There are many types of traffic studies that can be done by local highway agencies to provide helpful information. Four of these studies — turning movements, speeds, classification, and traffic volumes — will be discussed briefly here.

Turning movement studies are for the purpose of evaluating specific problem intersections. Some of the reasons for the evaluation might be excessive delay in one or more approaches to the intersection or a high number of accidents at the intersection. If a traffic signal is currently in operation at the location, turning movement studies may help in determining whether or not a turn signal phase should be utilized.

Turning movement studies are generally done manually, and can be as simple as using a clipboard and pencil. Complex "intersection counters" are available which compile data on up to forty-eight movements at one intersection. Data collected in these studies can be evaluated by traffic engineers to help in upgrading the specific intersection.

Turning movement studies can be conducted for any desired duration — one hour, two hours, eight hours, etc. — but normally should be collected for the period of time which includes rush hour traffic at that location, because obviously that is the period when the problems would be most severe.

Speed studies are for determining the speeds of free-flowing vehicles at a particular location. By free-flowing we mean those vehicles which are travelling at their own speed, not being influenced by the vehicles in front of, or behind, them. The speed of only the first vehicle in a platoon should be measured, because the trailing vehicles may not be travelling at their desired speed.

Speed studies may be conducted in several ways. Radar may be used, provided the user is inconspicuous enough that the vehicles do not slow down prior to being measured. Spot speeds may be determined manually, by measuring a distance on the ground and timing, with a stop watch, the vehicles as they pass through that distance. Automatic counters may be used, using road tubes placed a certain distance apart.

Data from speed studies should be collected for a sufficient number of vehicles to provide a representative sample of vehicle speeds, and should be included for trucks, buses, etc. — generally in proportion to their existence in the traffic stream.

Speed studies may be used for many purposes. Some of these include:
1. Maximum or minimum speed limits.
2. Advisory speeds.
4. Study of high-accident locations.
5. Before and after studies of improvements.
6. Analysis of complaints.
7. Analysis of speed trends over time.
Normally, speed limits are established to conform approximately to the 85th percentile speed. If all of the speeds collected are arranged in descending order, the 85th percentile speed is the speed which is exceeded by only 15% of the vehicles.

Vehicles classification studies involve determining the mix of the vehicles stream — how many (or what percentage) passenger cars, trucks, buses, etc. The breakdown of vehicle types can be as simple or as sophisticated as desired. The Federal Highway Administration uses thirteen classifications including motorcycles, passenger vehicles, buses, single unit trucks, 7 or more axle multi-unit trucks, etc. These studies are generally done manually over a short period of time — one or two hours — or they are done using one of the automatic classification counters which use road tubes, and can provide data for an extended period of time.

The primary purpose of classification studies for local highway officials is simply to provide information on the percent of trucks using a specific road or street, to provide guidance on pavement design if an improvement is scheduled.

Traffic volume studies are the most important studies for local street and highway officials. A volume counting program should be utilized in which every street and road segment is counted every few years (two years, three years, five years) to provide, over a period of time, historical data which will show trends in traffic volume growth.

Traffic volume data is recorded as vehicles per day, and is usually listed as ADT — average daily traffic. ADT will be discussed in some detail later on. Traffic volumes, together with classification data, provide the basic information needed by local highway agencies to make intelligent decisions regarding the priorities for improvements to their street and highway system.

Many different types of equipment are available for use in collecting traffic data. When HERPICC at Purdue started its "Traffic Data Collection Project" in which equipment was acquired and then loaned to local highway agencies for their use, equipment was purchased from the Golden River corporation and the GK Company. The list of companies mentioned here is not intended to be all-inclusive, nor is it intended to be an endorsement of the products manufactured by these companies. It is intended simply to provide a representative sample of the types of equipment currently on the market. In addition to Golden River and GK equipment, Diamond Traffic Products makes Traffic Tally equipment, Data Acquisition, Inc. produces MicroCounts equipment, and the Mitron System Corporation produces Mitron equipment.

Traffic data equipment available ranges from the very simple to extremely sophisticated. The sophisticated equipment utilizes permanent loops under the pavement, with direct connection to computers with software providing automatic compilation and evaluation of the data collected, including traffic volumes, classifications, speeds, etc. This type of equipment is probably beyond the reach of most local agencies, and is probably not needed by most of them anyway. The least expensive equipment is a simple volume counter which uses one road tube and simply records one count for every two axles, with the counts shown on a display, and no permanent record of the counts. These counters cost approximately $300 each, depending on the manufacturer, and are very useful if all that is required is a 24-hour count or a 48-hour count.

Equipment can be obtained which uses road tubes rather than permanent loops, but can be used to collect traffic volumes, speeds, or classification data and can be used with computers to summarize and analyze the data collected. Several of the companies listed above have this type of equipment available, with prices ranging up to several thousand dollars.

As mentioned earlier, traffic volumes are usually referred to as ADT — average daily traffic. Frequently, local highway agencies put a volume counter out for twenty-four hours, get a volume, and call it ADT. Unfor-
fortunately, this is not ADT. This is simply a twenty-four hour volume.

There is another term used to describe traffic volumes, and that is AADT — annual average daily traffic. This figure is obtained by using a permanent count station and totalling the volume at that location for one year, and dividing that total by 365. This is the only true AADT. Any other volume, obtained from anything less than a one-year count, is an estimate of AADT.

In order to make these estimates closer to the true value of AADT, we can apply factors to the volumes obtained from our short counts, provided that we have data from which to obtain these factors. This data must come from a permanent count station, preferably located on the same classification of road (arterial, local, etc.) as the one for which the ADT is being estimated.

Usually, the factors used to adjust this raw data are daily factors and monthly factors. Daily factors are obtained by totalling the volumes for one week, dividing by seven, and comparing each day’s volume with that average. If the average volume is 500 vehicles, and the volume counted for Tuesday was 625, then Tuesday had 125 percent of the average traffic, and the daily factor to be applied to the Tuesday count would be 0.80, the reciprocal of 1.25.

To determine a monthly factor, get the average volume per day for each month, and compare it to the AADT. For example, if the AADT is 800, and the average daily volume for July is 1000, then the July volume is 1.25 times the AADT, and the July monthly factor is 0.80.

To complete this example, if we took a 24 hour count at a particular location on a Tuesday in July and the total we got was 1200 vehicles, the ADT (or the estimate of AADT at that location) would be 1200 times the daily factor times the monthly factor, or 1200 x 0.80 x 0.80, which equals 768 vehicles. This would be our best estimate of the AADT at that location.

This discussion of some basic traffic studies was not very technical, and much more information could have been included, but hopefully, this will provide you with a starting point in your collection of data for traffic studies.