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### An Evaluation of Roadside Litter

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POLLUTION

AN EVALUATION OF ROADSIDE LITTER

Presented To  
Dr. Joe Nix  
In Fulfillment Of  
Honors Program H-492

Rex Moreland Terry

August 25, 1972

## AN EVALUATION OF ROADSIDE LITTER

### LITTER--An Increasing Problem

In a society in which issues such as environmental protection, cleaner air and cleaner water are receiving increasing verbosity, the time appears ripe for a factual analysis of a too-little thought of problem connected with these issues--the problem of litter on the nation's highways.

Although only a fraction of total waste, litter constitutes the most visible waste since it is ever-present on our nation's increasingly traveled highways. Society has begun to look more critically at the litter problem. There have been clean-up campaigns, roadside barrels, signs warning the motorist of the impending penalty for littering; but the problem remains. These very positive steps have contributed substantially to the solving of the problem. But the fact remains that the minds of the general public need to be changed. The purpose of an evaluation of this nature is not necessarily to change the minds of our nation's automobile travelers, but to present many forms of litter, and perhaps the "why" of certain types of littering in a concise way. The evaluation should also reveal, generally, segments of the society from which the bulk of the litter comes. Perhaps if enough data is presented on this subject, people will be brought to a consciousness about litter and will stop unconscious

littering. This would contribute to the mind-changing process.

#### EXPERIMENTAL PROCEDURES

The evaluation was conducted by using a simple data sheet (Table I) with seventeen divisions representing various broad categories of litter. Ten different highway locations were used for the collection of data. The locations were recorded at the top of each data sheet in the space provided. Also recorded were the number of miles surveyed at each location, so the total number of miles of the entire survey could be determined.

Of the seventeen general categories, beer containers occurred most frequently in the survey. The next most frequent was the snacks category. This category included paper cups, candy wrappers, marked drive-in sacks, small milk containers and any items that could have been eaten as snacks, including grocery store items. This category covered the broadest base of litter, and only lacked one-half of one percent occurring as frequently as the designated beer containers category.

A soft drink category was included to cover soft drink cans and bottles. Auto utensils and accessories was meant to include such automobile items as broken belts, motor oil cans and hub caps. The household food containers category included only those containers from the grocery store, not small sacks, which would have been included in the snacks category.

After the initial survey was taken, it was realized that

a category to account for houseware items would be needed. Household hardware is the general term that was used to cover five smaller categories of litter used in the home: Glass, metal, plastic, paper, clothing and rags. Only what appeared to be perhaps a broken window pane or a drinking glass was counted in the glass category. Aluminum foil was many times counted under metal, because of its almost exclusive use in the home. Glass and metal were two of the most infrequent categories.

Anything fashioned of plastic for household use was included in the plastic category from a plastic ruler, to a discarded appliance. The most frequent item in this category was the plastic bag.

Paper appears twice on the data sheet, but in this category it is limited to home use. Since paper sacks were virtually eliminated in this category (because they were contained for the most part in snacks and household food containers), the category relied almost exclusively on such items as kleenex tissue and paper towels, but was by far the most frequently occurring category in the household hardware section.

Clothing and rags was a seldom-occurring category for items such as old shoes, pieces of tattered clothing and other old rags. Farm products oftentimes overlapped some of the other categories, such as plastic, paper or automobile utensils and accessories. For example, a paper sack labeled as a livestock feed, although paper, would

appear under the farm heading. This, then, was largely a judgement column, depending on whether the item appeared most frequently on the farm.

Smoking refuse was designed to include not only cigarette and cigar waste, but empty cartons, cigar boxes, and matches as well.

Processed paper, the category in which paper appears for the second time, was designed to contain any printed matter. It encompassed all newspapers, magazines, and other printed paper such as personal checks, order blanks, cards, and envelopes.

Liquor bottles is quite self-explanatory. It should be noted that liquor was separated from beer in the survey. Ice containers was almost an after thought in the data sheet. It could have easily been counted in the designated beer containers category, or in snacks, but it was made a separate entity. It occurred second to the least number of times in the survey.

Building material included such things as nails, shingles, pieces of lumber, and tools.

Every conceivable form of litter having been categorized, a last category marked simply "other", was included in the event any item had been slighted. This category occurred the least frequently with such items as fishing lures and shotgun shells.

## PRESENTATION OF DATA

The method by which data would be tabulated having been established, surveys were taken and data recorded at ten different sites on six highways from the Arkadelphia and Clark County area.

Arkadelphia is located in Clark County, Arkansas, seventy miles southwest of Little Rock. It is about thirty-five miles south of Hot Springs, and is located along the main route from Little Rock, to Texas. Arkadelphia has a population of about 10,000, including two colleges. The city is located in a county where liquor is prohibited, the nearest "wet" county being Garland County. Arkadelphia has very good public school facilities and a number of churches and many civic organizations can attest to the fact that the city harbors a healthy atmosphere of community interest and civic pride.

Highway 7 is the road to Hot Springs to the north and Camden to the south. It is a very heavily travelled road leading north to the county where liquor and horse racing are permitted. For this reason, more data was taken from this highway than any other (Table II).

Highway 67 is a United States highway that is the old main route through Arkansas. While still a heavily travelled road, it has been recently replaced by the Interstate System as the main thoroughfare.

Highway 8 West is the most direct, although not the quickest, route from Arkadelphia to the Oklahoma border.

Location \_\_\_\_\_

DESIGNATED BEER CONTAINERS \_\_\_\_\_

SOFT DRINKS--cans and bottles \_\_\_\_\_

SNACKS--paper cups, candy wrappers,  
marked sacks, small milk \_\_\_\_\_

AUTO.utensils & accessories \_\_\_\_\_

HOUSEHOLD food containers \_\_\_\_\_

HOUSEHOLD HARDWARE (a)glass \_\_\_\_\_

(b)metal \_\_\_\_\_

(c)plastic \_\_\_\_\_

(d)paper \_\_\_\_\_

(e)clothing & rags \_\_\_\_\_

FARM Products \_\_\_\_\_

SMOKING REFUSE \_\_\_\_\_

PROCESSED Paper \_\_\_\_\_

LIQOUR Bottles \_\_\_\_\_

ICE Containers \_\_\_\_\_

BUILDING Material--wood, shingles \_\_\_\_\_

OTHER \_\_\_\_\_

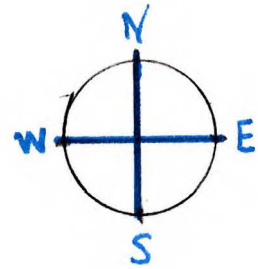
TABLE I  
Data Sheet



TABLE II Ten locations covered by survey marked by red points. ●

Source: 1971 Highway Map of Arkansas  
Prepared by Arkansas Highway Department

Scale: One inch equals approximately thirteen miles



Amity, a small town in the foothills of the Ouachita's and close to the Caddo River, is only thirty miles from Arkadelphia on Highway 8.

Highway 51 is a much less travelled road than the other selections. It is almost exclusively contained in Clark County, and serves such small towns as Okalona and Joan.

Old Military Road, is a local road that crosses Interstate 30 approximately four miles north of Arkadelphia at the Caddo River. It is popular with local residents, especially students as a road leading to favorite swimming and fishing spots on the river.

After observing and tallying litter content at each location, a sum total of items was recorded on the data sheet. At the end of the survey, the total number of items of litter and the total number of miles were available.

Highway	Number of Locations	Total Miles	Total Items Of Litter
7 North	3	1.2	1431
67 South	2	1.2	934
7 South	1	.4	442
8 West	2	1.2	1183
51 East	1	.4	201
Old Military Road	1	.4	319
TOTALS	<u>10</u>	<u>4.8</u>	<u>4510</u>

TABLE III

Upon the completion of the survey, a series of six lithograms were constructed, (Table IV), representing the six highways included in the survey. In each lithogram, the seventeen categories were represented, each being a certain percentage of the total number of items of litter for the respective highway. These lithograms represent the focal point of the entire survey and constitute the most

TABLE IV  
Graphs Representing the Six Highways in the Project

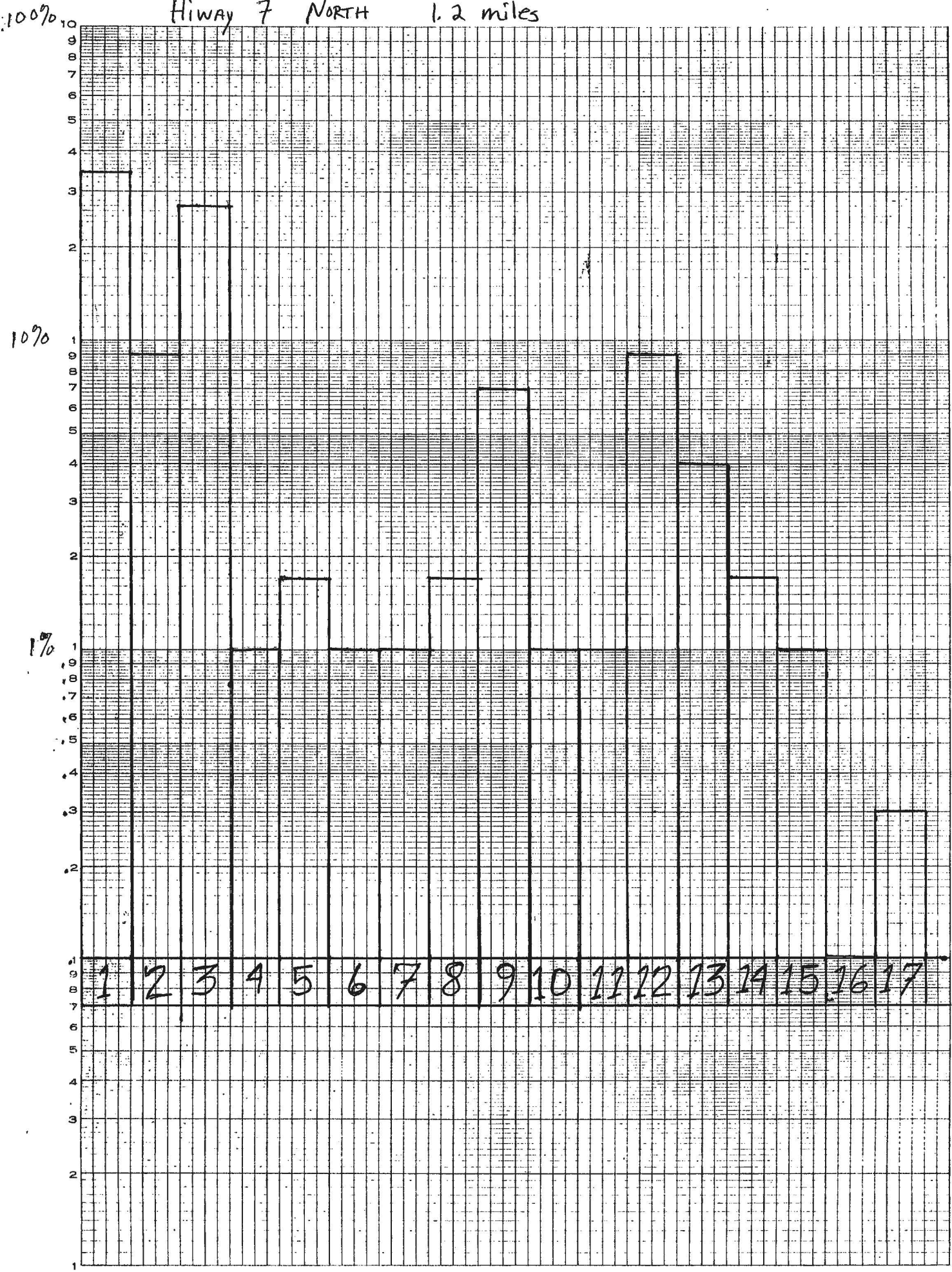
Legend

The numbers at the left of each page and reading vertically represent percentages of each category, and range from .1%-100%.

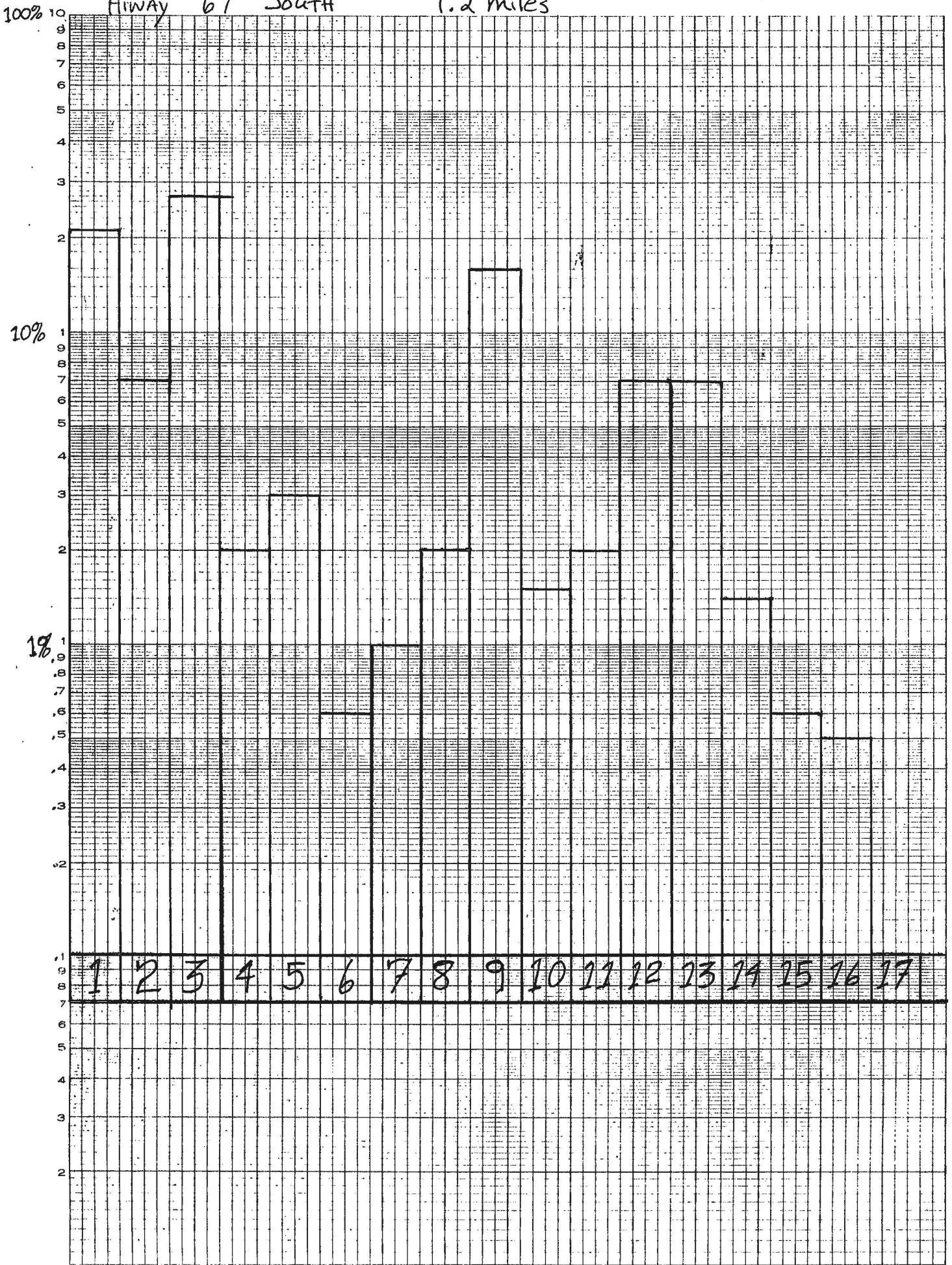
The numbers 1-17 reading horizontally across the bottom of each graph represent the following categories:

- 1--Designated beer containers
- 2--Soft drinks
- 3--Snacks
- 4--Automobile utensils and accessories
- 5--Household food containers
- 6--Glass
- 7--Metal
- 8--Plastic
- 9--Paper
- 10--Clothing and rags
- 11--Farm products
- 12--Smoking refuse
- 13--Processed paper
- 14--Liquor bottles
- 15--Ice containers
- 16--Building material
- 17--Other

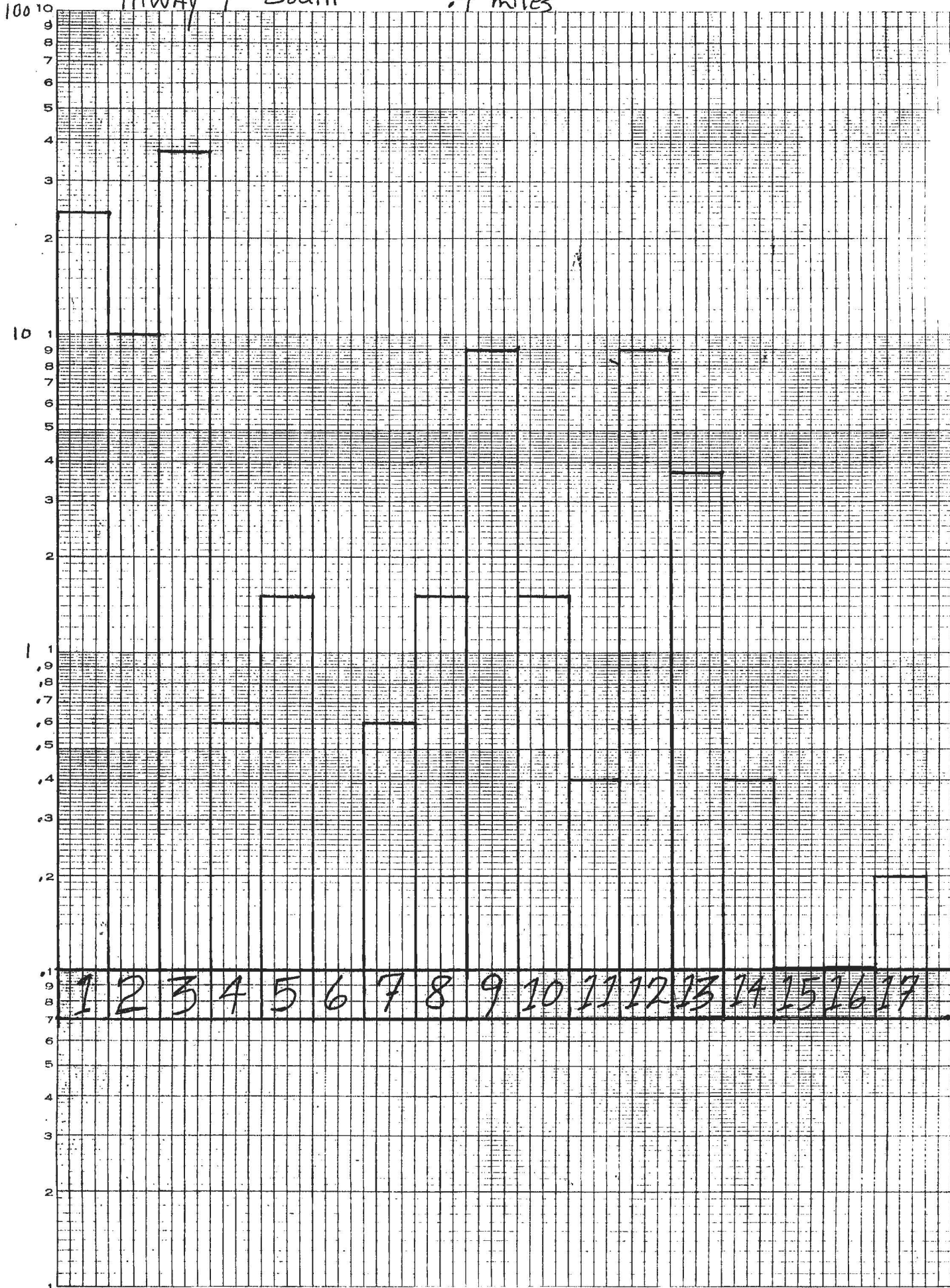
Hiway 7 NORTH 1.2 miles



Hiway 67 South 1.2 miles

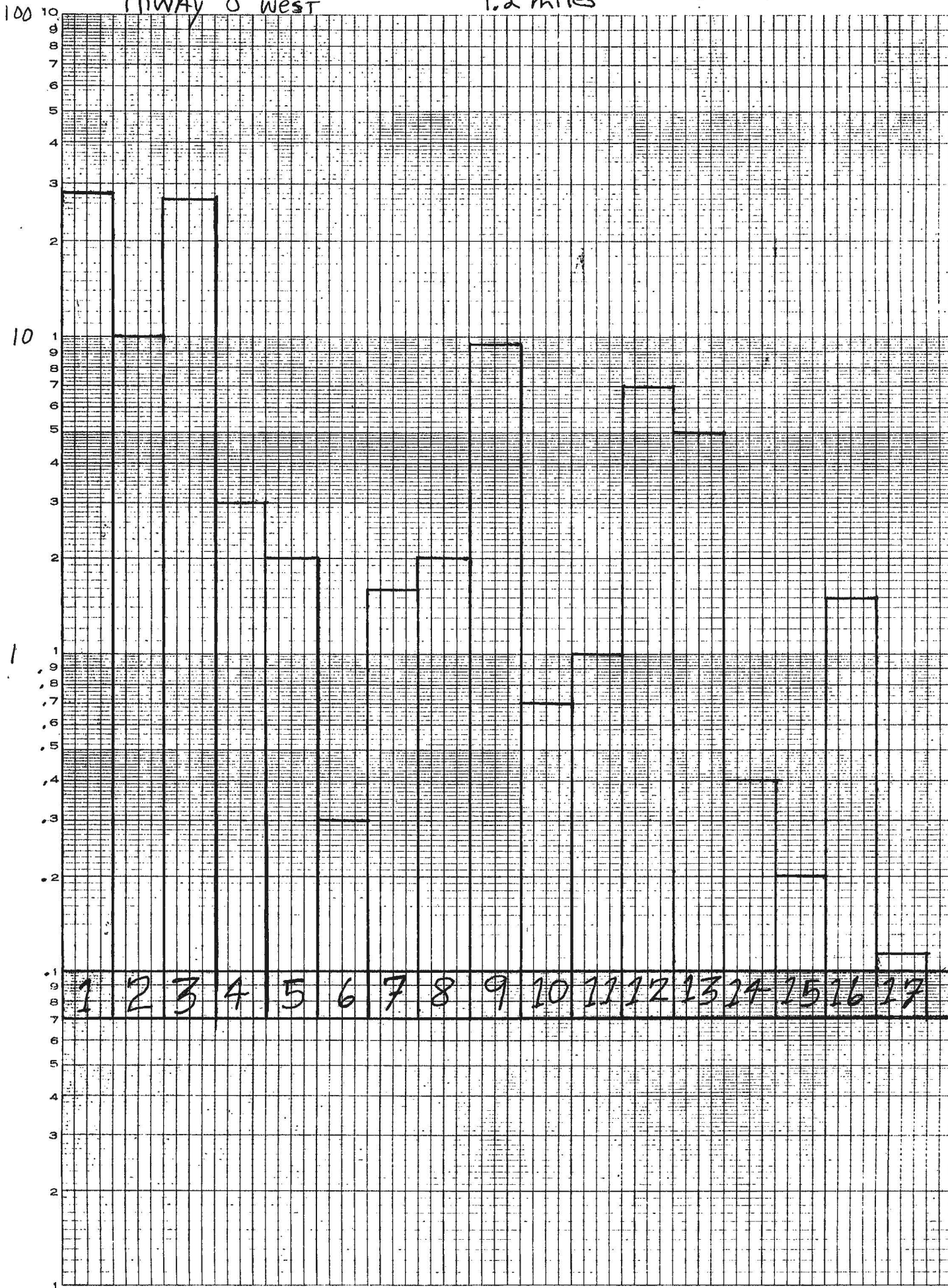


Hiway 7 South .4 miles



Hiway 8 west

1.2 miles



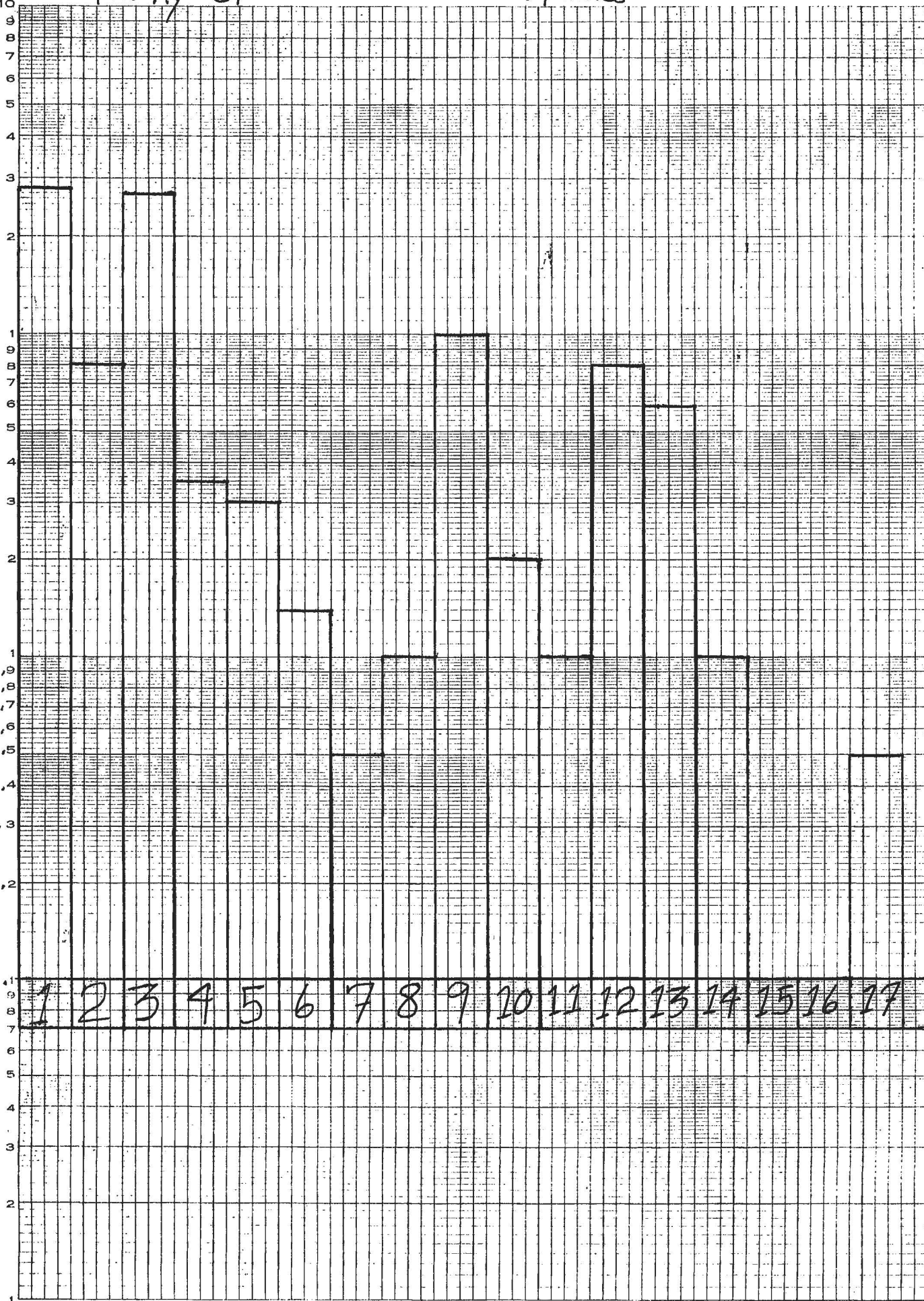
100  
10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
1  
9  
8  
7  
6  
5  
4  
3  
2  
1  
9  
8  
7  
6  
5  
4  
3  
2  
1  
1  
9  
8  
7  
6  
5  
4  
3  
2  
1

Hiway 51

.4 miles

10

1





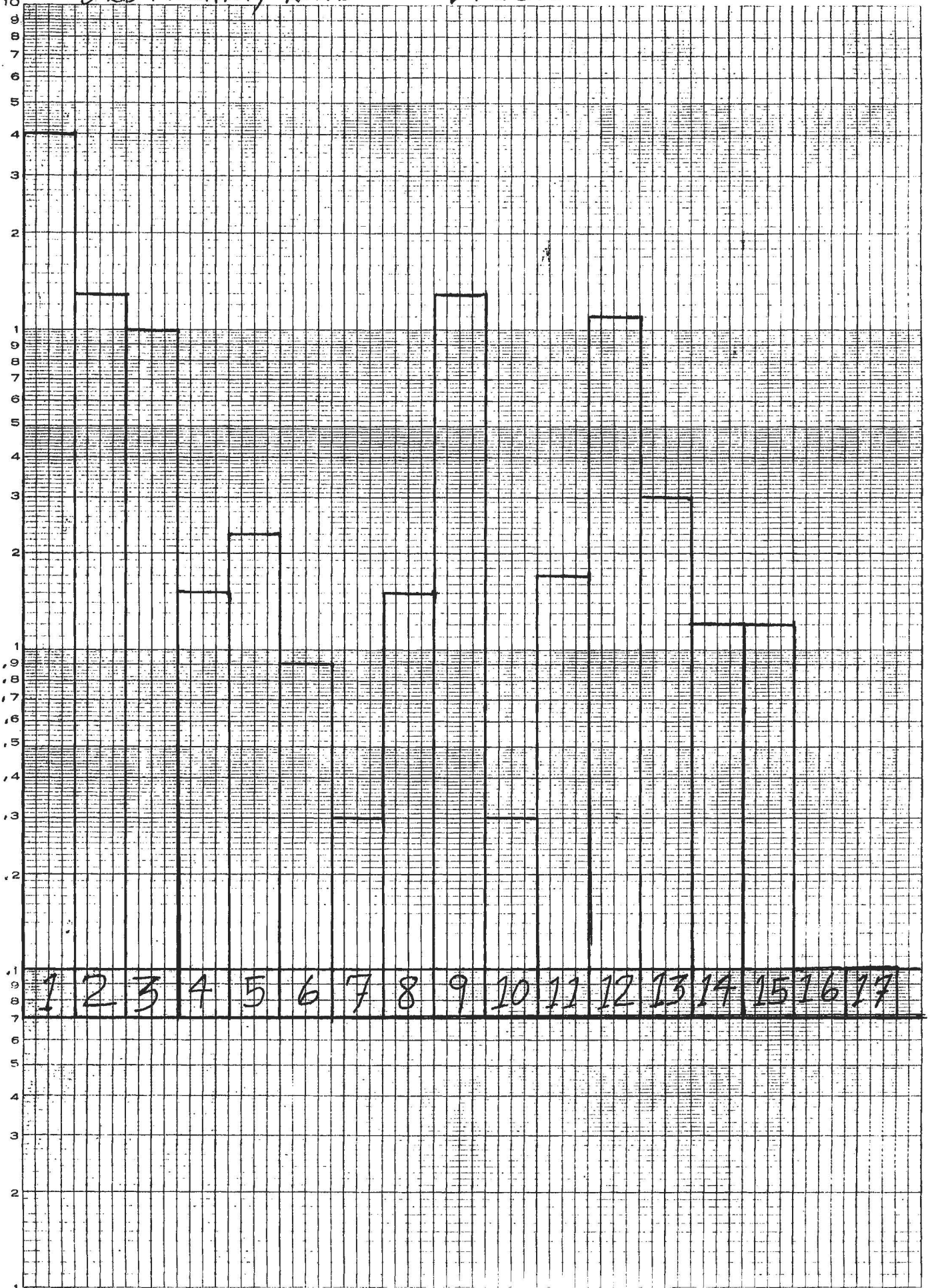
100

# OLD MILITARY ROAD

4 miles

10

1



revealing aspects of the project.

## RESULTS AND DISCUSSION

In every case, two categories--beer and snacks--were by far the front runners. Since snacks is such a broad category in the volume of litter it contains, it is somewhat amazing that the beer category led every highway except two--Highway 67 South and Highway 7 South.

It was expected that Highway 7 North to Hot Springs would yield the highest percentage of alcoholic beverage refuse, since it is the highway to and from the nearest "wet" county. But, in fact, Old Military Road contained a higher percentage of beer cans (40%) than Highway 7's percentage of beer containers and liquor bottles added together. This is probably caused by the fact that this is a rather isolated road, used only by residents of the surrounding area. It is not a state supported road, and naturally doesn't have as much traffic as other highways, especially in the evening hours. The assumption here is that this road is popular with college students who desire an unmolested location for drinking. Not only does Old Military Road lead in percentage of beer containers, it is also first in ice containers, a somewhat related category, a close third in liquor bottles, and first in smoking refuse. These facts seem to bear out the previous assumption of the nature of the road.

It is interesting to note that the two smallest percentages of beer containers were found on the two southbound highways

included in the survey (7 and 67). This fact can be related to the fact that Arkadelphia as well as Clark County is a "dry" area.

Highway 51, a small state road, shared the lead in the household food containers with Highway 67 South. The smaller road should have been stronger in domestic litter of this nature than the larger roads, one would think, but the difference in them is not substantial.

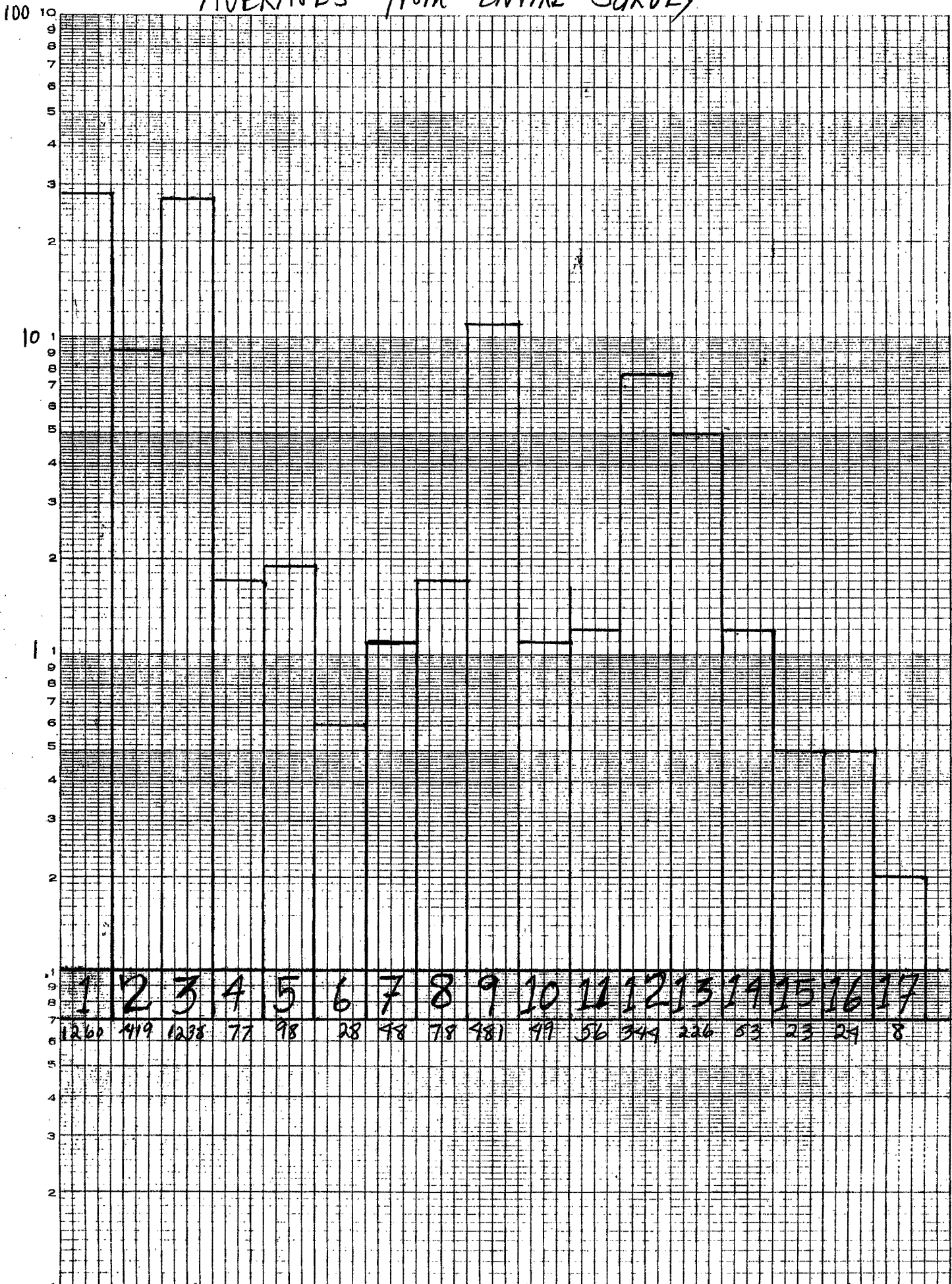
One category that has <sup>been</sup> slightly overlooked up to this point, is that of soft drinks. Throughout the survey, it was one of the most consistent categories, usually running a distant third behind beer and snacks, with one exception, when it actually ran in front of the snacks category on Old Military Road.

The six lithograms proved to be amazingly similar. As was pointed out earlier, certain roads were expected to produce very different amounts of various categories than other highways, for example, the expected higher percentage of beer containers on Highway 7 North. But the similarity of distribution is a very distinct fact throughout each lithogram.

To provide an over-all perspective of the survey, one lithogram has been included that contains averages of all highways--the total number of items of litter for each category as opposed to the total amount of litter for the entire survey (Table V). It is obvious that beer and snacks lead all the other categories. Beer containers had a very

TABLE V

# AVERAGES from ENTIRE SURVEY



SURVEY INCLUDED 4,510 items. UNDER EACH CATEGORY NUMBER is the total number for that category.

narrow over-all lead--only one-half of one percent in the final analysis. The last place category, of course, was the one entitled "other." The least frequently occurring significant categories were ice containers and building material.

#### CONCLUSION

The surest way to eliminate the problem of litter is to attack the source of the larger items of litter. Perhaps an advertising campaign at all liquor stores against littering would be effective. Most breweries contain on their products a request of "Please don't litter," but apparently this form of advertising hasn't worked as well as we would like. Perhaps a nominal deposit charge even on the aluminum cans would help solve the problem. This would be drastic, considering the recent onslaught of no deposit, no return containers, but perhaps we need drastic change to correct the problem.

There is a penalty in our state for littering highways. But how many times have we seen this penalty enforced on our acquaintances or even on ourselves? There should be a "crackdown" by the state police in this area. This would be instrumental in solving the problem.

Perhaps a tax on snack items that are taken from the drive-in or grocery store would be effective. It would be very difficult to enforce any tax or deposit law on snacks, but since this represents the second highest number of all litter, it would be worthy of consideration. Also, packaging of the snacks could be changed. There are so many wrappers and sacks on some snack items, that they become cumbersome

when put in the automobile litter bag.

A new item in industry and the home for garbage disposal is the compactor. Perhaps roadside compactors would be helpful. This is a very clean way of disposing of litter. A roadside shredder may also be practical. Indeed, roadside barrels don't catch all of the trash of travellers, but these new slants on this theory would provide some degree of enjoyment and sense of duty by the depositors of the litter.

The most practical as well as one of the newest forms of litter disposal is reclamation. When we realize that a can or bottle or even an old newspaper can be recycled and still be useful, perhaps we won't as readily dump the item on the highway. Recycling has already proved its worth.

Arkansas has very serviceable and scenic highways. The problem of litter is not so large that it cannot be alleviated or even eradicated. A television advertisement sums the problem up nicely--"Litter is too nice a name for trash." We can clean up our highways if steps such as these in the education process of people to the problem continue.