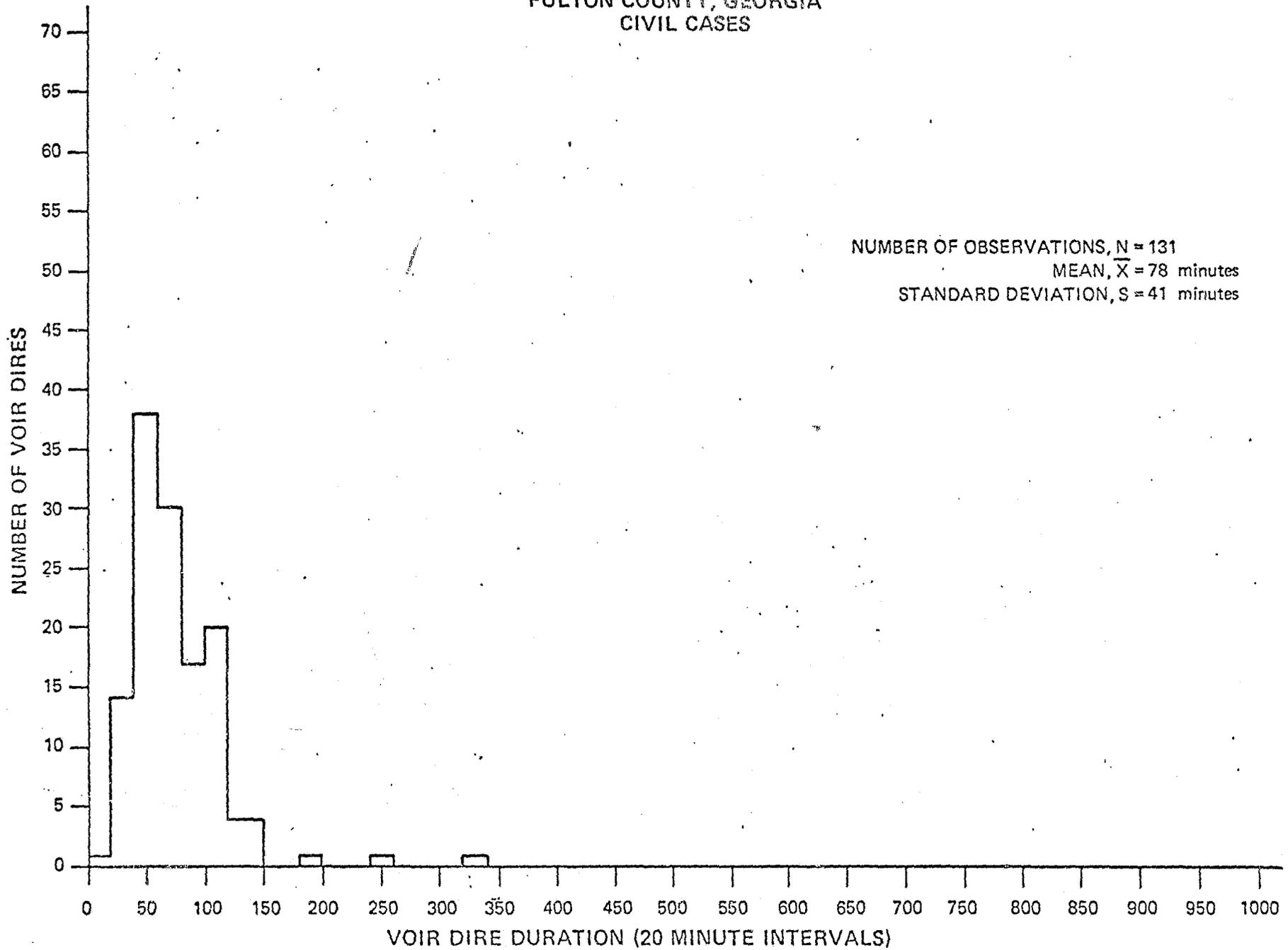


FULTON COUNTY, GEORGIA
CRIMINAL CASES

NUMBER OF OBSERVATIONS, $N = 107$
MEAN, $\bar{X} = 86$ minutes
STANDARD DEVIATION, $S = 46$ minutes

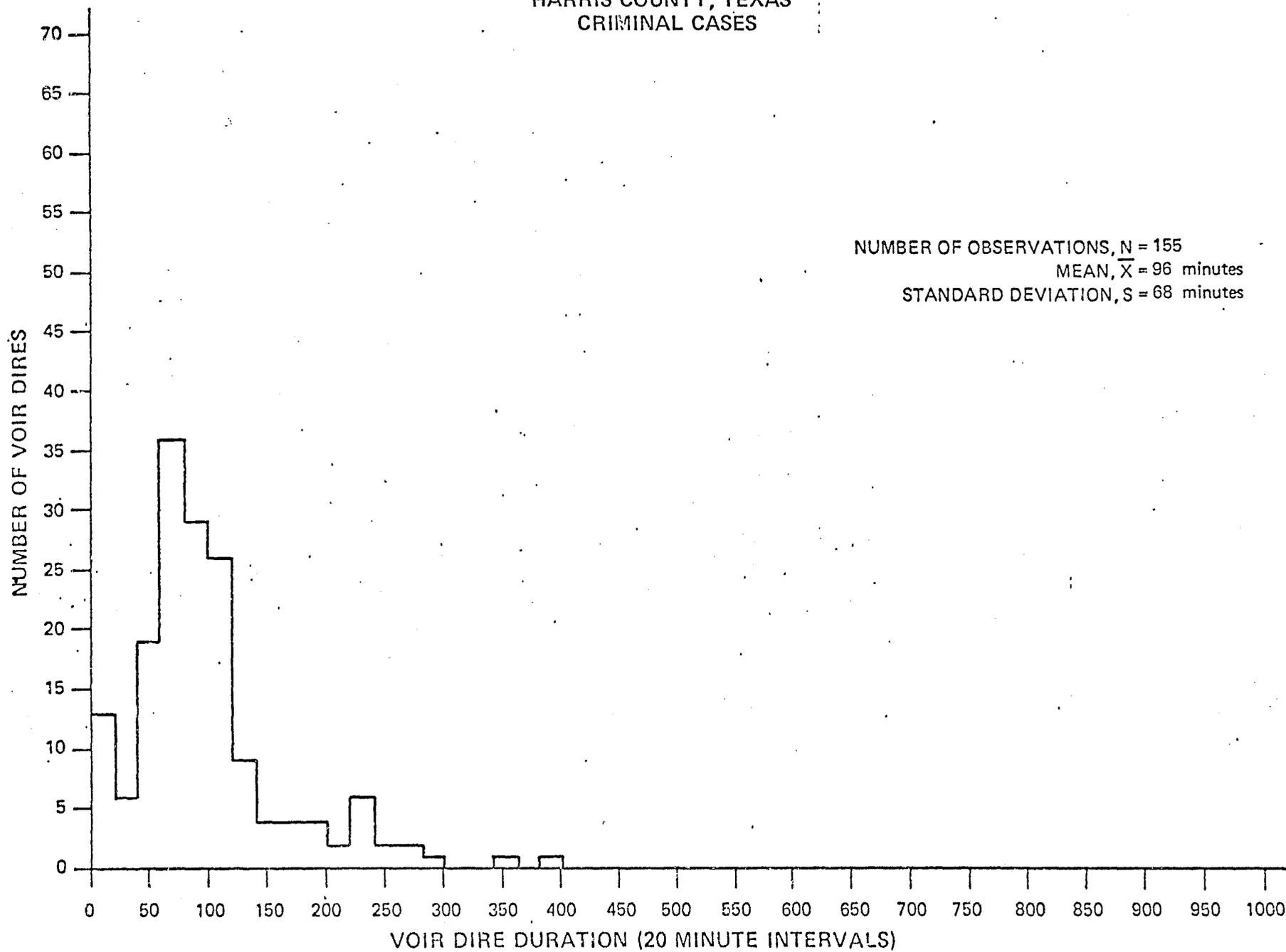


FULTON COUNTY, GEORGIA
CIVIL CASES

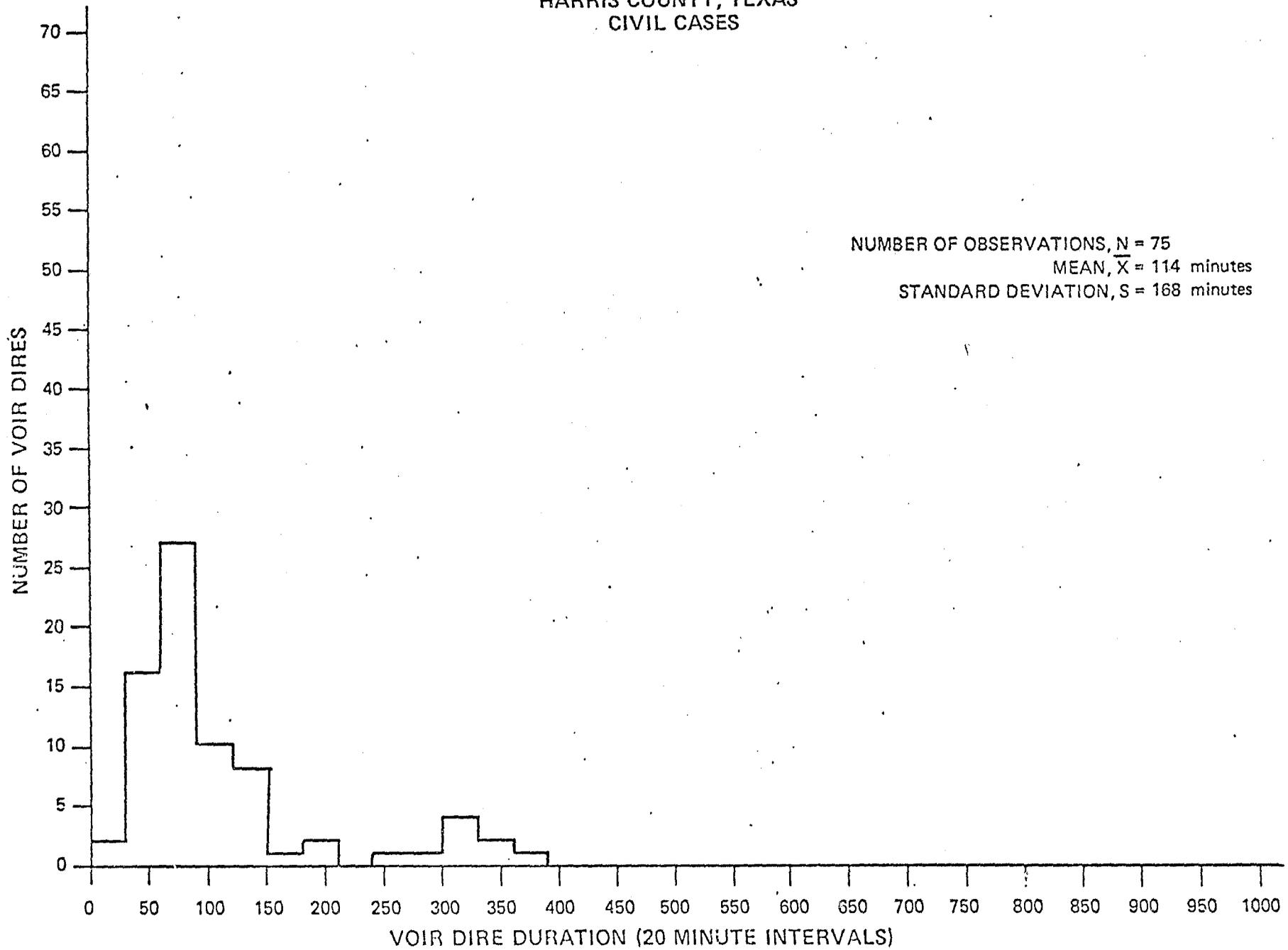


HARRIS COUNTY, TEXAS
CRIMINAL CASES

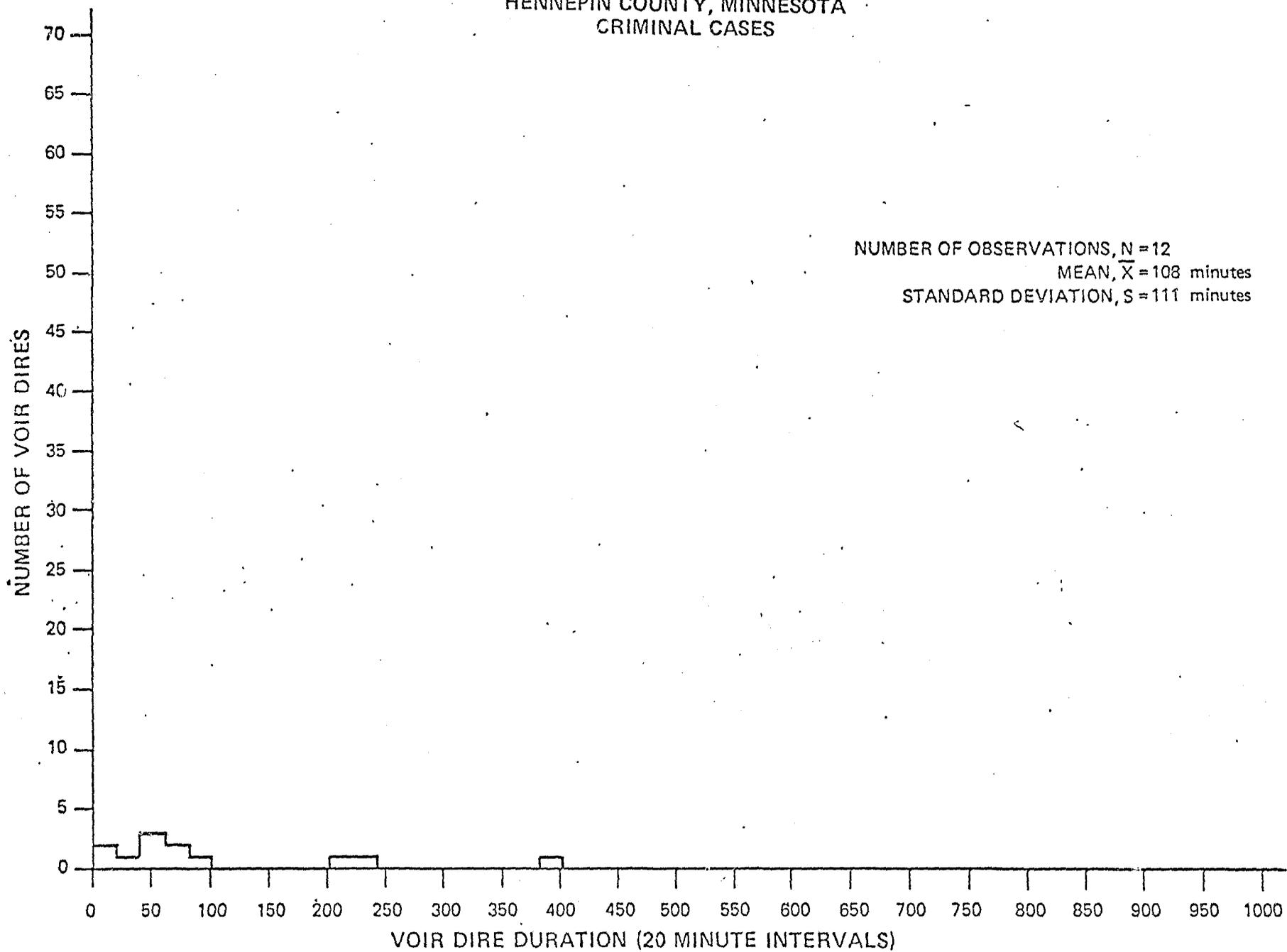
NUMBER OF OBSERVATIONS, $N = 155$
MEAN, $\bar{X} = 96$ minutes
STANDARD DEVIATION, $S = 68$ minutes



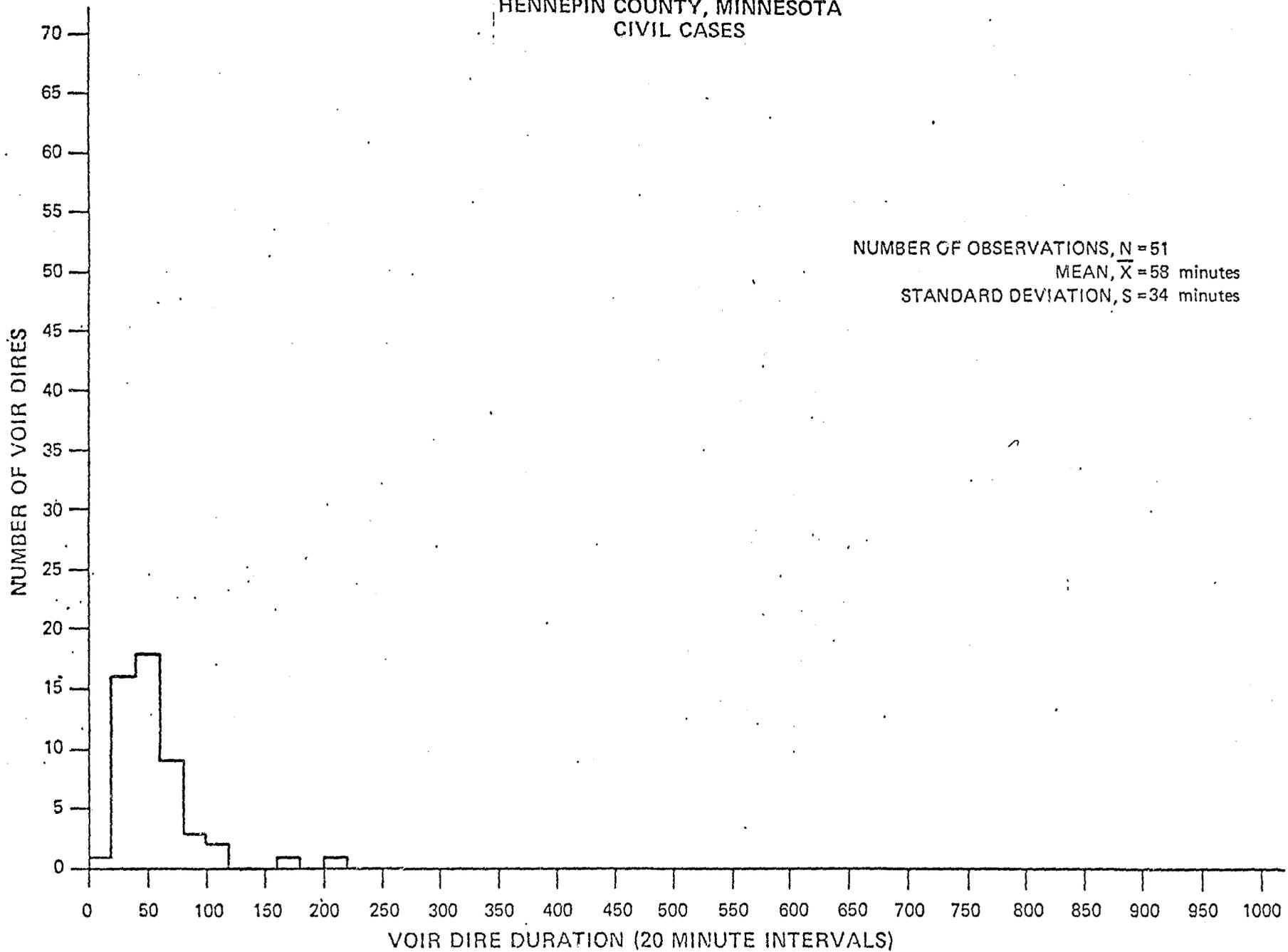
HARRIS COUNTY, TEXAS
CIVIL CASES



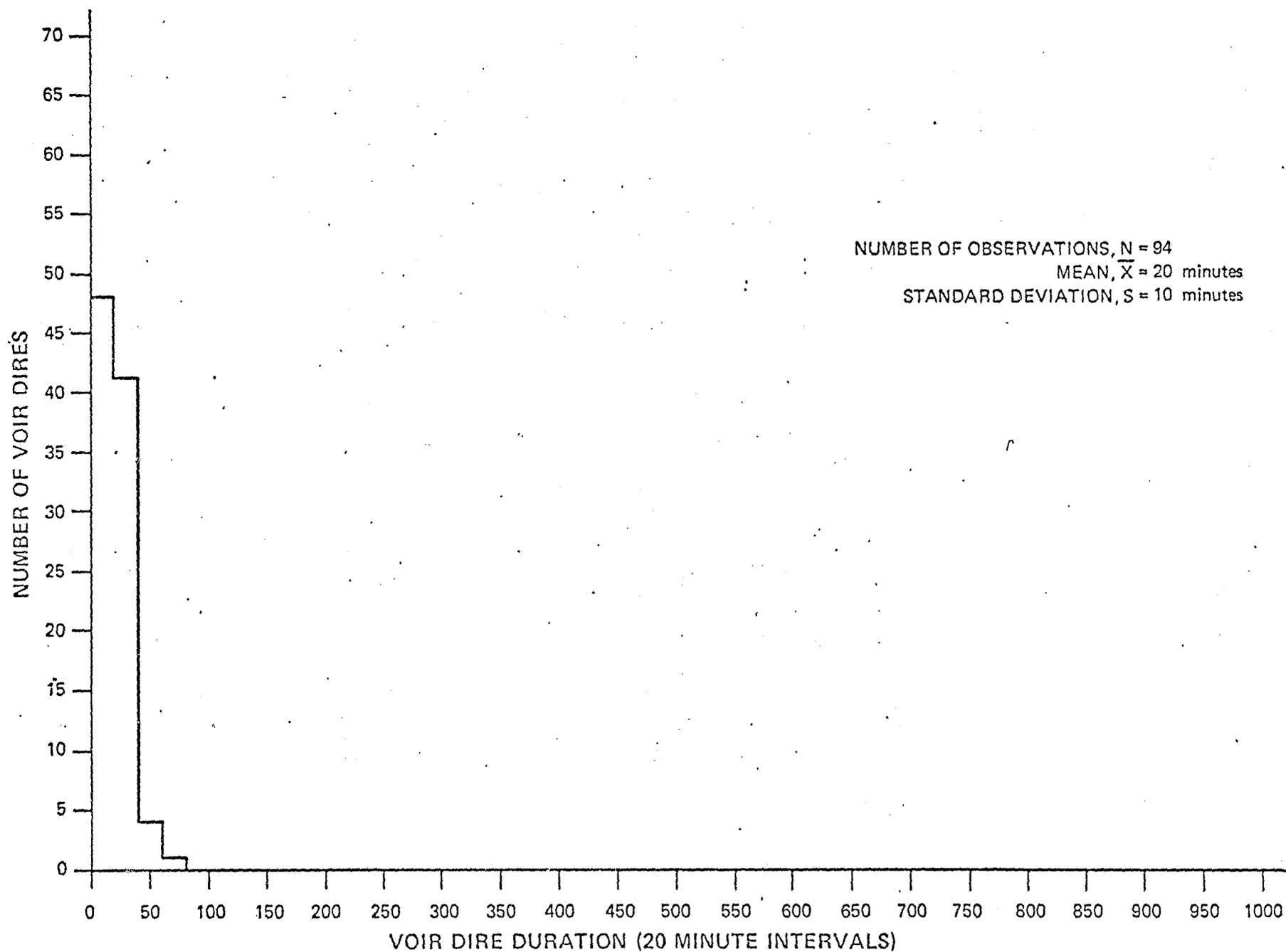
HENNEPIN COUNTY, MINNESOTA
CRIMINAL CASES



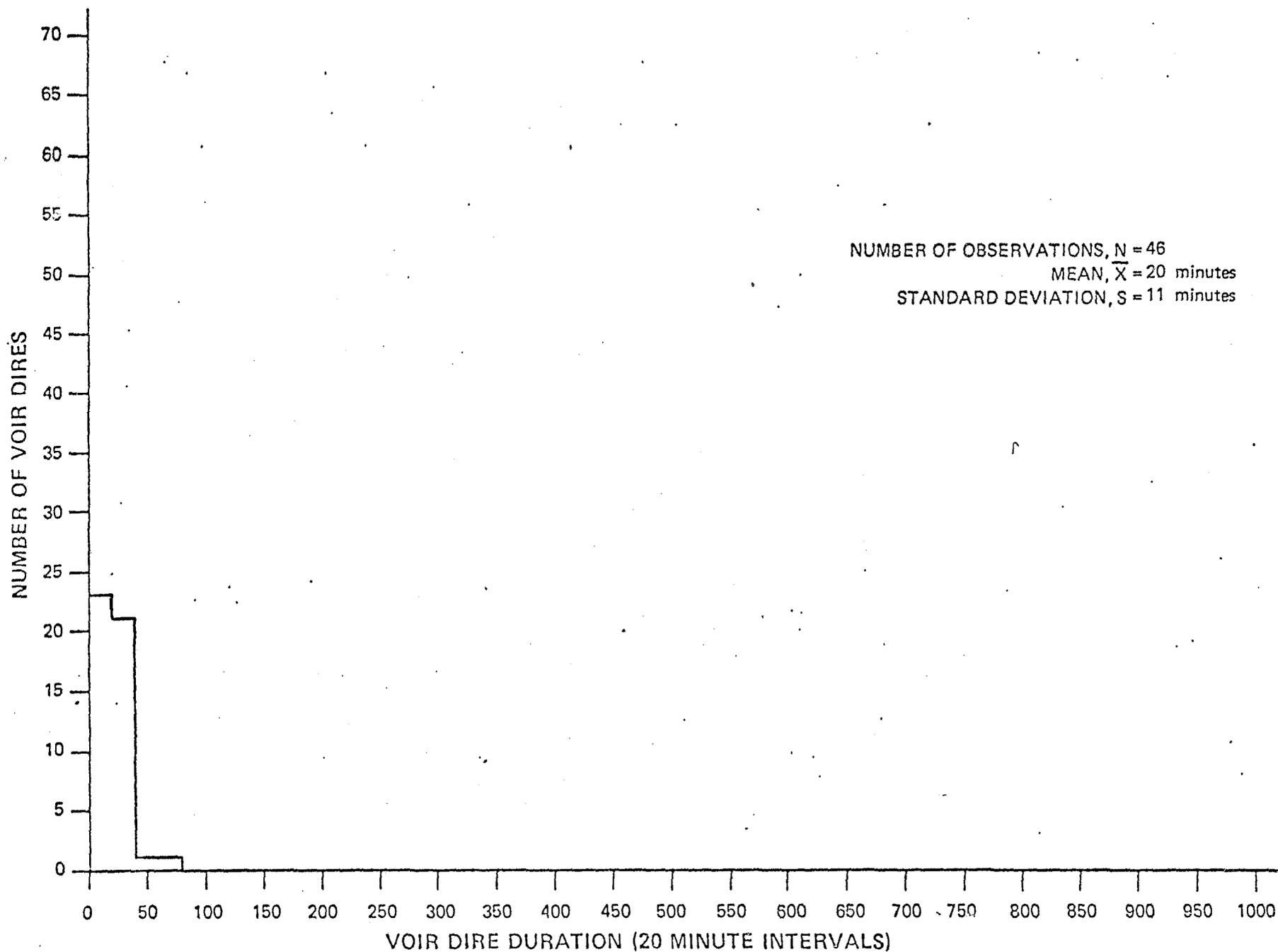
HENNEPIN COUNTY, MINNESOTA
CIVIL CASES



PRINCE GEORGES COUNTY, MARYLAND
ALL CASES



PRINCE GEORGES COUNTY, MARYLAND
CRIMINAL CASES

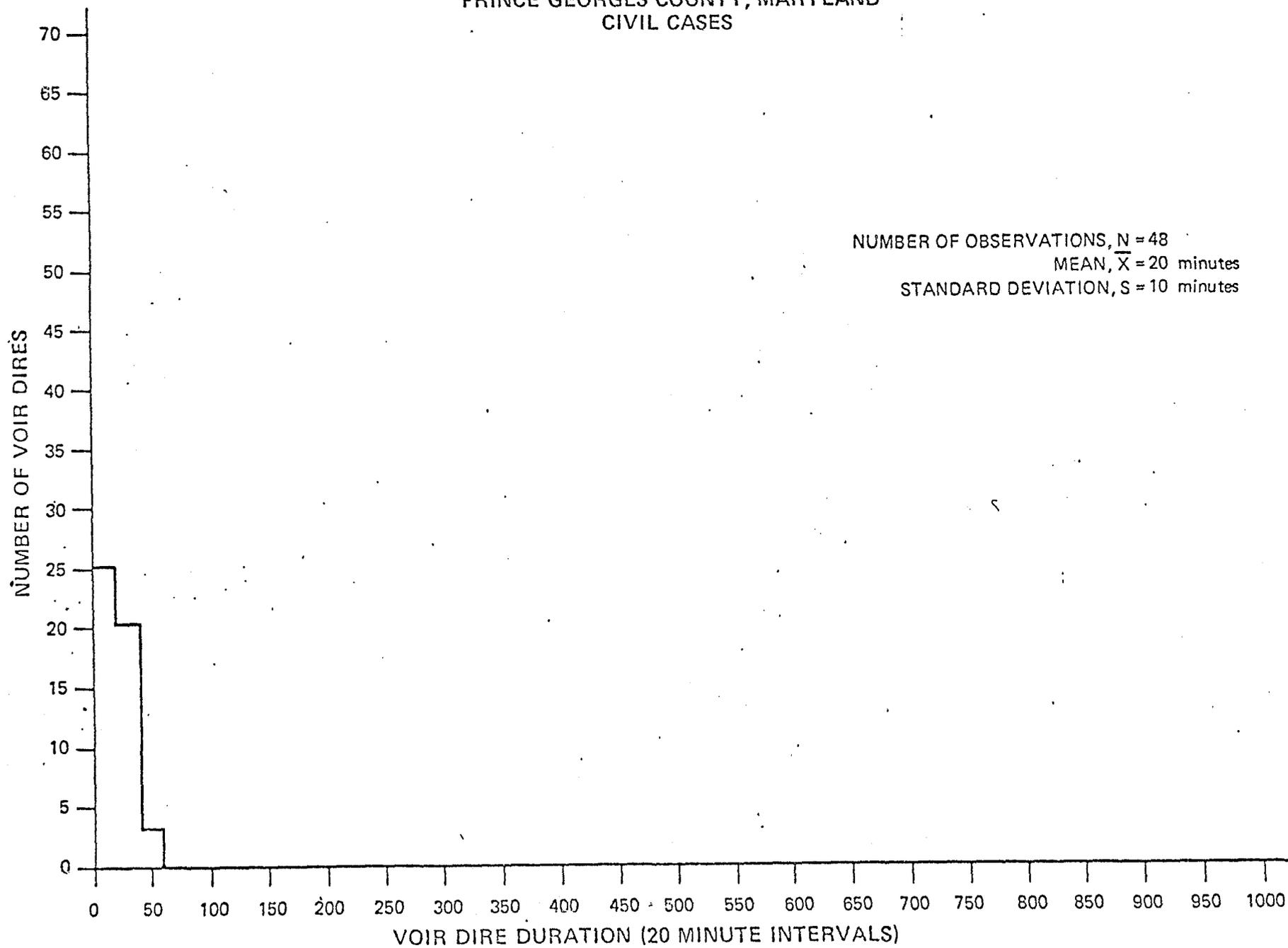


CONTINUED

2 OF 3

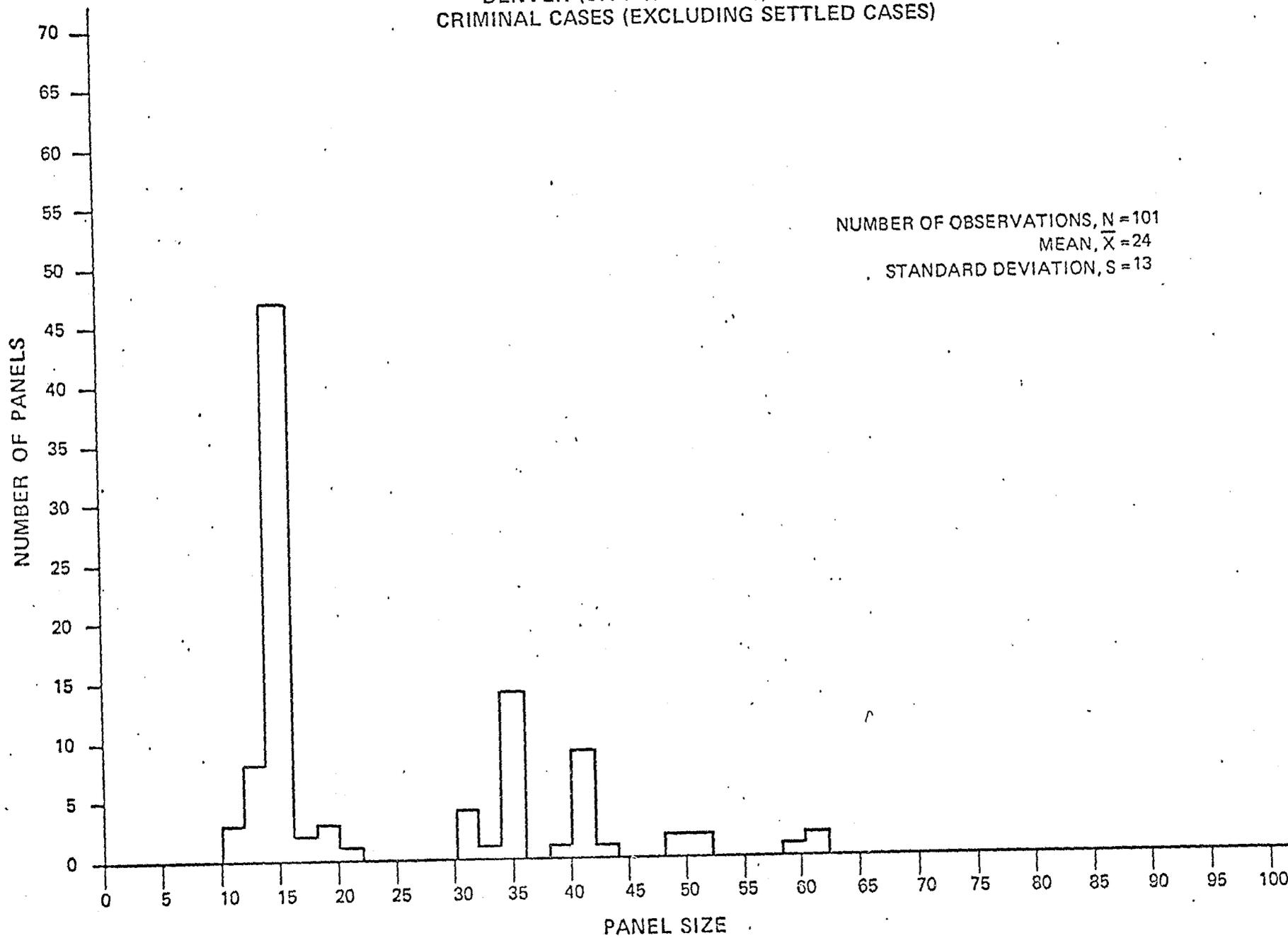
PRINCE GEORGES COUNTY, MARYLAND
CIVIL CASES

NUMBER OF OBSERVATIONS, $N = 48$
MEAN, $\bar{X} = 20$ minutes
STANDARD DEVIATION, $S = 10$ minutes

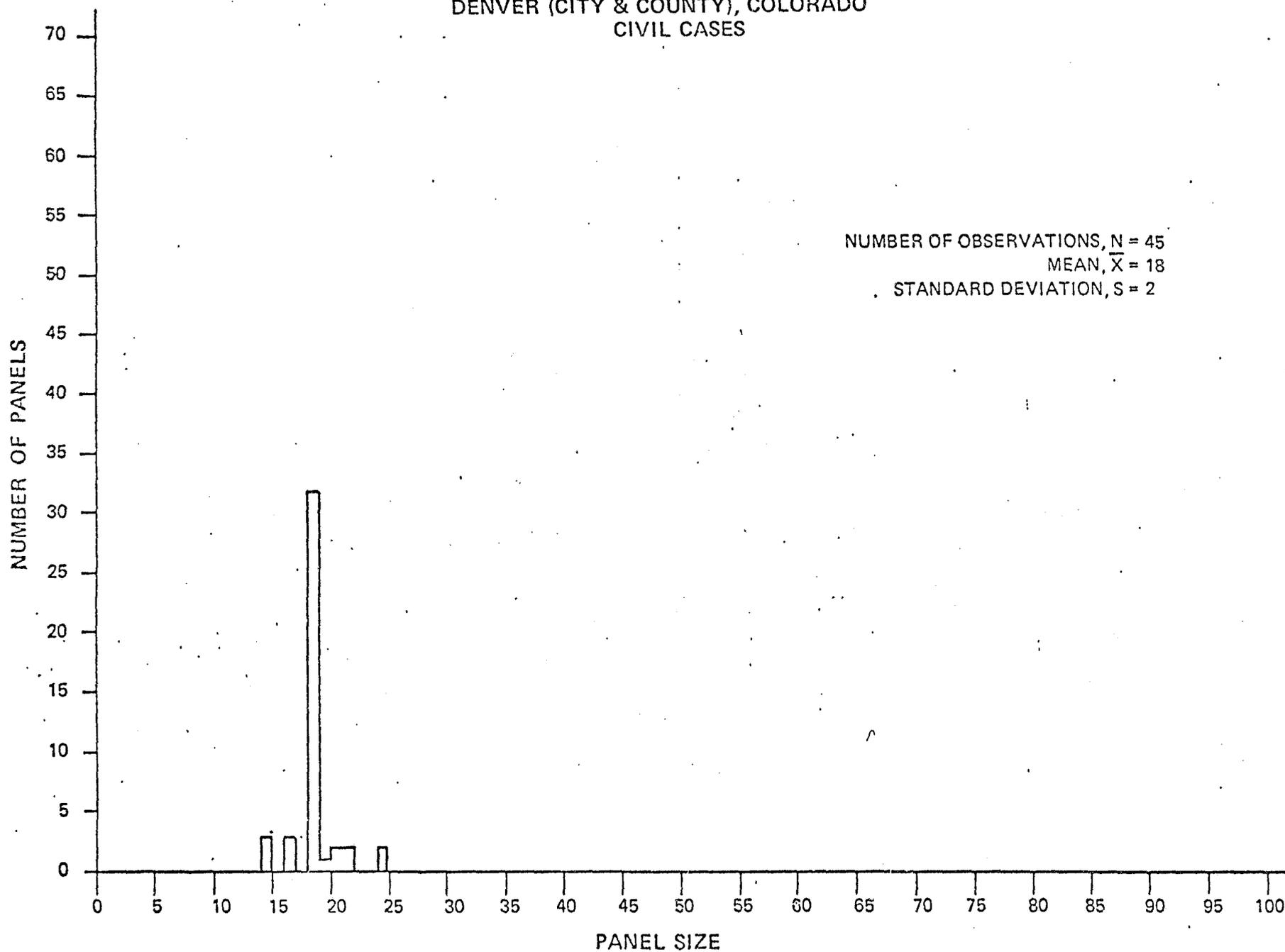


DISTRIBUTIONS OF PANEL SIZE

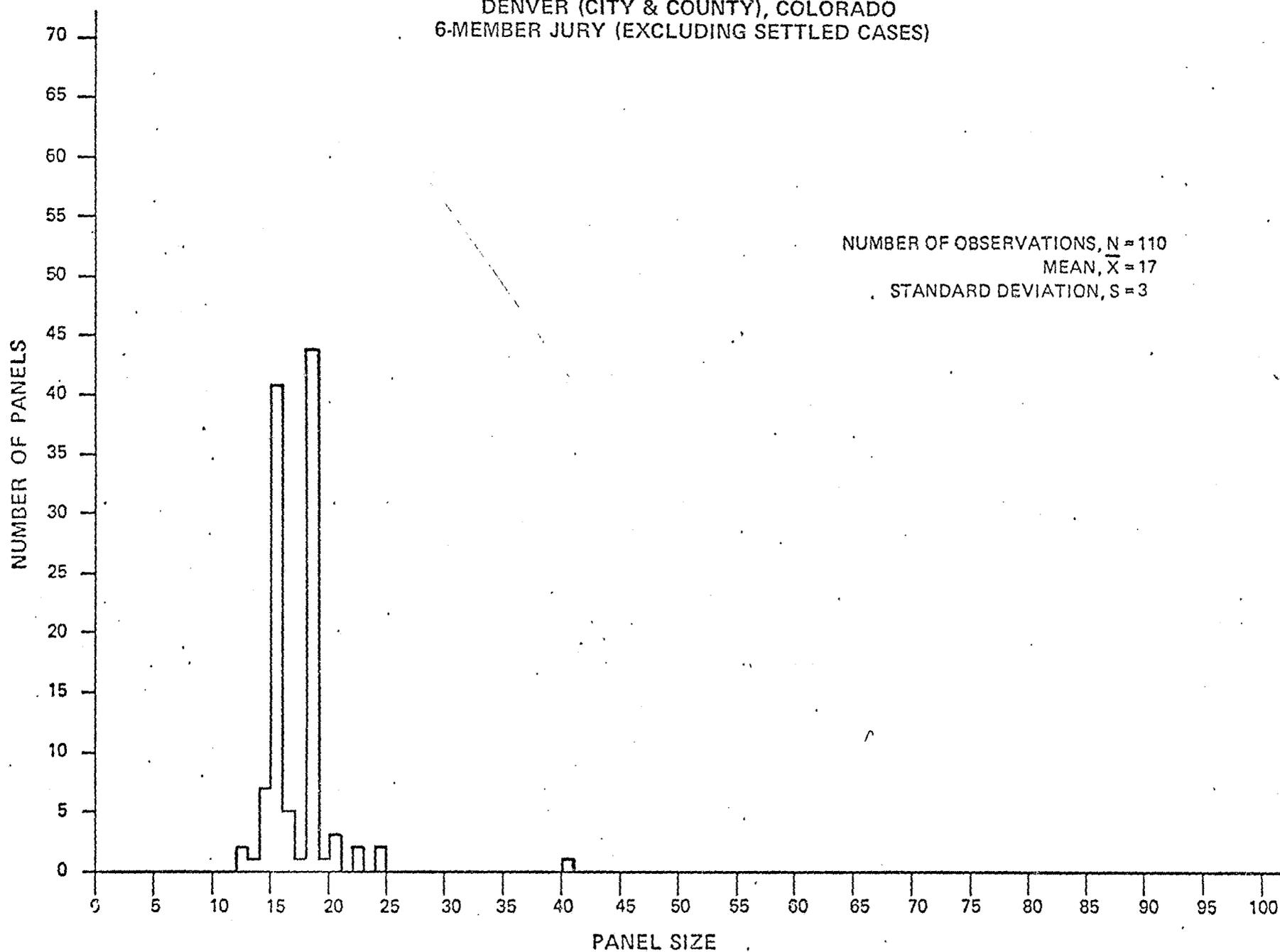
DENVER (CITY & COUNTY), COLORADO
CRIMINAL CASES (EXCLUDING SETTLED CASES)



DENVER (CITY & COUNTY), COLORADO
CIVIL CASES



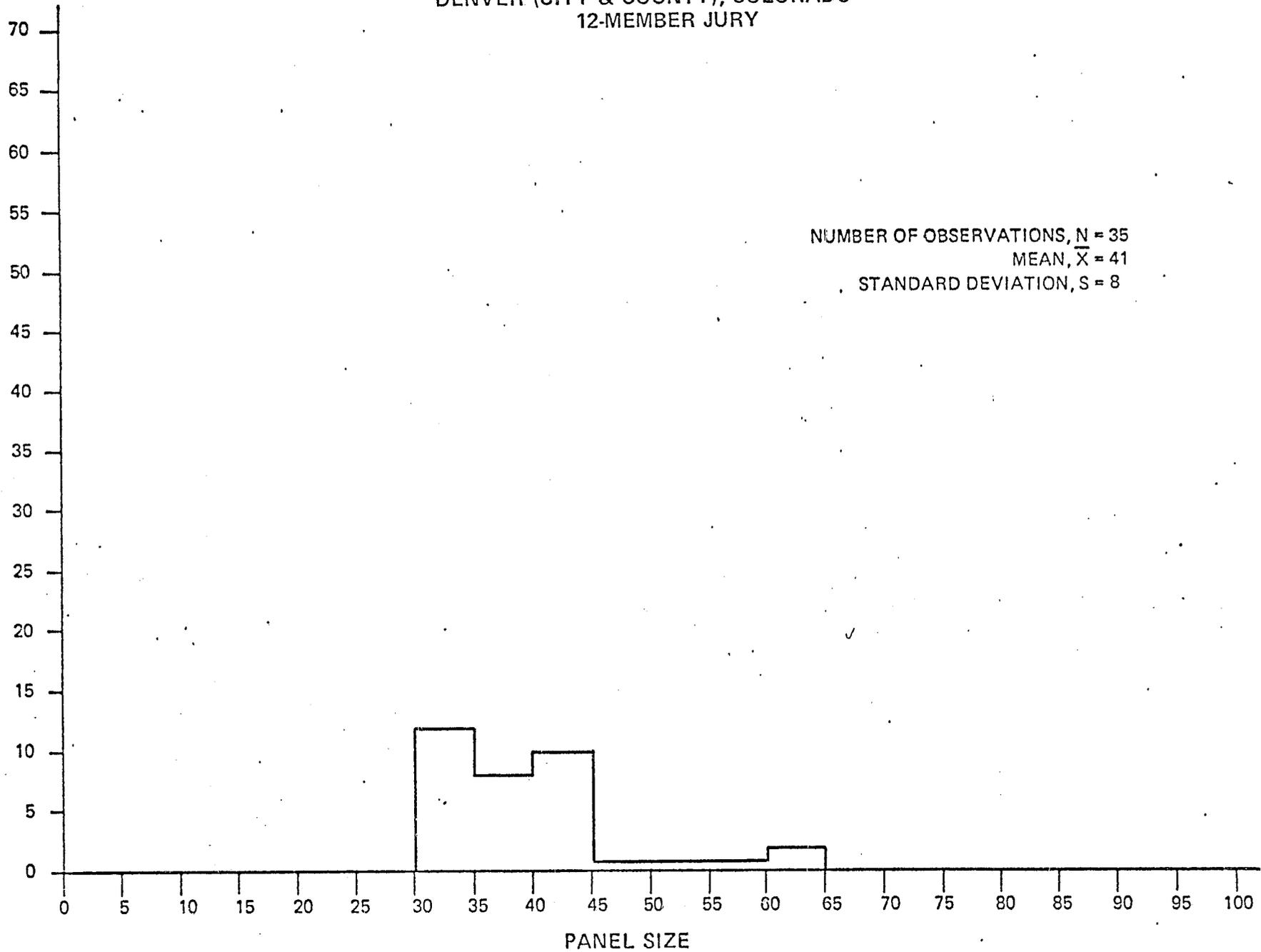
DENVER (CITY & COUNTY), COLORADO
6-MEMBER JURY (EXCLUDING SETTLED CASES)



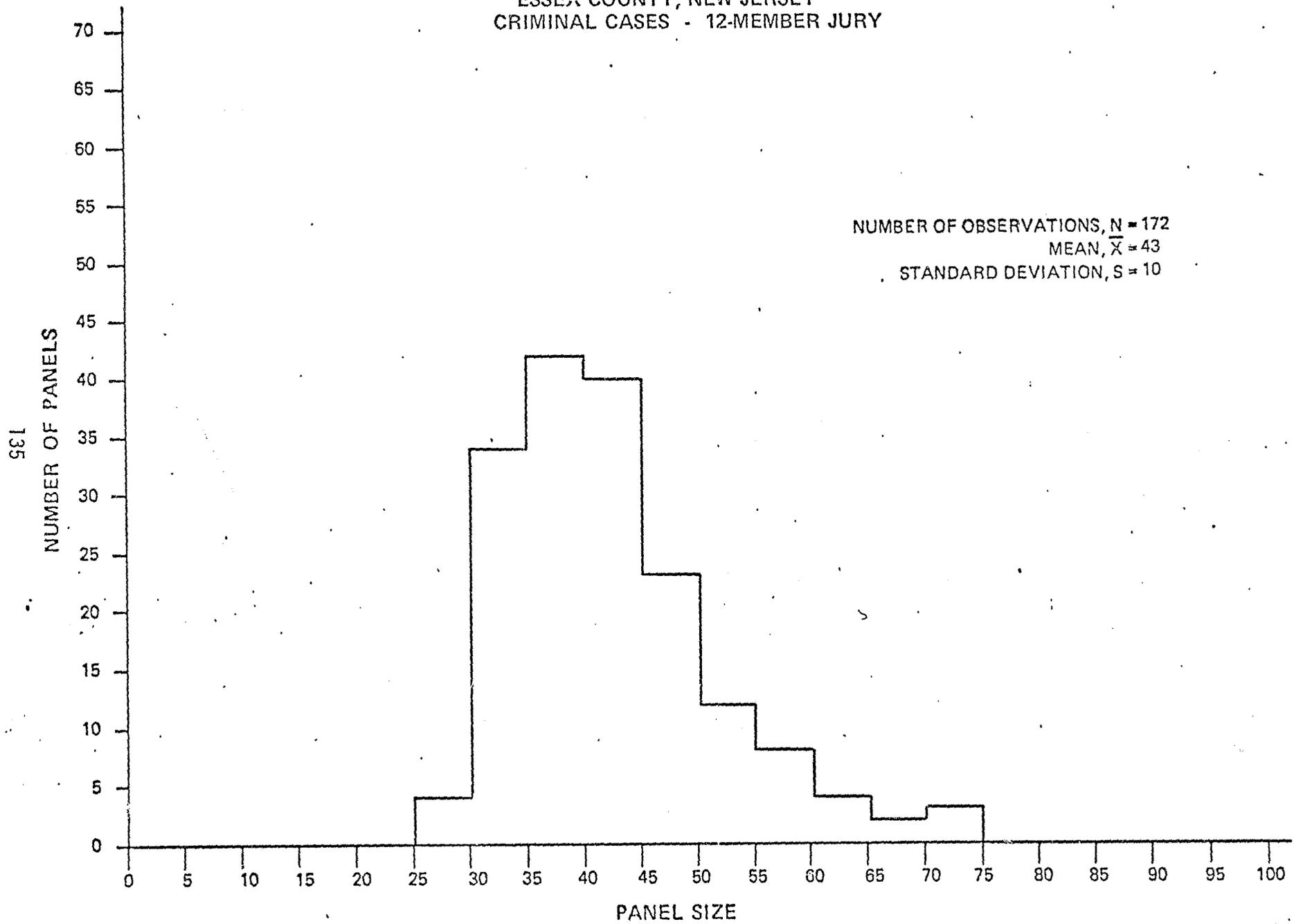
DENVER (CITY & COUNTY), COLORADO
12-MEMBER JURY

NUMBER OF OBSERVATIONS, $N = 35$
MEAN, $\bar{X} = 41$
STANDARD DEVIATION, $S = 8$

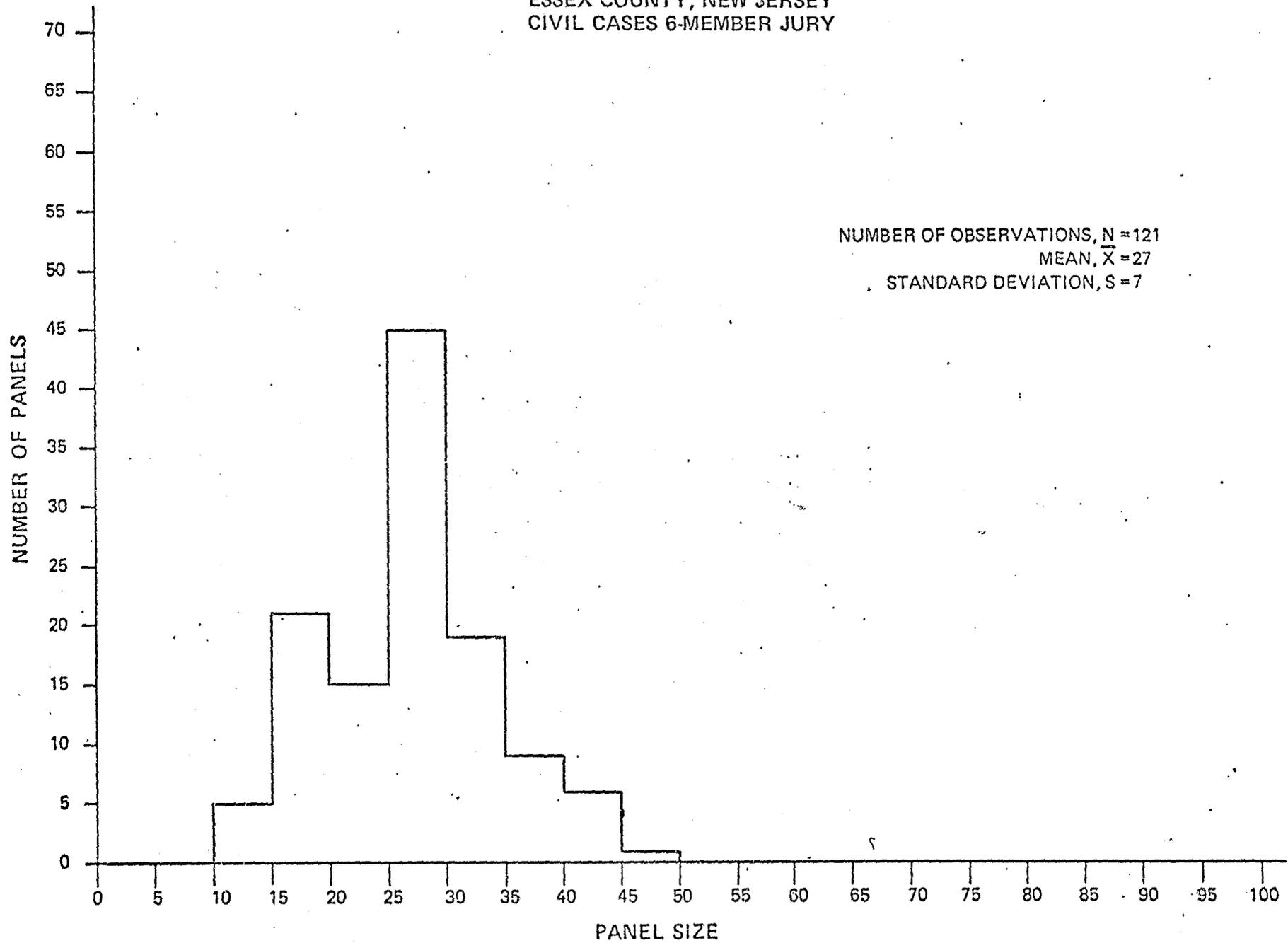
134
NUMBER OF PANELS

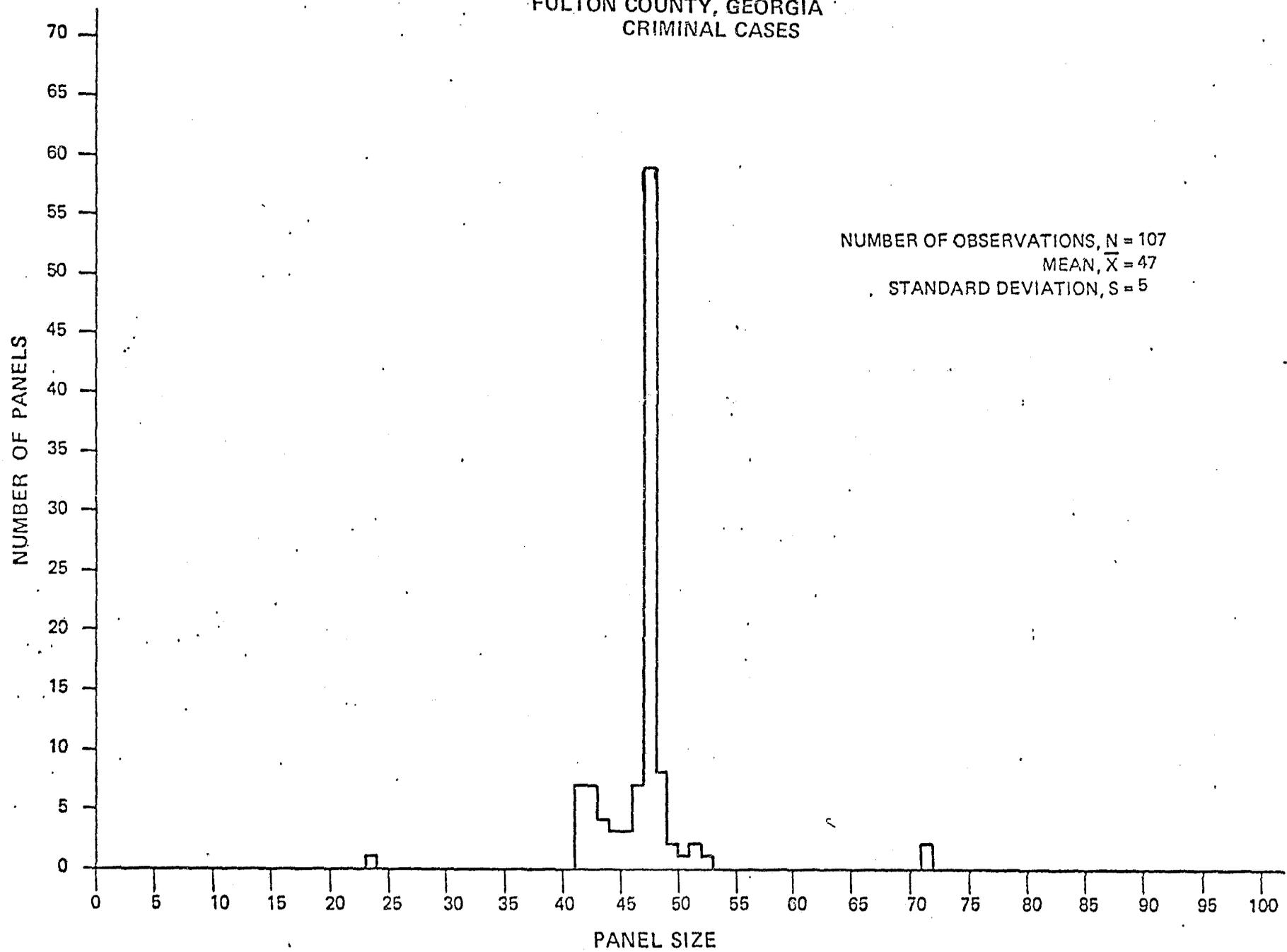


ESSEX COUNTY, NEW JERSEY
CRIMINAL CASES - 12-MEMBER JURY

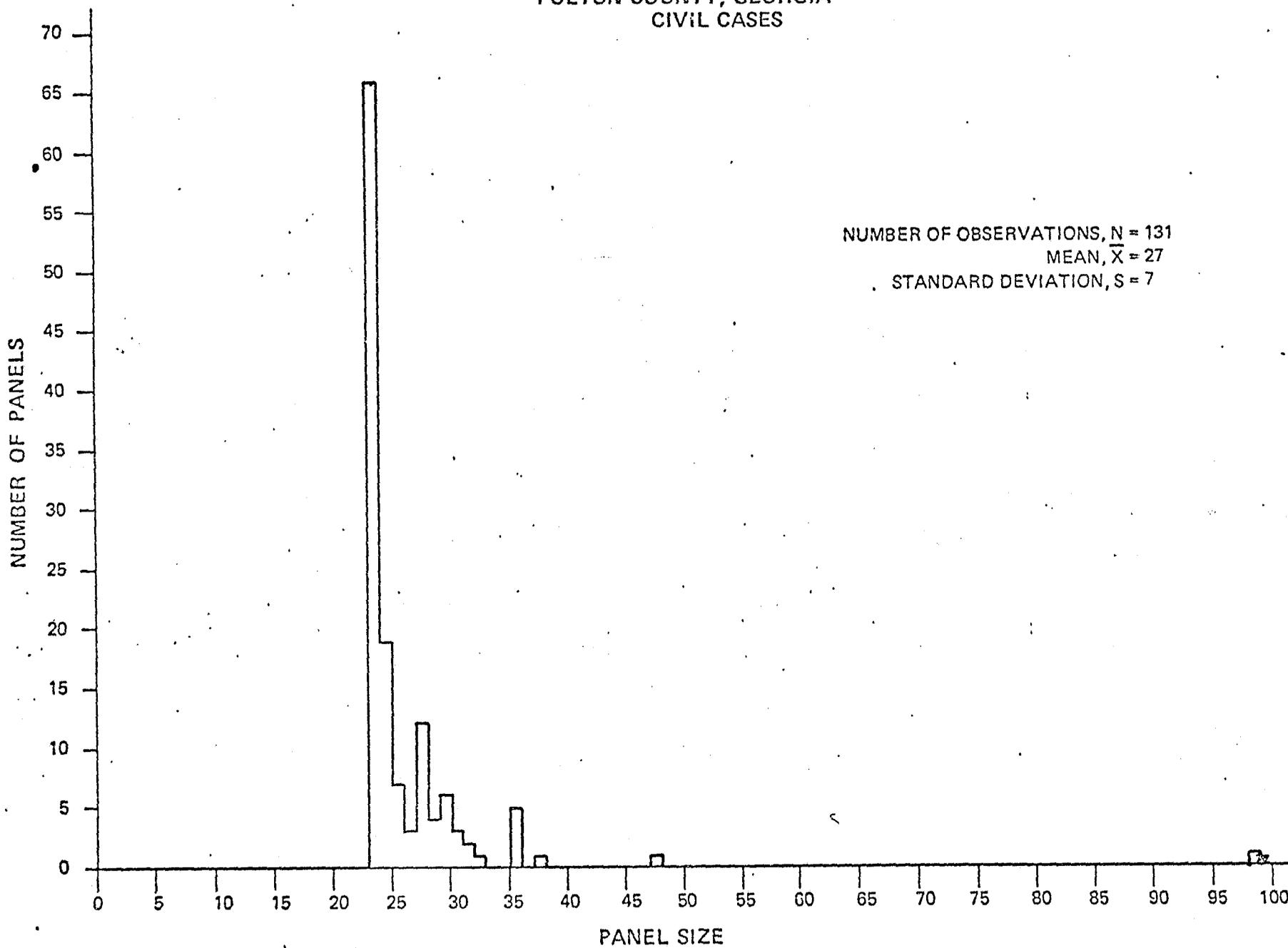


ESSEX COUNTY, NEW JERSEY
CIVIL CASES 6-MEMBER JURY

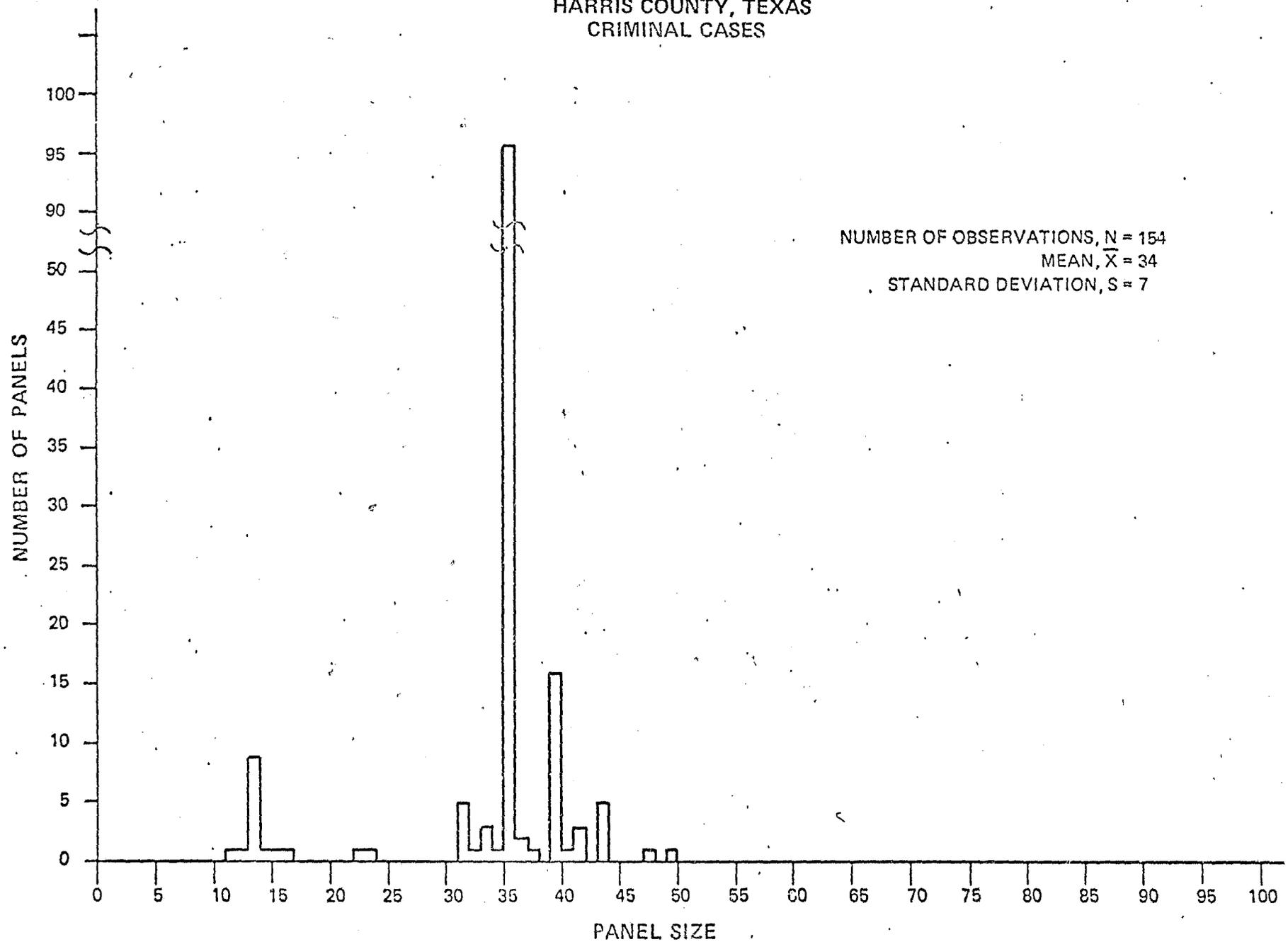


FULTON COUNTY, GEORGIA
CRIMINAL CASES

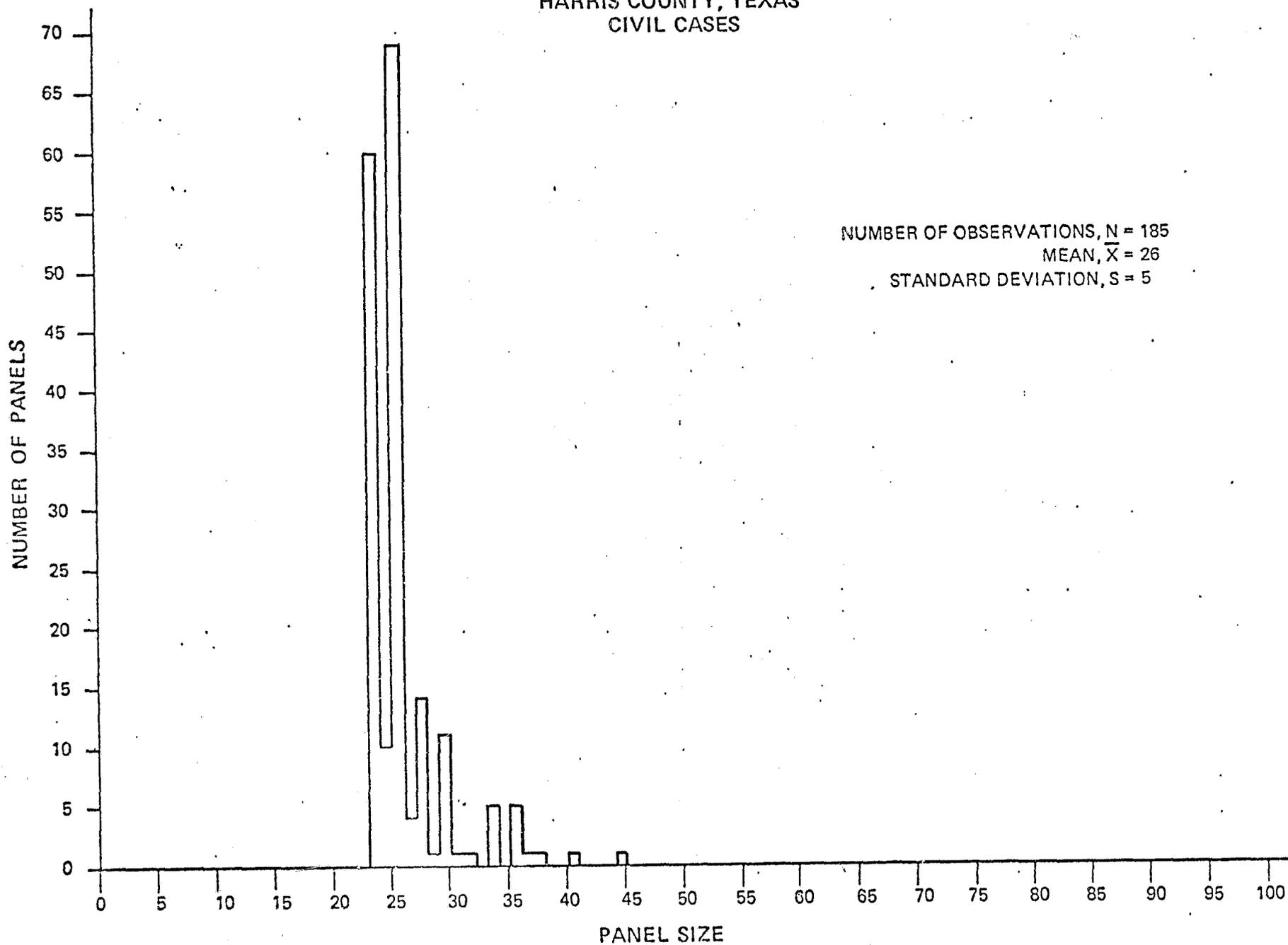
FULTON COUNTY, GEORGIA
CIVIL CASES



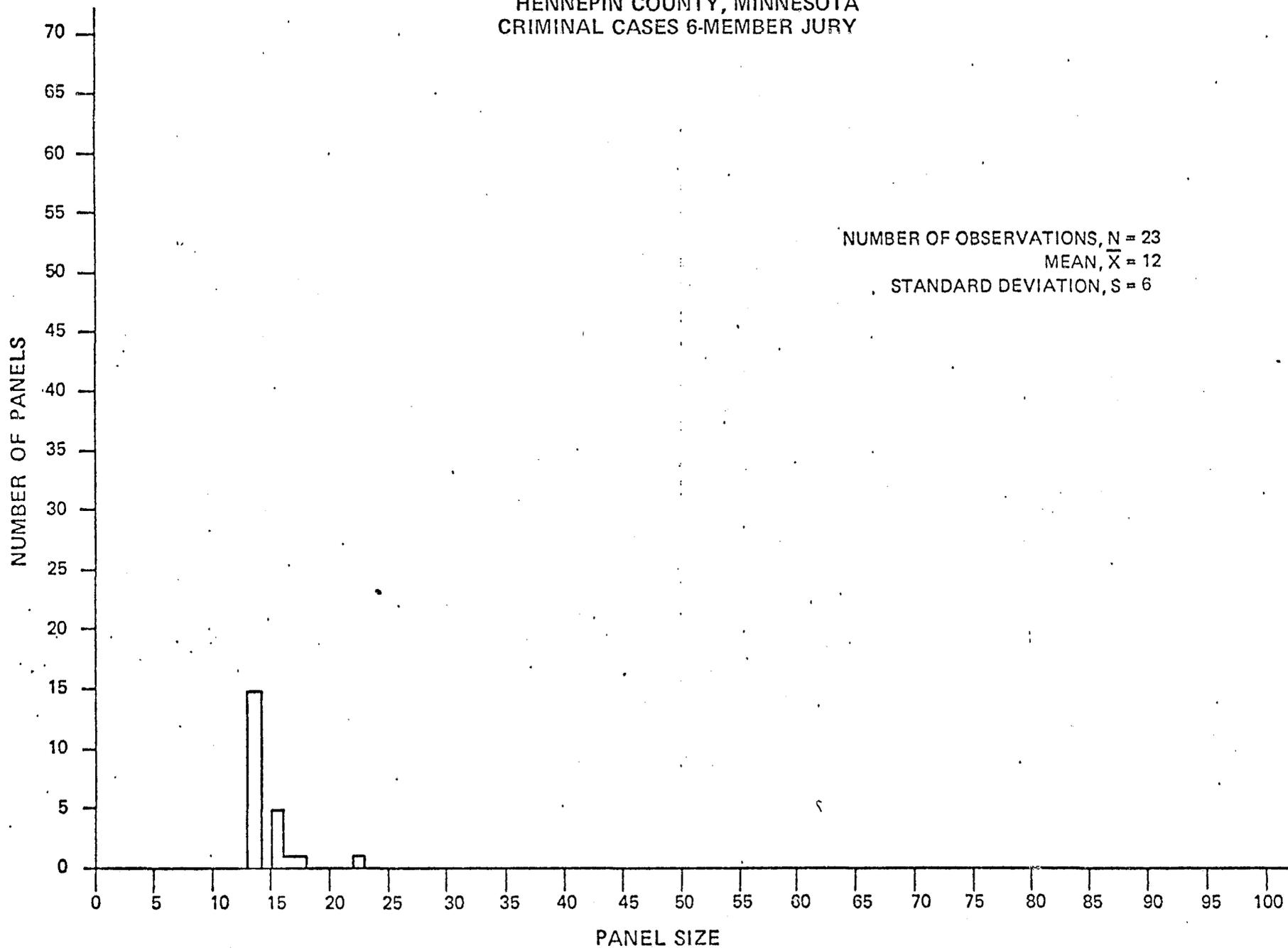
HARRIS COUNTY, TEXAS CRIMINAL CASES



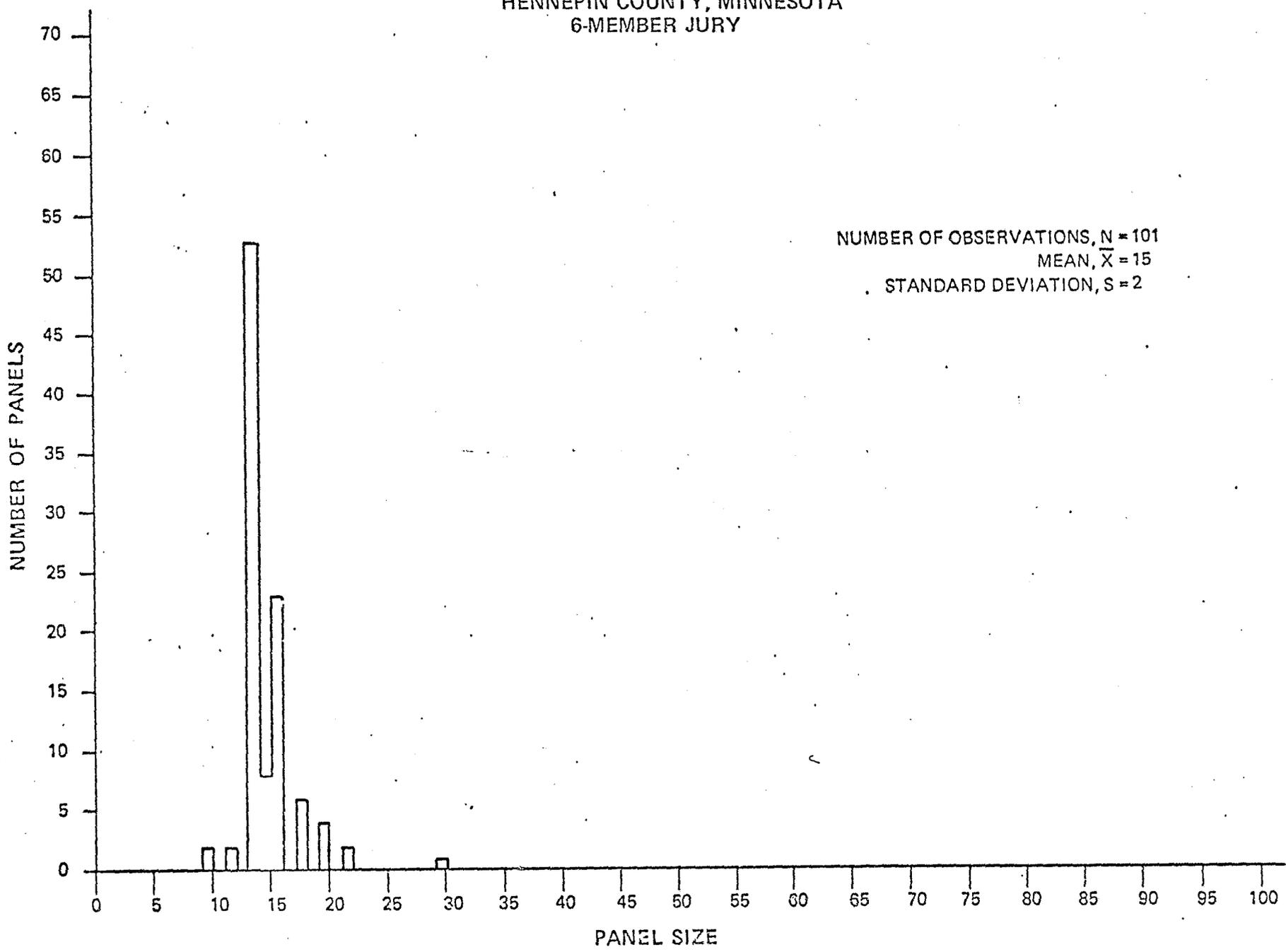
HARRIS COUNTY, TEXAS
CIVIL CASES



HENNEPIN COUNTY, MINNESOTA
CRIMINAL CASES 6-MEMBER JURY

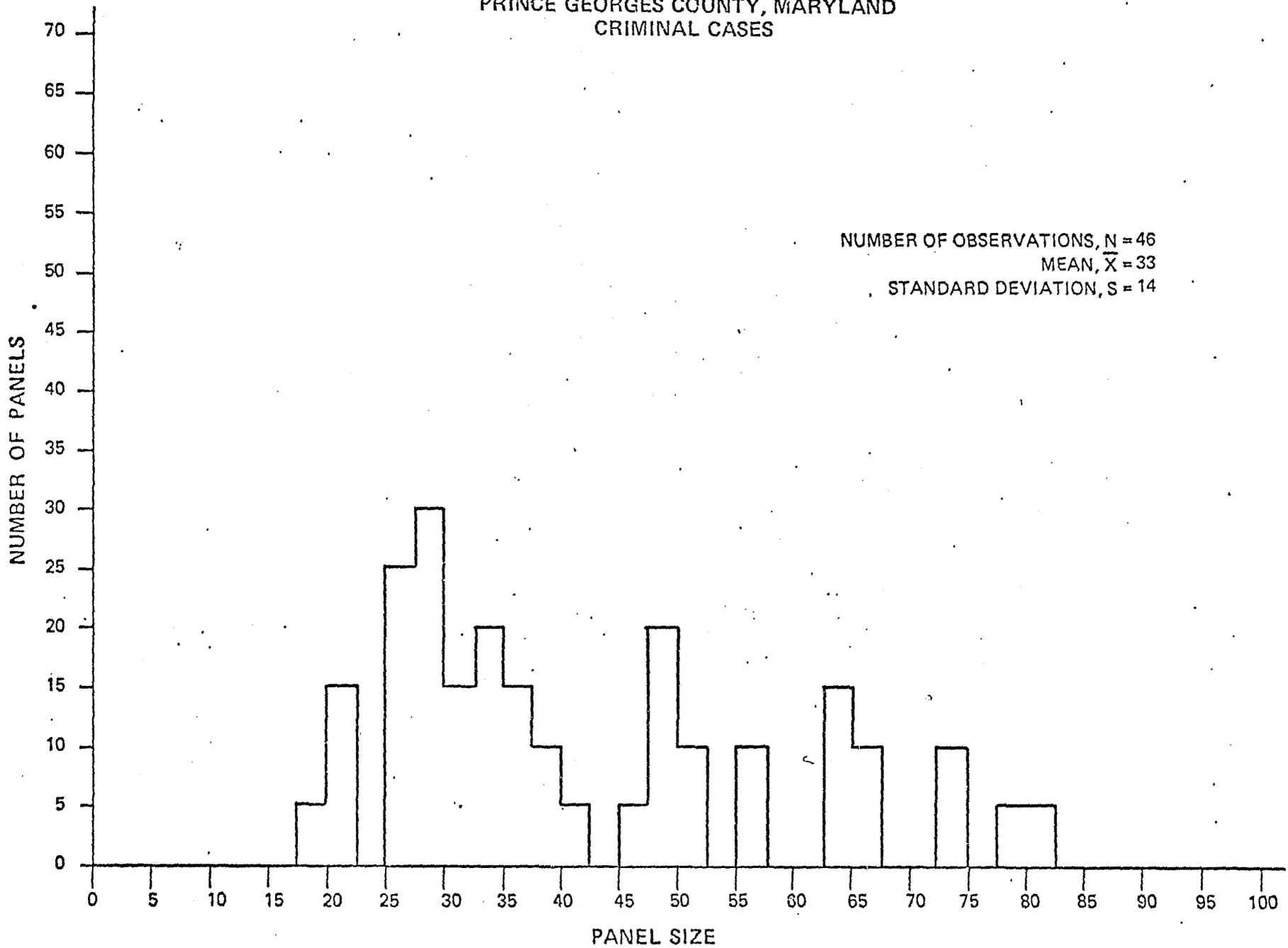


HENNEPIN COUNTY, MINNESOTA
6-MEMBER JURY

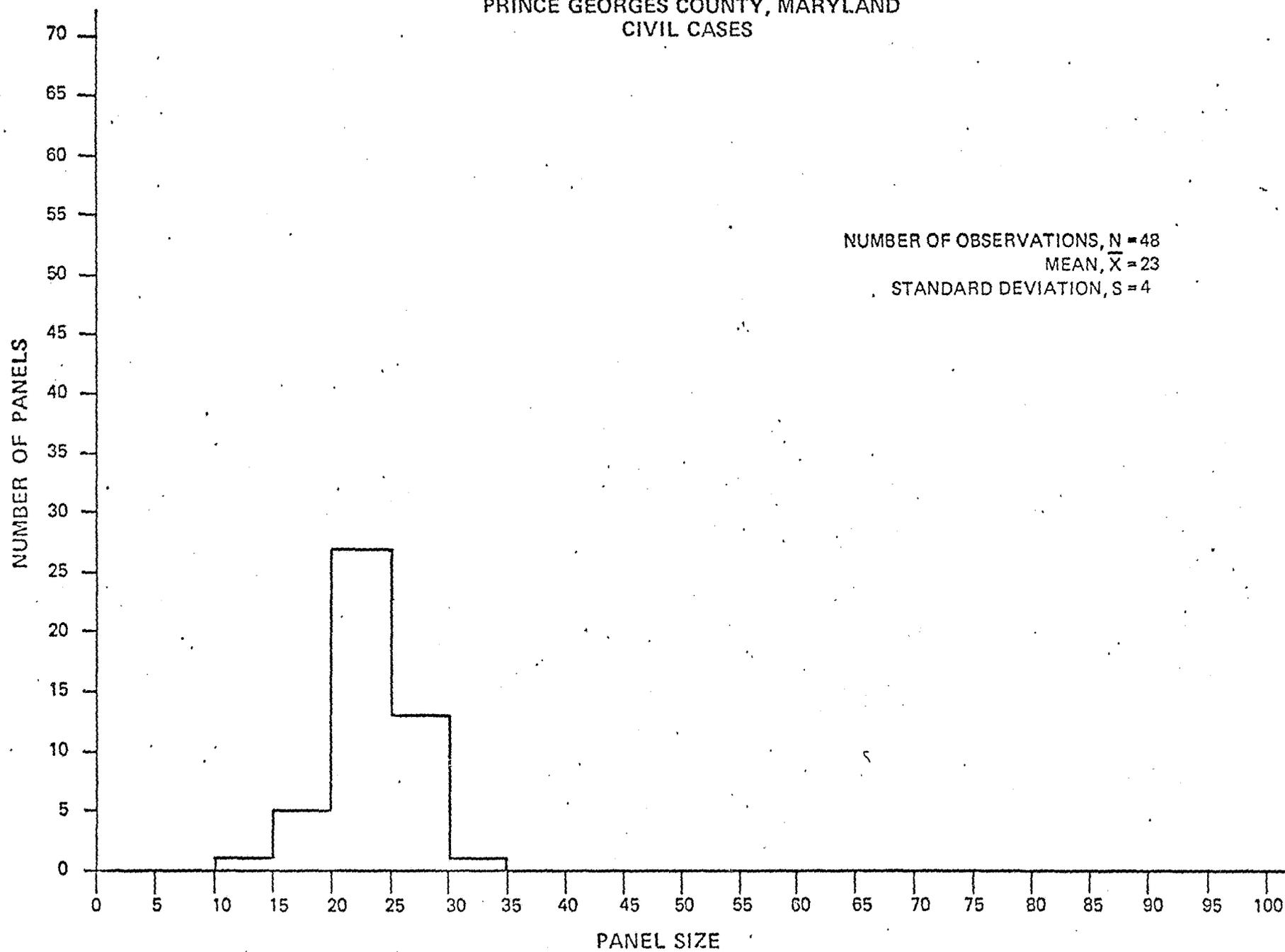


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PRINCE GEORGES COUNTY, MARYLAND
CRIMINAL CASES

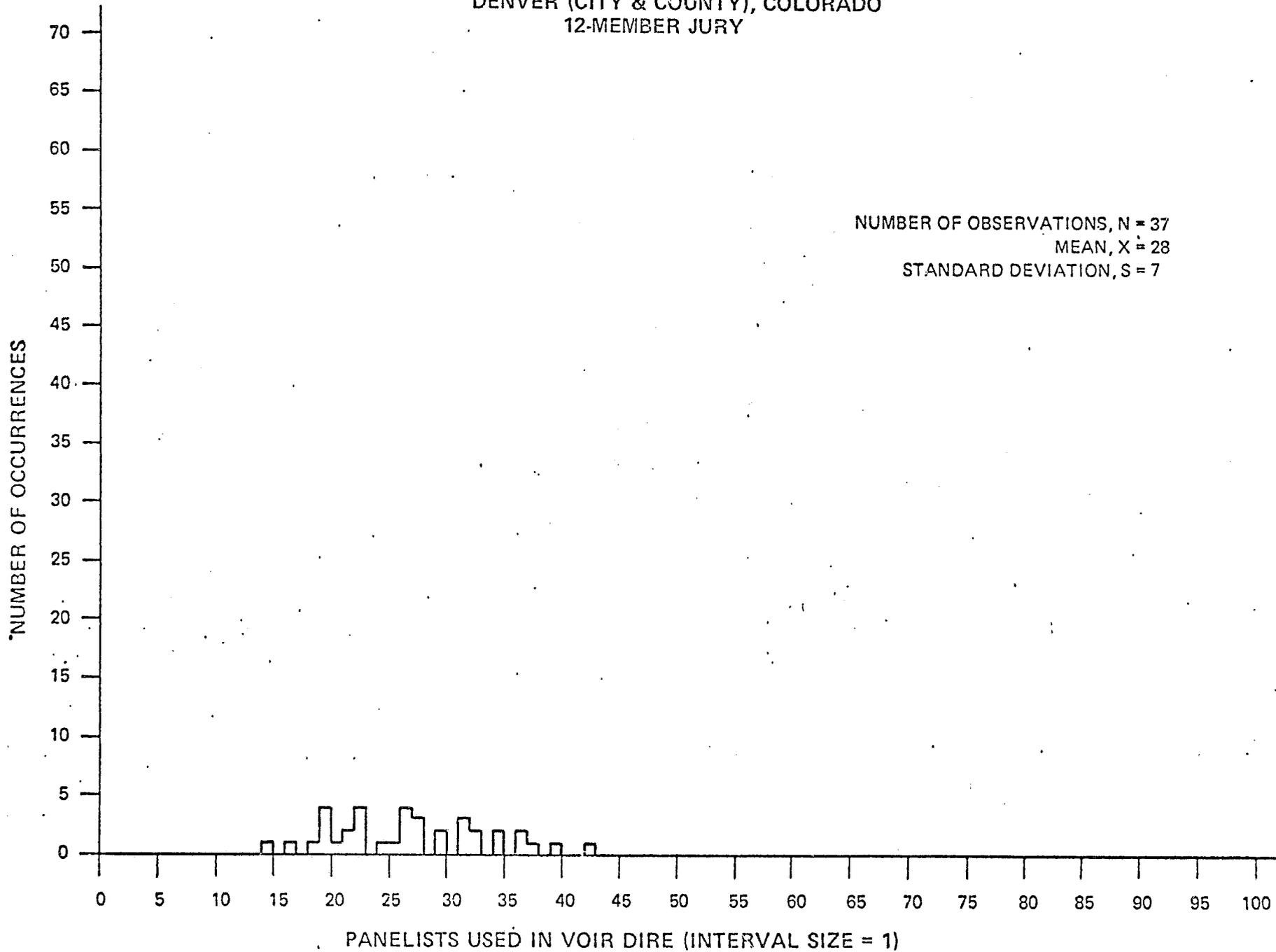


PRINCE GEORGES COUNTY, MARYLAND
CIVIL CASES



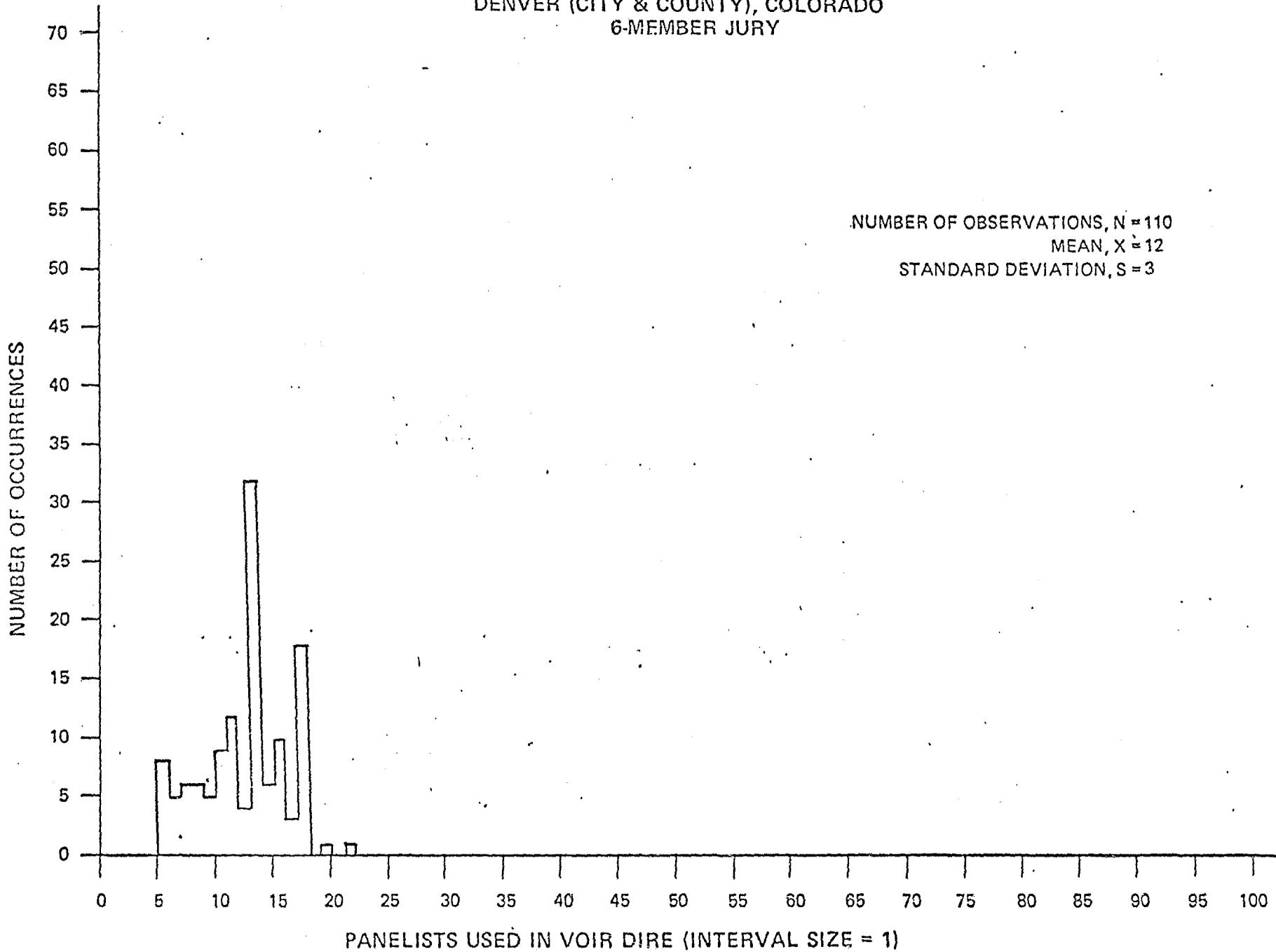
DISTRIBUTIONS OF PANELISTS USED IN VOIR DIRE

DENVER (CITY & COUNTY), COLORADO
12-MEMBER JURY

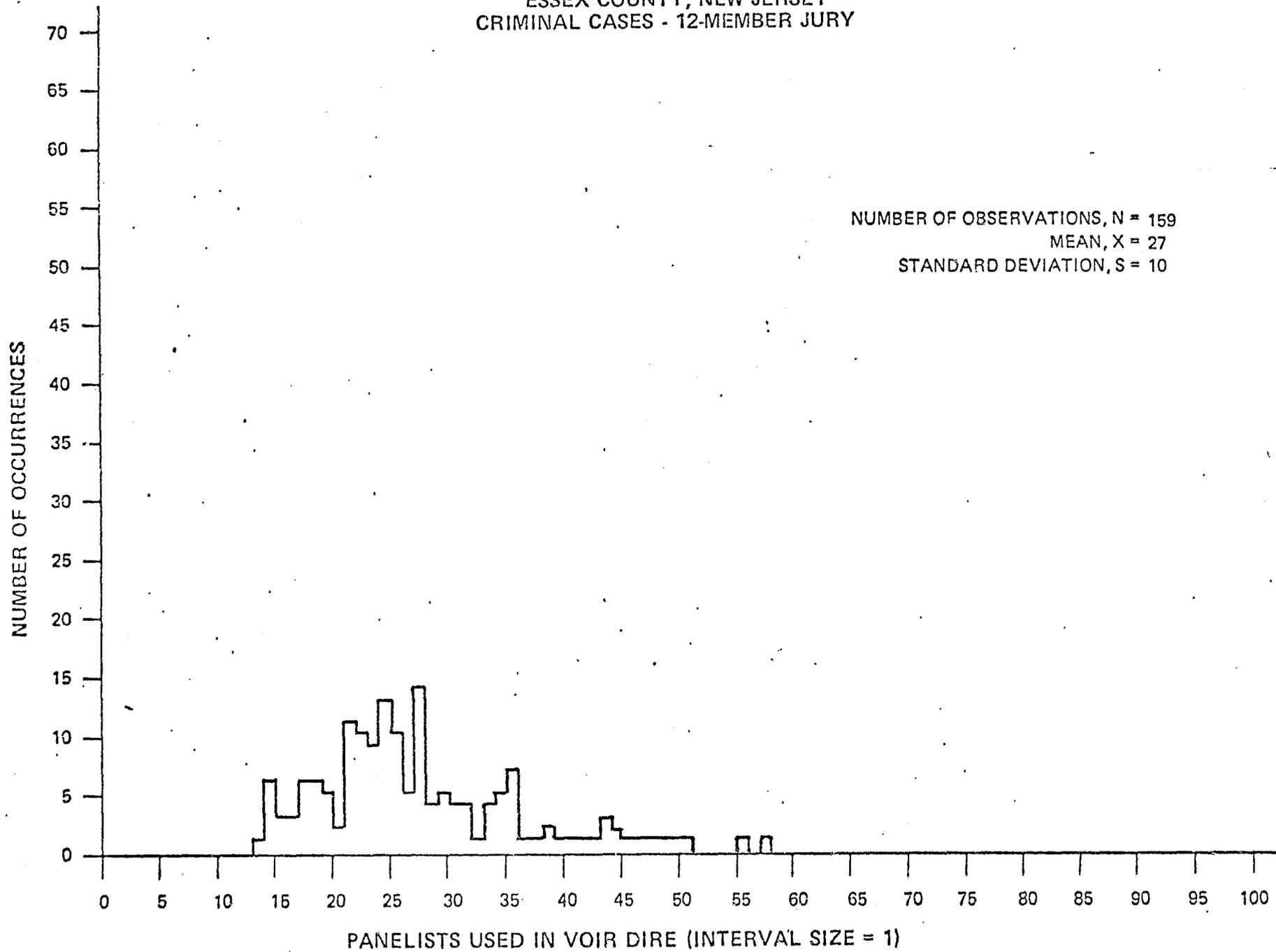


DENVER (CITY & COUNTY), COLORADO
6-MEMBER JURY

NUMBER OF OBSERVATIONS, $N = 110$
MEAN, $\bar{X} = 12$
STANDARD DEVIATION, $S = 3$

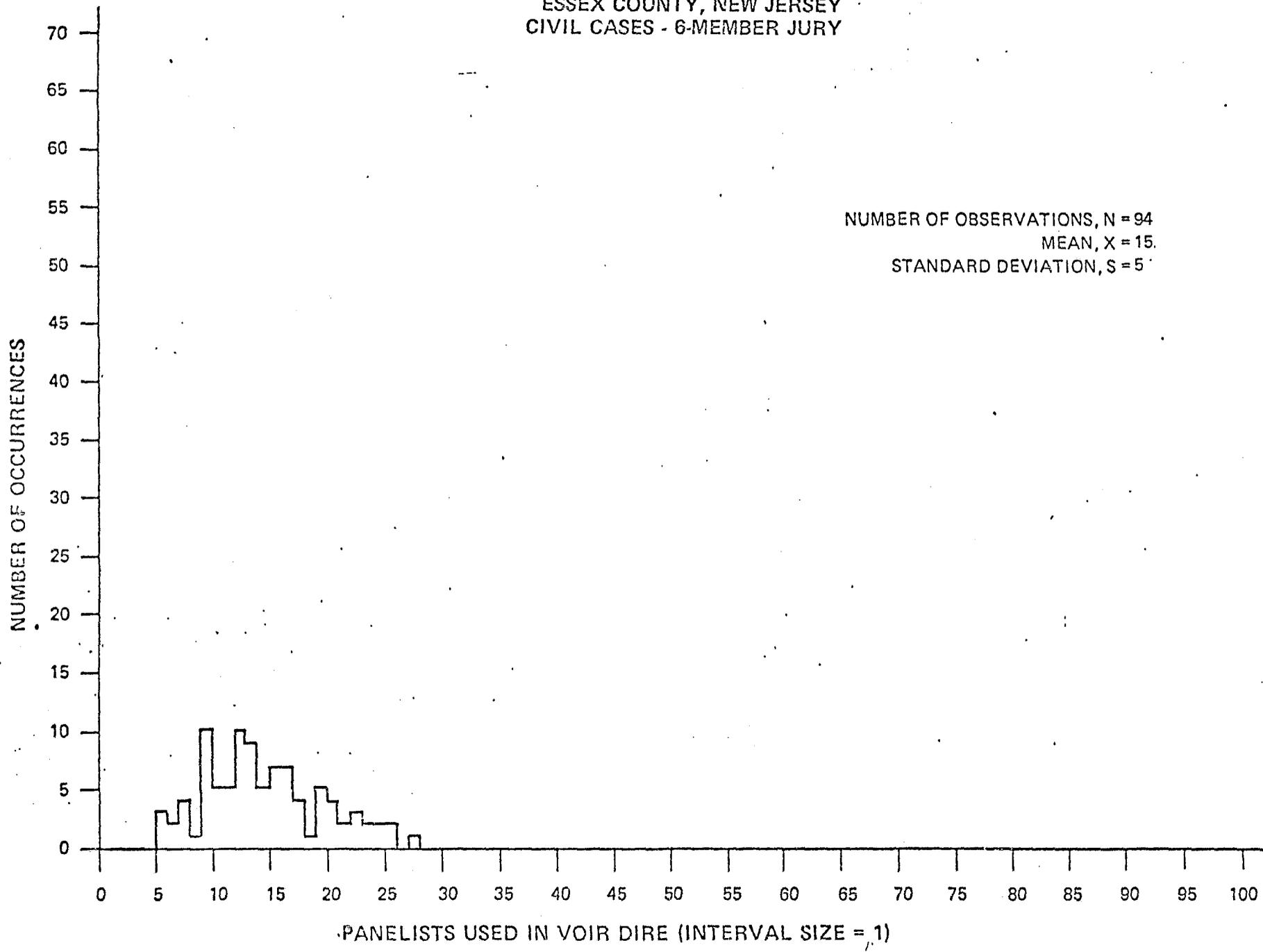


ESSEX COUNTY, NEW JERSEY
CRIMINAL CASES - 12-MEMBER JURY

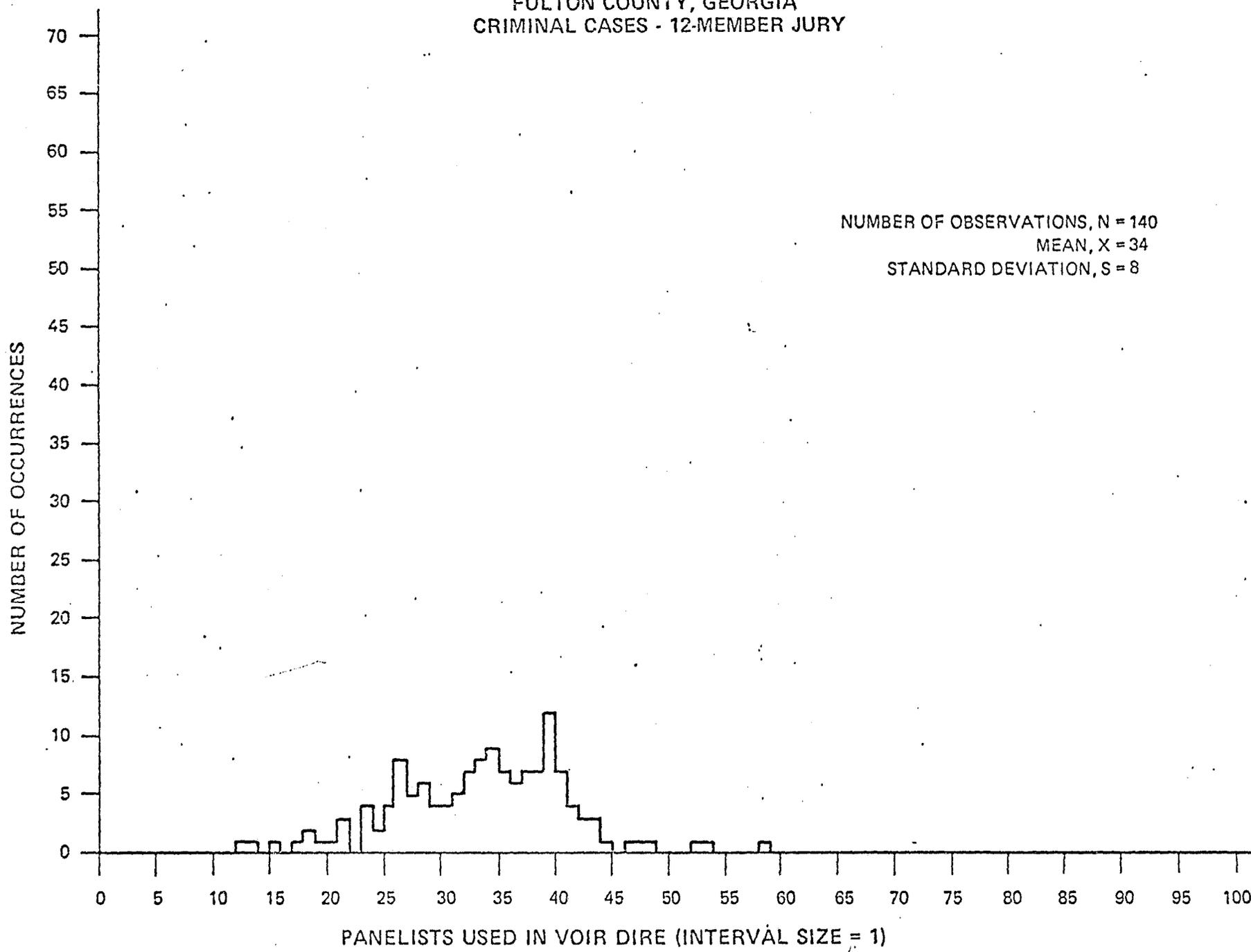


ESSEX COUNTY, NEW JERSEY
CIVIL CASES - 6-MEMBER JURY

NUMBER OF OBSERVATIONS, N = 94
MEAN, \bar{X} = 15.
STANDARD DEVIATION, S = 5

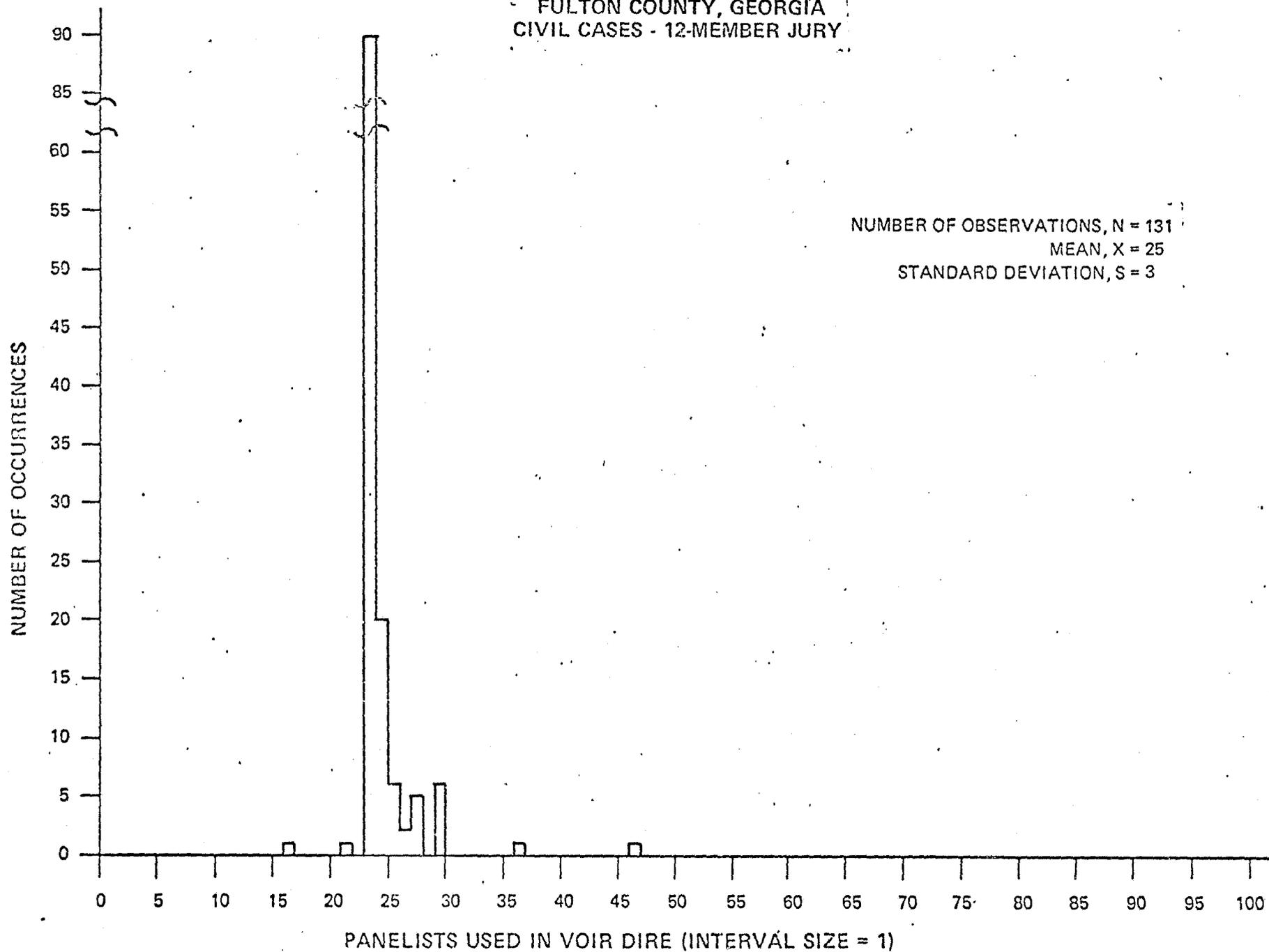


FULTON COUNTY, GEORGIA
CRIMINAL CASES - 12-MEMBER JURY

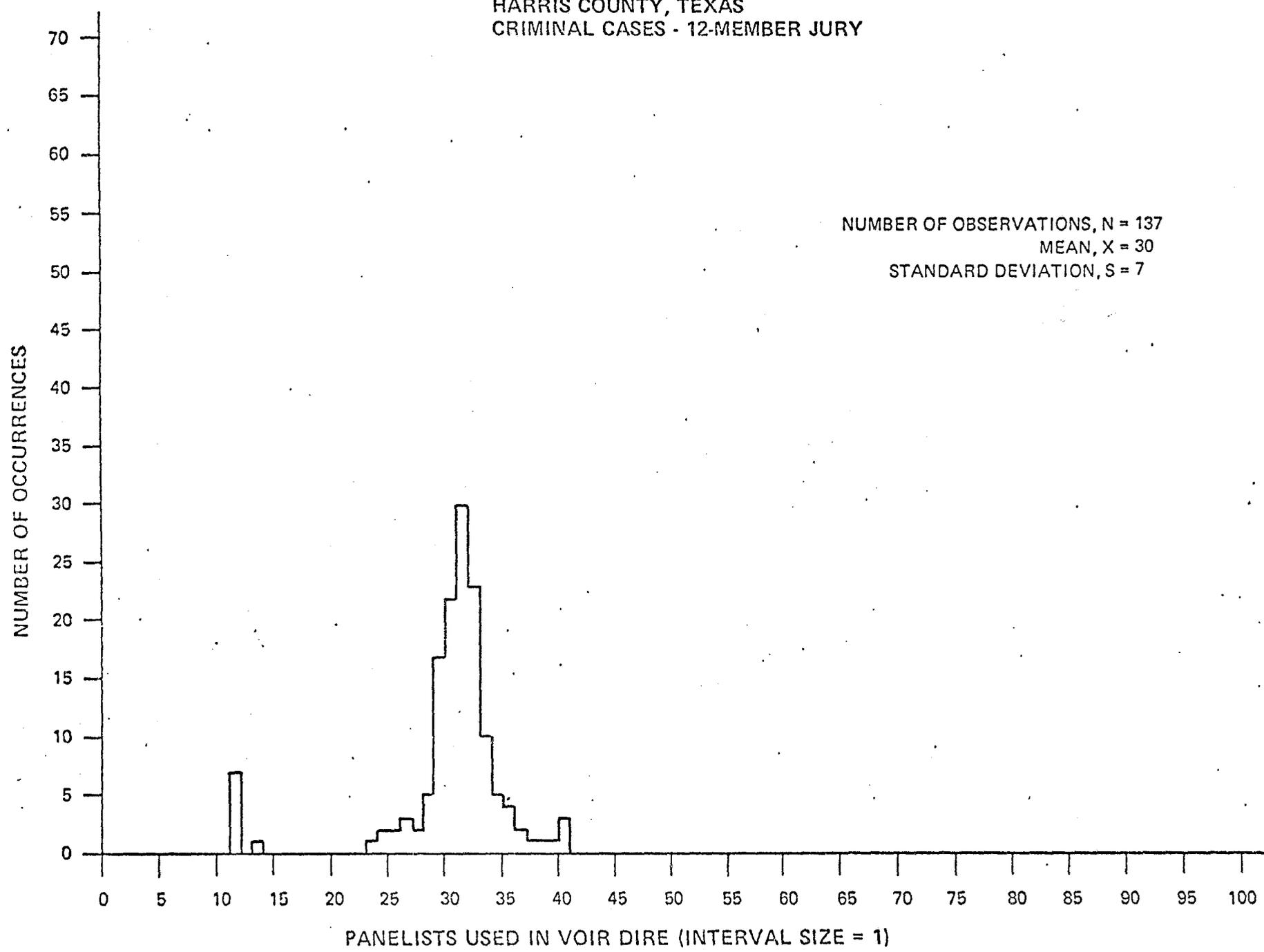


FULTON COUNTY, GEORGIA
CIVIL CASES - 12-MEMBER JURY

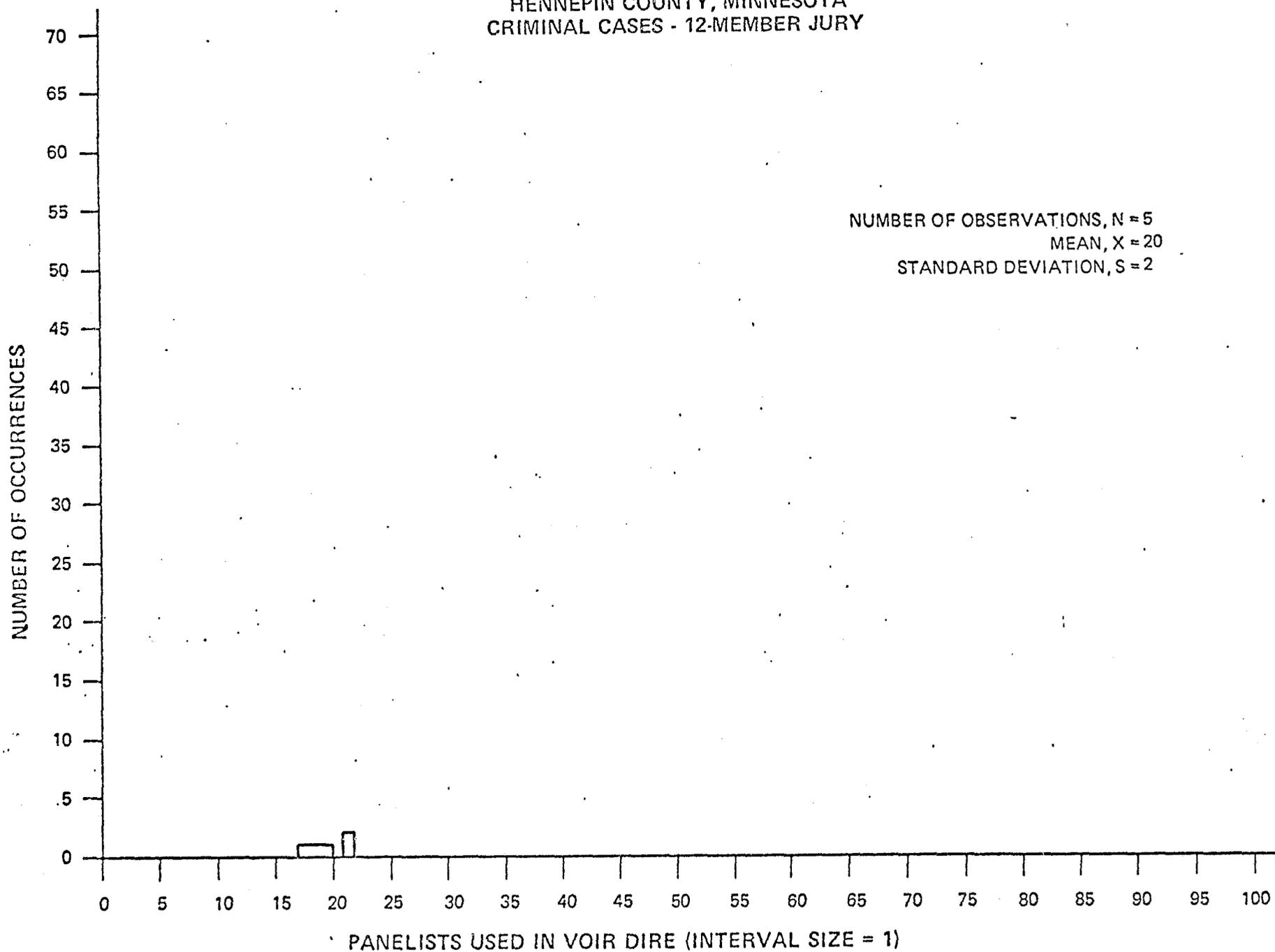
NUMBER OF OBSERVATIONS, $N = 131$
MEAN, $X = 25$
STANDARD DEVIATION, $S = 3$



HARRIS COUNTY, TEXAS
CRIMINAL CASES - 12-MEMBER JURY

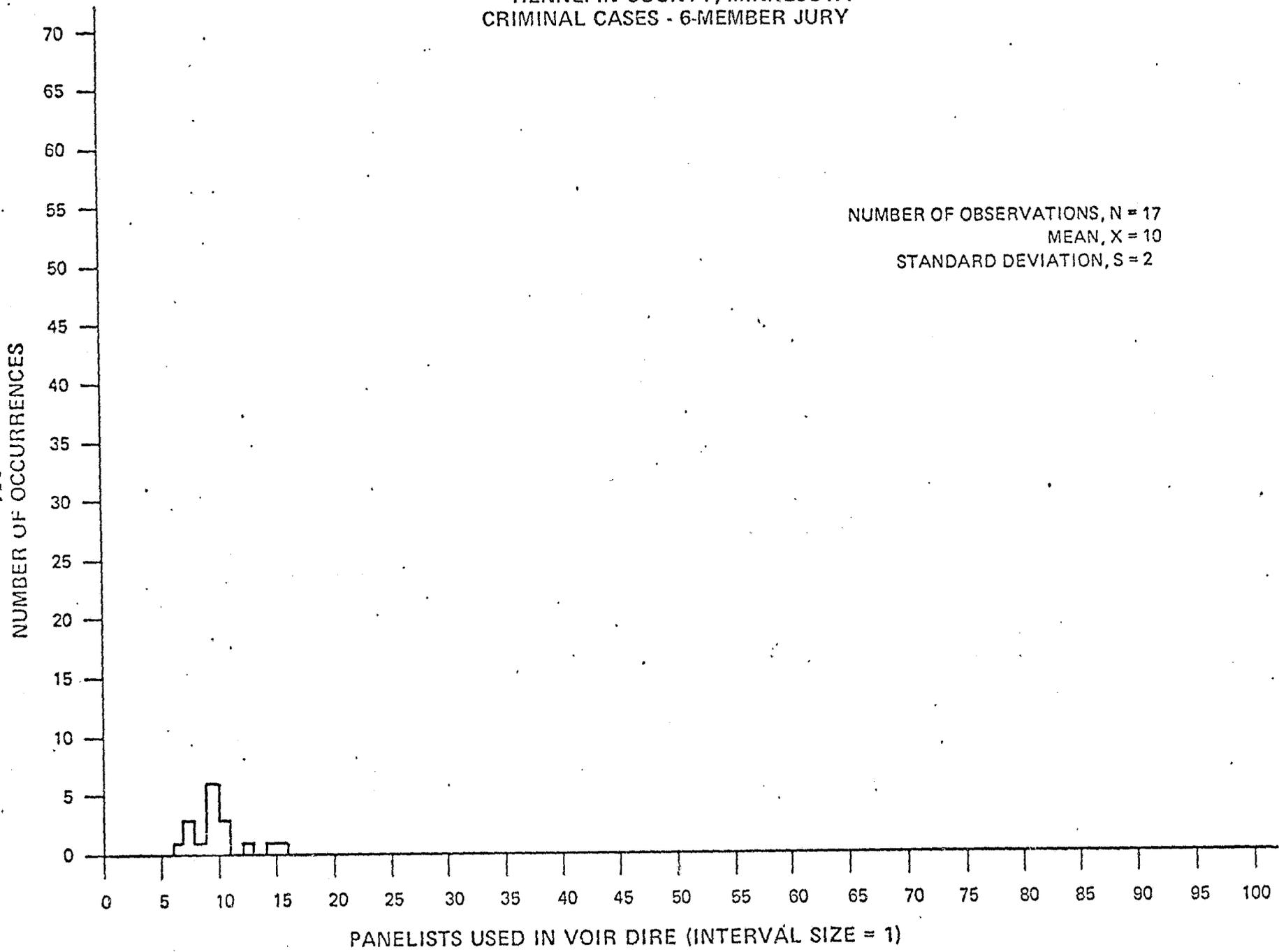


HENNEPIN COUNTY, MINNESOTA
CRIMINAL CASES - 12-MEMBER JURY



HENNEPIN COUNTY, MINNESOTA
CRIMINAL CASES - 6-MEMBER JURY

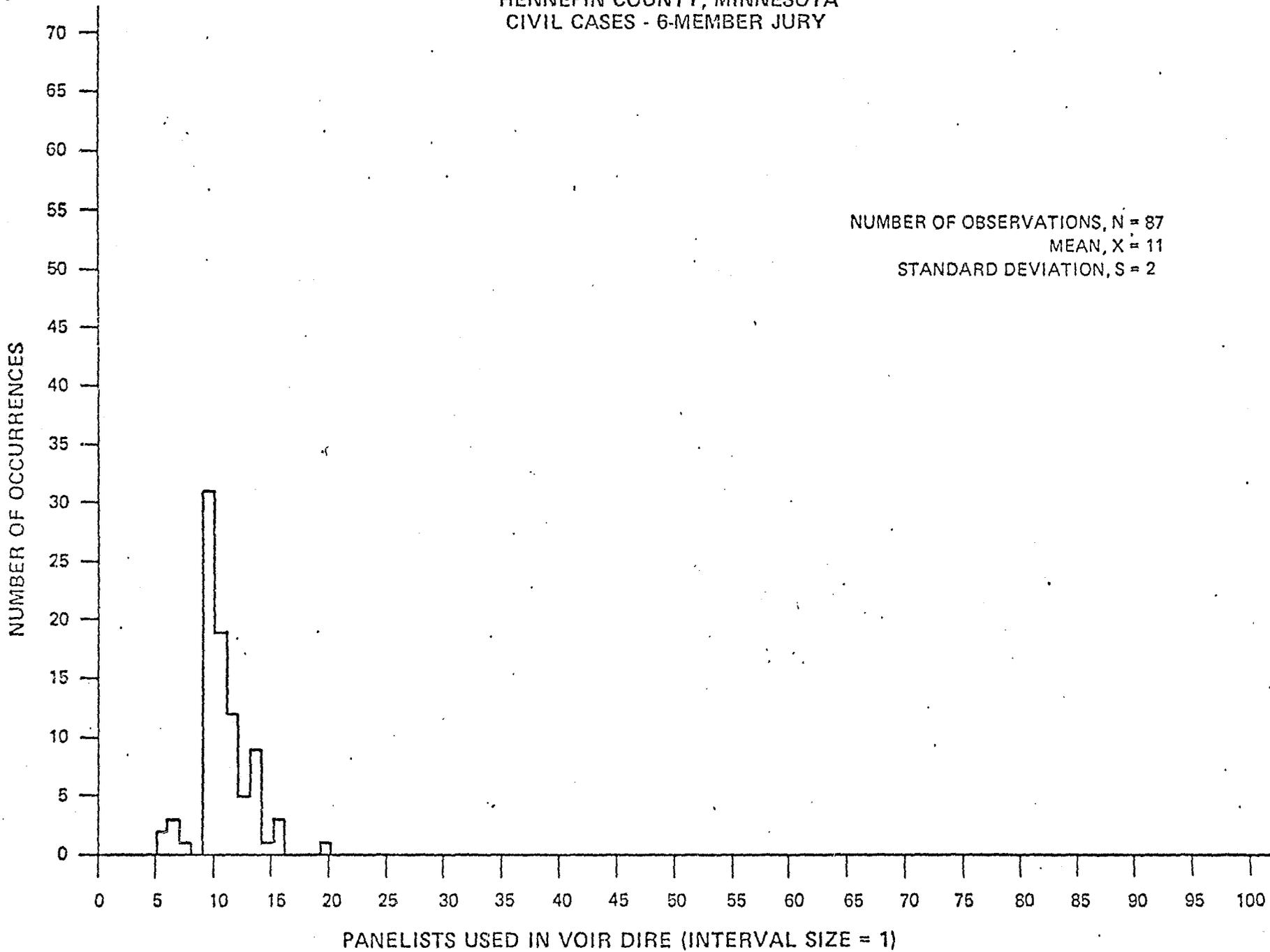
NUMBER OF OBSERVATIONS, $N = 17$
MEAN, $\bar{X} = 10$
STANDARD DEVIATION, $S = 2$



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HENNEPIN COUNTY, MINNESOTA
CIVIL CASES - 6-MEMBER JURY

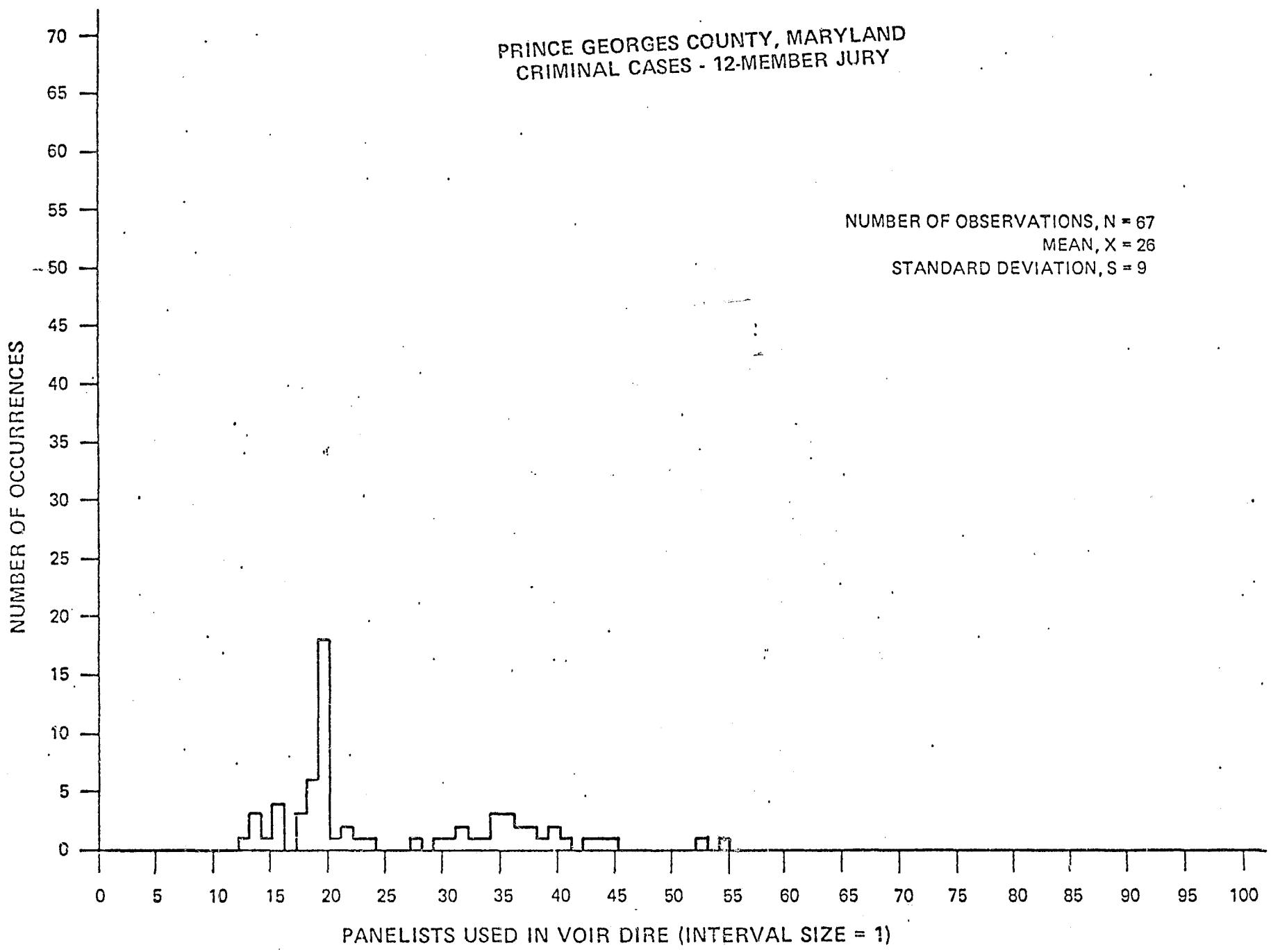
NUMBER OF OBSERVATIONS, $N = 87$
MEAN, $\bar{X} = 11$
STANDARD DEVIATION, $S = 2$



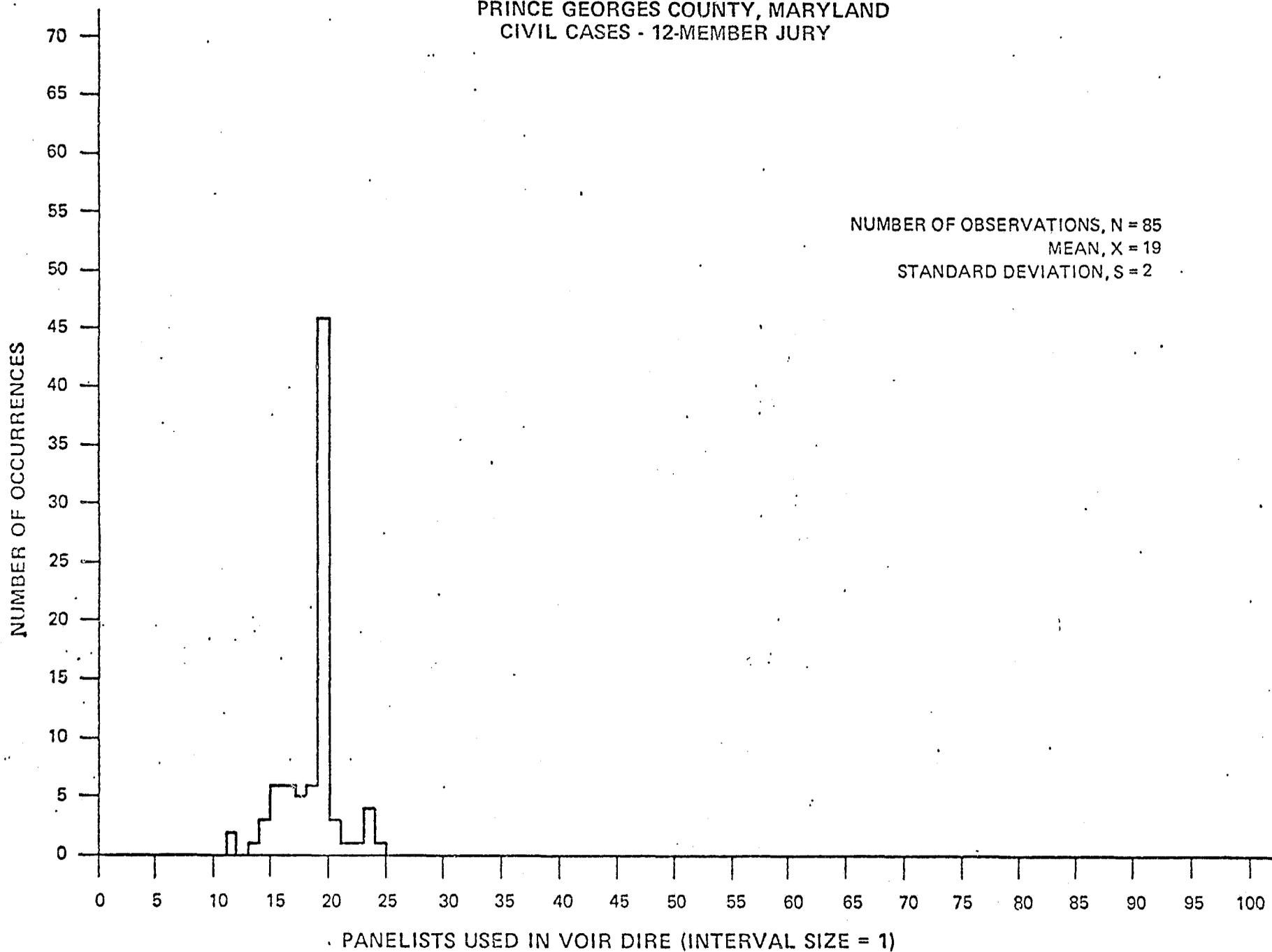
PANELISTS USED IN VOIR DIRE (INTERVAL SIZE = 1)

PRINCE GEORGES COUNTY, MARYLAND
CRIMINAL CASES - 12-MEMBER JURY

NUMBER OF OBSERVATIONS, N = 67
MEAN, X = 26
STANDARD DEVIATION, S = 9

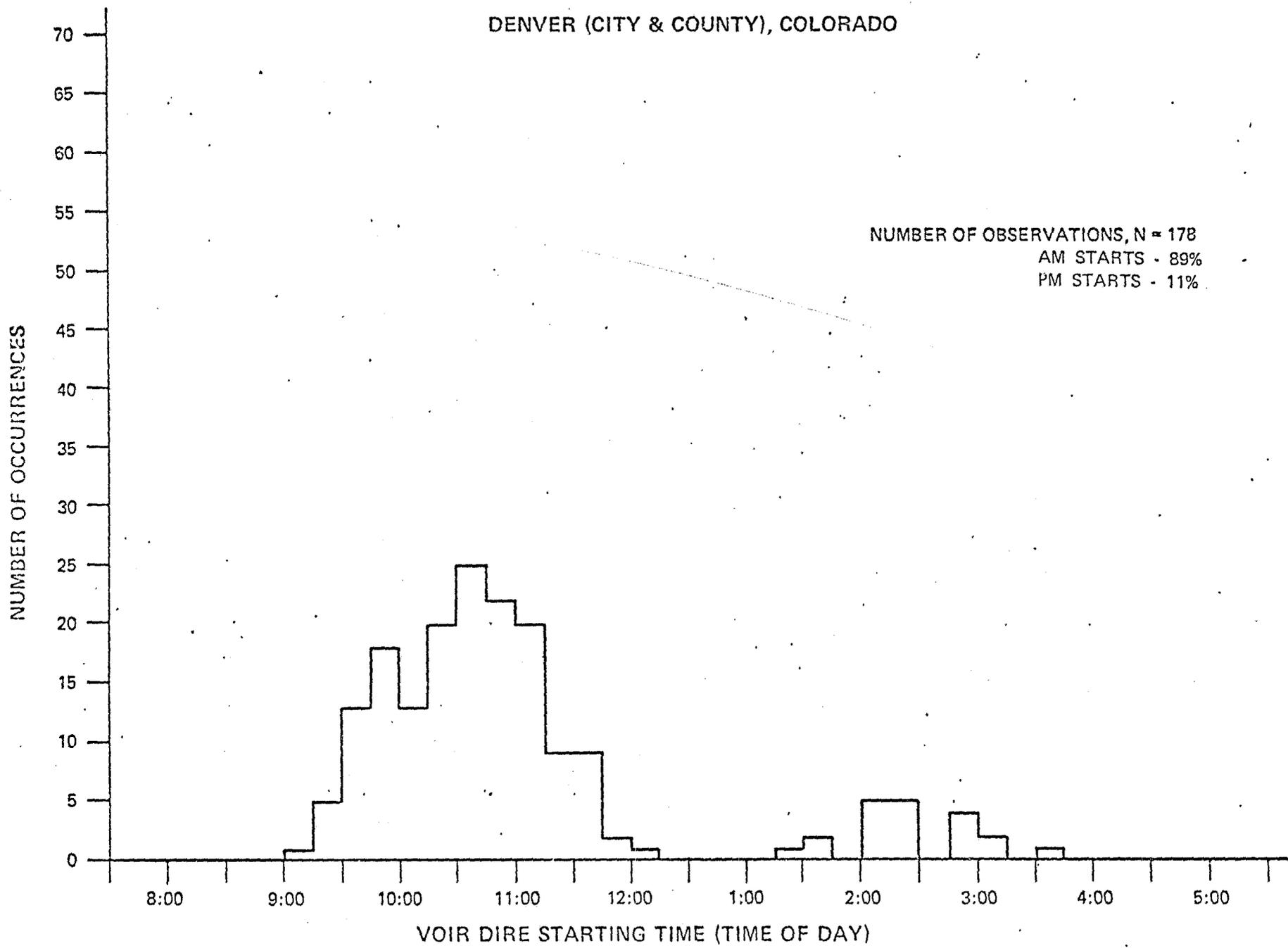


PRINCE GEORGES COUNTY, MARYLAND
CIVIL CASES - 12-MEMBER JURY

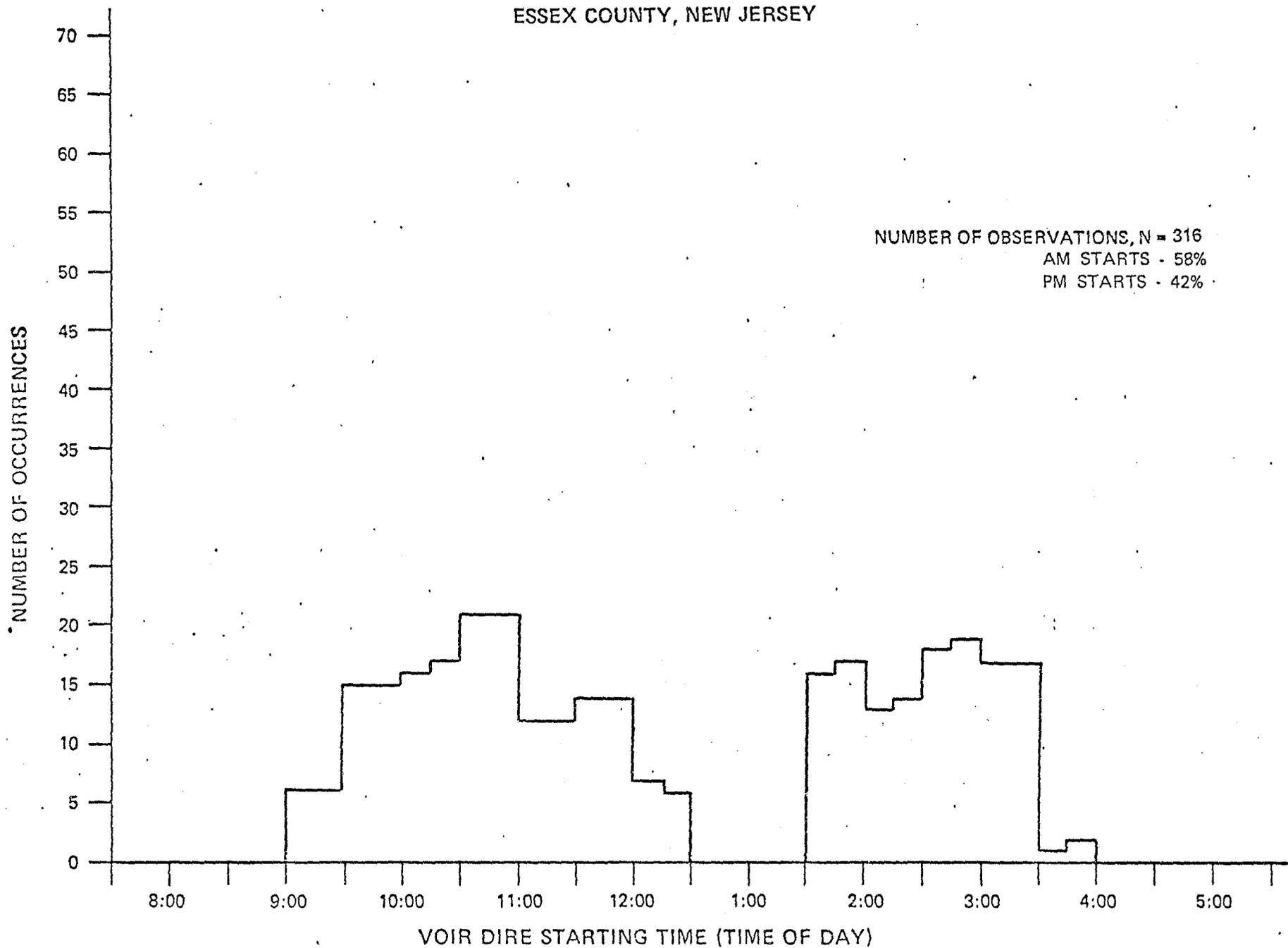


DISTRIBUTIONS OF VOIR DIRE STARTING TIMES

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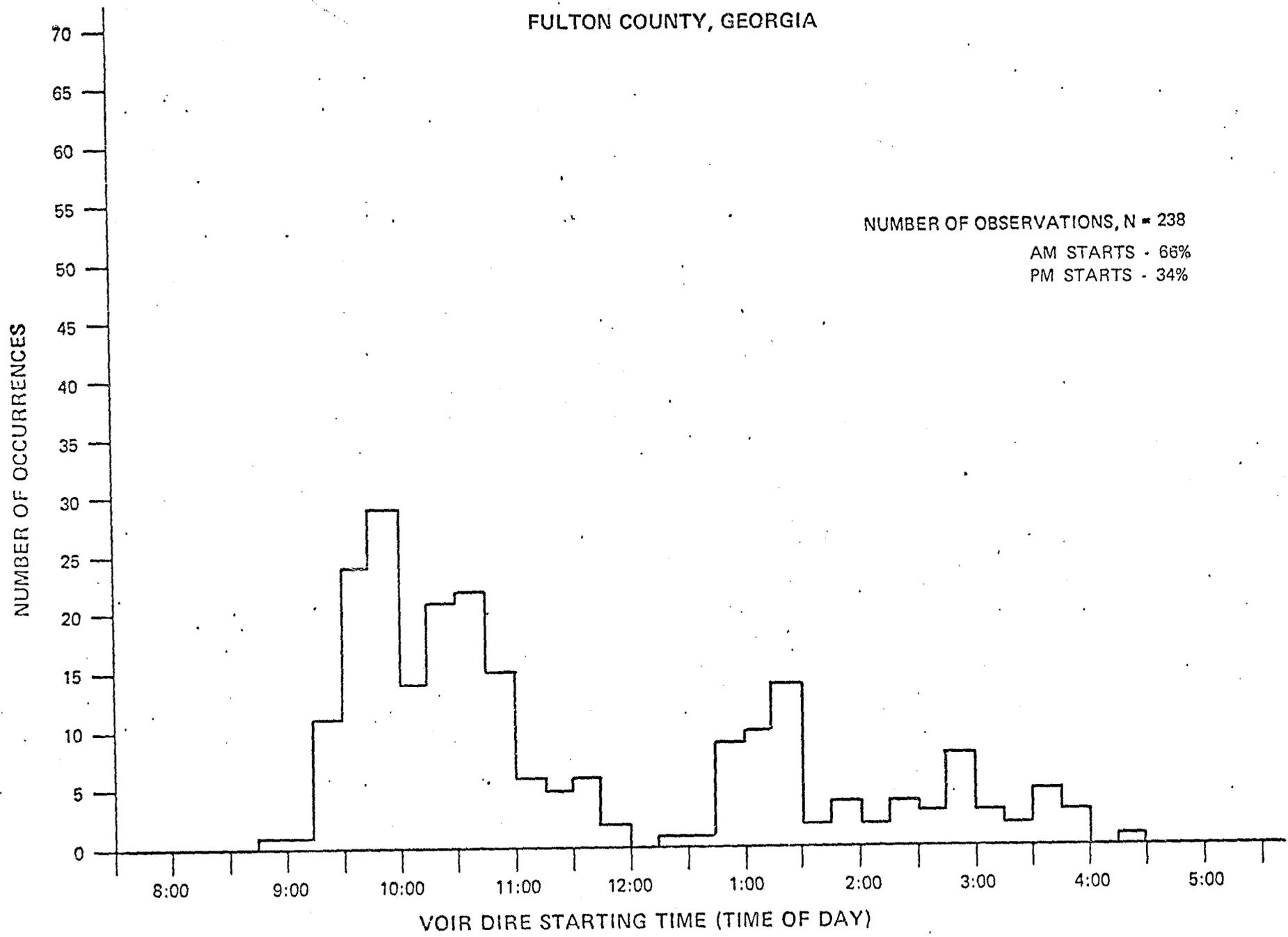


ESSEX COUNTY, NEW JERSEY

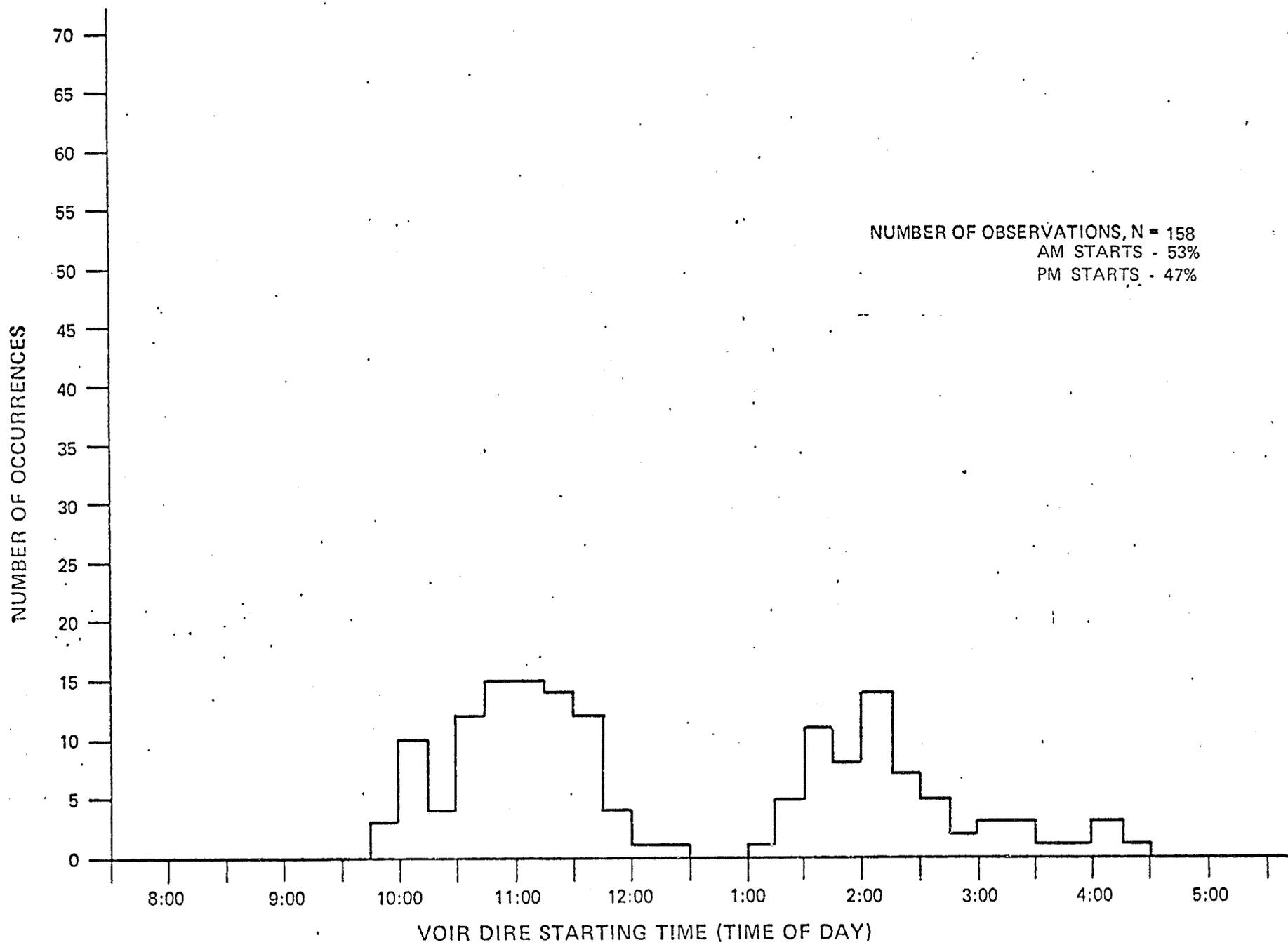


09

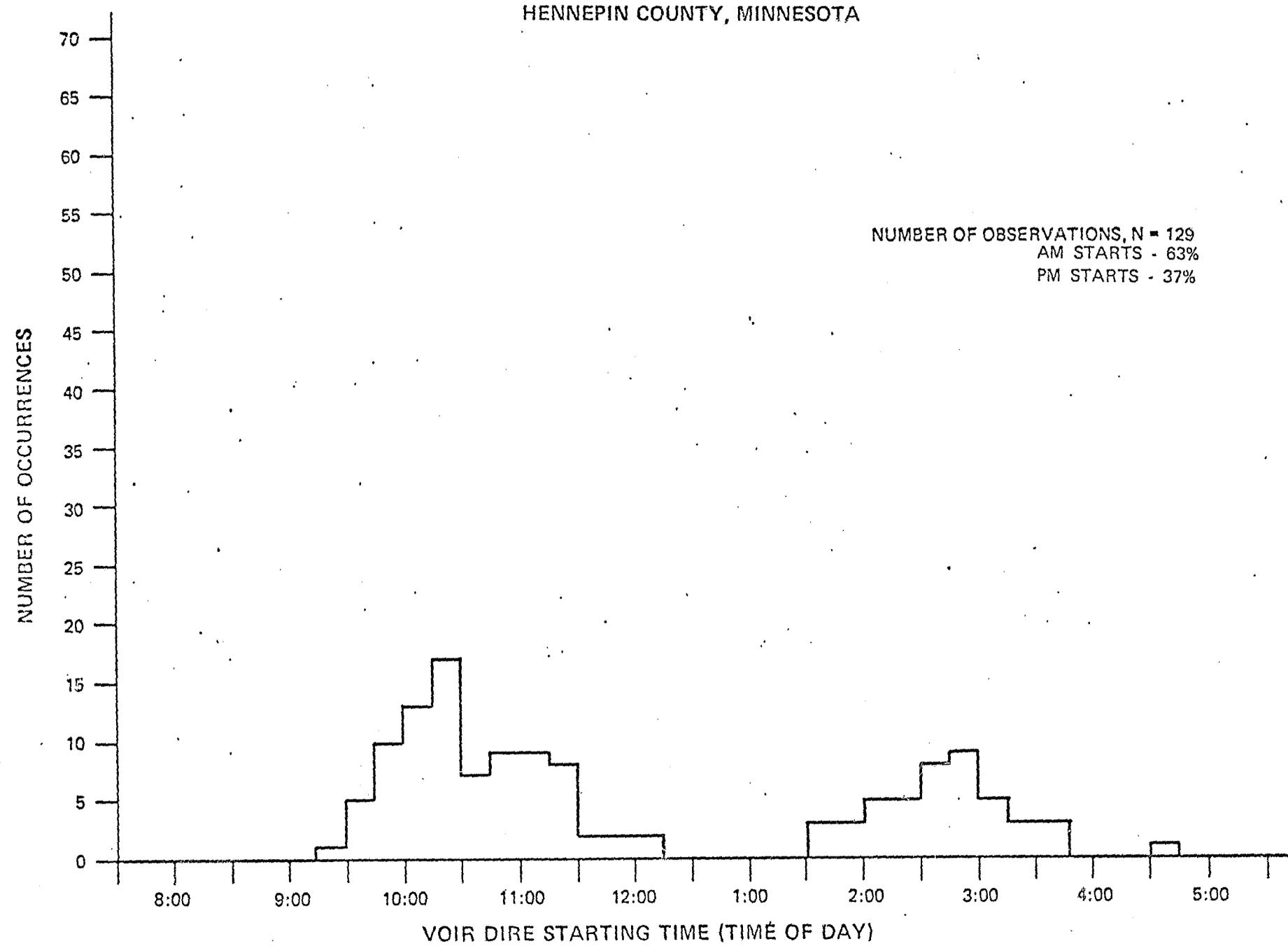
FULTON COUNTY, GEORGIA



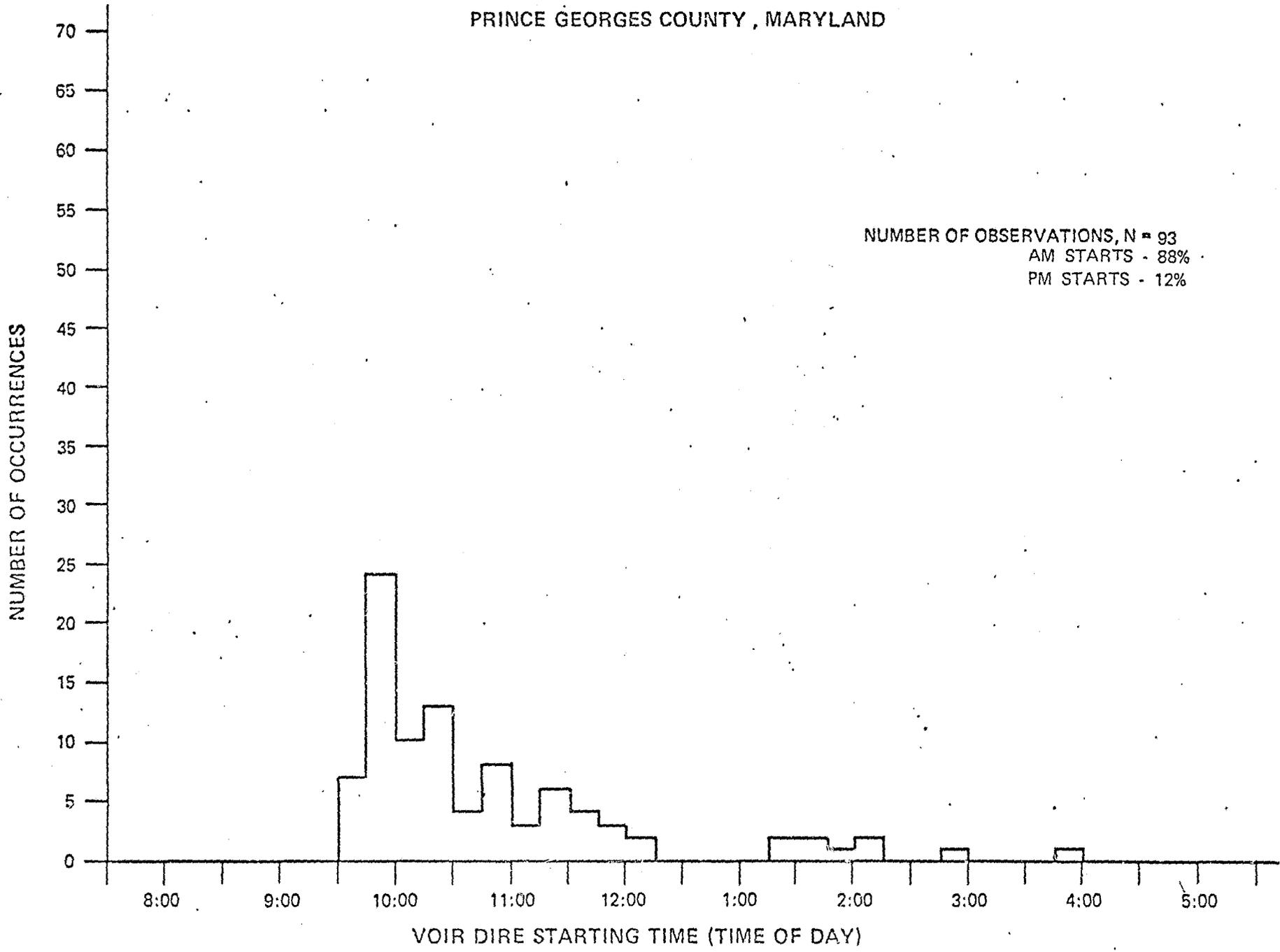
HARRIS COUNTY, TEXAS



HENNEPIN COUNTY, MINNESOTA



PRINCE GEORGES COUNTY, MARYLAND



END