

to be ironed out. It is difficult to do good patch work by hand tamping and frequently isolated spots have been neglected because of inability or cost required to move a large roller to some out of the way location for only a few square yards of surface.

The mud jack is another major piece of equipment that has been in existence for only the past few years. It has considerable merit where properly used, but is not a cure-all for irregularities in pavement surfaces. Perhaps its greatest value is for use at either side of structures where there usually is some settlement of fill, resulting in voids under the pavement.

There are many concrete mixers to choose from, and recently some development has been made in producing a mixer especially adapted for preparing bituminous patch material.

All equipment needs to be repainted from time to time. Any surface to be properly painted must first be thoroughly cleaned. The modern way to apply paint is with a spray or paint gun. Some such equipment will prove quite serviceable to any maintenance organization, since it will not only expedite work of painting equipment and signs brought into the shop, but with portable air compressor and sand blast attachment will be especially valuable in repainting structures.

One very important thing I have not mentioned as yet. You should remember that all equipment is subject to wear and that the best will require some servicing and replacement of parts. Buy with an understanding as to the ease or difficulties to be encountered in securing replacement of parts.

There is a world of good equipment. The American people are machine-minded. Often there are two or more articles between which you are unable to choose. In that event, the salesman who has approached you in the best manner is most likely to get the business. I recommend that each of you spend all the time you can in the armory looking over the splendid display that has been brought here at great expense this week for your convenience. You will find many of the best manufacturers of road equipment represented here with extensive lines and a group of competent, courteous salesmen ready to answer all questions and explain the merits of their equipment to you.

PREPARATION OF A COUNTY MAP

By George Gault, Wayne County Surveyor and
Road Supervisor

Before starting a county map it must be determined just what information the map is to show, so that it may be made to as small a scale as possible without difficulty in reading. We find that a large map is inconvenient to handle in the field,

and of course the larger the map the greater the cost of prints or other forms of reproduction. We believe that the minimum information that should be shown is about as follows:

1. The original United States Survey with the section, township, and range lines plainly indicated, and the section numbers indicated near the center of each section.

2. The civil township lines and the name of each township.

3. The corporation lines of all incorporated towns with the name of the incorporation placed within the corporate lines if possible.

4. The names of all unincorporated towns and any other points of public interest such as outlying churches and cemeteries.

5. All public roads within the county with their names or numbers plainly shown.

6. The approximate location and name of the larger streams of the county.

7. Miscellaneous items such as property lines, names of landowners, the number of acres owned by each, and the approximate location of the smaller streams and ditches.

Having determined the size and shape of the map in accordance with the information to be shown, it should next be decided what kind of reproductions are to be made from the map. If prints are to be made directly from a tracing, the legibility will be apparent while the work is in progress. If it is intended to reduce the map and then secure prints, it will be necessary to make the lines somewhat broader and the letters and figures larger so that the map will be easy to read when reduced.

Owing to the irregular shape of most of our counties, there will usually be some blank spaces between the actual map and the border lines of the map. This space may well be utilized to show information of general interest in table or statement form which it is not possible to show within the map boundaries. Since a number of different kinds of lines on the map itself is confusing, we believe that it is more desirable to show the different types of road by a table of mileage than to attempt to show them by symbols on the map itself. The population of the county separated into the various townships, towns, and special districts is of general interest, and this information can best be shown in table form. We also believe that the latitude, longitude, and sea-level elevations of certain points should be shown.

The size and shape of the map having been determined, the procedure to be followed will depend largely upon the information which is available. An atlas of Wayne County was prepared in 1874. This atlas contained a map of each of the 15 townships on a scale of two inches to the mile and maps of each of the cities and towns of the county on such a

scale that the entire set of maps could be bound in a book fourteen by sixteen inches in size. In 1893 a similar atlas was prepared except that the scale was somewhat larger and the completed book was fifteen inches by twenty-two inches. Both atlases were prepared by firms who sent in their own employees and secured a sufficient number of sales orders before the work was started. Apparently the 1893 atlas was carefully prepared, as we found very few needed changes when preparing the new map, excepting those due to actual physical changes.

OUR PROCEDURE

During the summers of 1927, 1928, and 1929 we handled a considerable amount of construction work and quite a number of private surveys. In order to keep down the expenses, some high school boys were employed during the summers. On rainy days and in their spare time we had these boys make pencil tracings of the various township maps in the 1893 atlas. In going to and coming from our construction work we carried these pencil tracings and by the use of our speedometers checked them for accuracy and for the kind of road surface. When we had logged a road by reading the speedometer at each cross road and each bend, we colored it on the map with a red pencil. Roads which had been vacated or abandoned were erased from the tracing. The section, township and range lines, and section numbers had been placed on the pencil tracings, and during spare time the names of the land owners were placed on the map. These were taken from the county auditor's transfer book. When the description in the transfer book was not sufficiently clear, reference was made to the township assessor's plat books. If neither was sufficient, notation was made and the deed looked up in the recorder's office. When we had completed checking an entire township, we made a map on tracing cloth from the pencil tracing. Because of the interest in rural real estate at this time we sold a sufficient number of prints from these tracings to pay for the time spent in the preparation of the maps.

In 1893 a wall map about four feet square was prepared by an outside firm. This was on a scale of two inches to the mile and showed the names of the landowners as well as the roads, streams, towns, etc. Our copy of this map was completely worn out and it was not possible to obtain a new one. The maps in the other county offices were in a bad condition, and the county board of education wished an up-to-date county map for the schools. In 1929, using our pencil tracings for such corrections as were necessary, we corrected this wall map and traced and platted a new county map on tracing cloth. This map indicated the roads, streams, section, township, and range lines, the corporation lines of unincorporated towns, and the names of all land owners where the acreage

was sufficiently large to permit the owner's name to be printed within the boundary lines of his lands. The number of acres owned by each land owner was shown beneath his name. No extra help was employed. White prints were obtained from this tracing and 100 copies were sold at \$3.50 each. Since

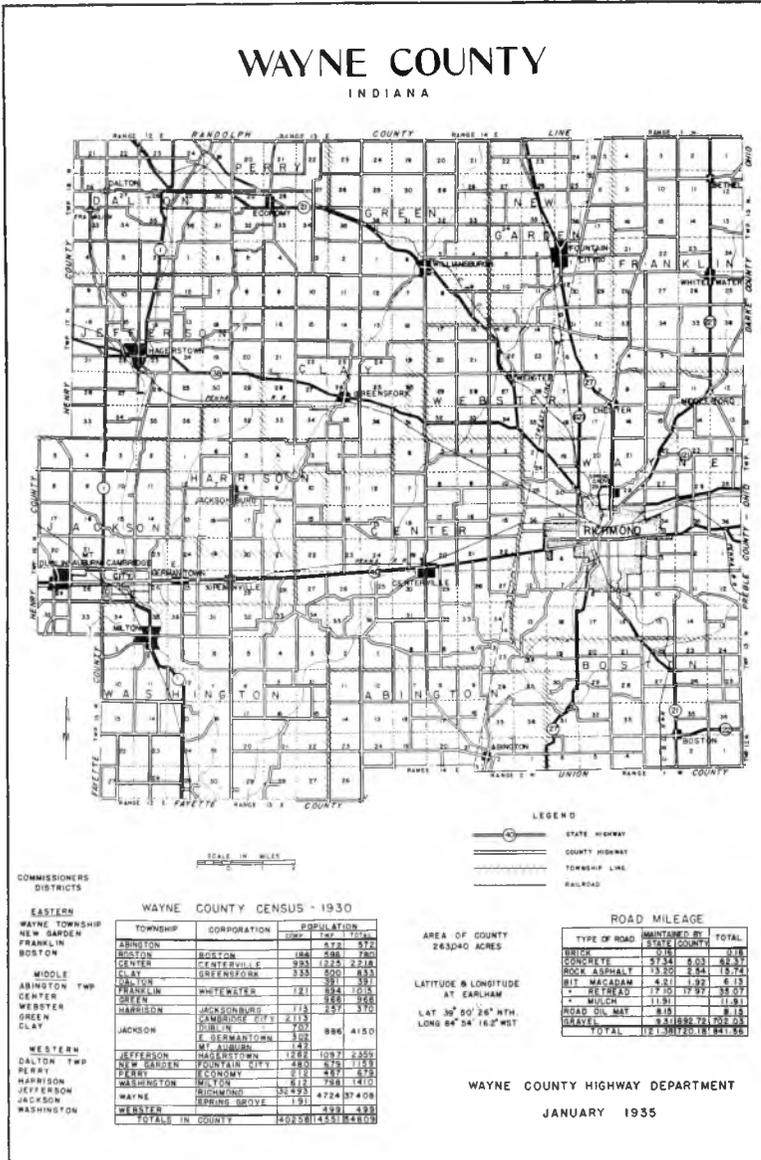


Fig. 1. Small map of Wayne County, printed on an 8 1/2 x 11-inch sheet.

1929 we have been correcting this map from the transfer records once each year or oftener. Each time the map is revised a notation is made on the margin as to the date of revision so that the prints indicate to what date they are corrected. We now keep only one or two prints on hand for sale so that when we want prints for our own use we can obtain an up-to-date print.

Since taking over the maintenance of the county road system we have found the large map rather cumbersome to handle in the field. We wished to use quite a number of these maps for progress reports in the various activities of the road department. Last summer we prepared a map on tracing linen on a scale of one inch to the mile, using double lines for the roads. The section, township, and range line, the civil township lines, and the names of the towns were shown. All lines and lettering were made heavy so that the map when reduced to letter size would be legible. Roads were shown in double lines so that any portion of the roads could be easily colored to show any desired information. (Fig. 1). The cost of this reduction and 2,000 of the small prints was \$7.00.

Last winter we secured the approval of a CWA project for a survey of the drainage structures of the county. As one graduate engineer was available for this work, we secured some very good information from this survey. The roads were again logged and the speedometer reading was recorded at all drainage structures. Thus, when we again have spare time, we can show the exact location of all bridges and culverts on our large map. As our roads are in general not more than one mile apart, it will then be possible to sketch in the location of all small streams and make our map more complete.

MAPS OF CITIES AND TOWNS

There are fourteen incorporated towns in Wayne County. Richmond, the county seat, has a population of 32,493, and correct maps of the city are kept by the city engineer. Before 1930, quite a number of street, alley, and sewer improvements were made in several of the remaining towns which range in population from 121 to 2,113. As we were employed to do the engineering work on these improvements, it was necessary to make a survey of quite a large part of several of the towns. When we made up the assessment roll, it was necessary to secure the names of the lot owners. In order to preserve this information, we blocked out maps on a scale of 100 feet to the inch showing the entire town as indicated on the plat records in the recorder's office and such additions and vacations as were discovered in the field that had not been recorded. On this skeleton map we added the information resulting from our work on the improvement. We still add any measurements obtained from our private survey work and now have fairly complete maps of the various towns.

The 1933 law covering maintenance of county highways provides that maps be made of each road district and that the roads be either numbered or named. In Wayne County we have nine road districts of varying mileage and shape. These variations are caused by the type of the roads, their grade and alignment, and the volume of traffic. We prepared district maps, using a single heavy line for each road, to such scale that the map could be shown on an 8 by 10½ inch sheet. We use the names by which the roads have been known for years and have these names shown on these district maps. The only change involved the assignment of the same name to a road throughout the county regardless of how many districts it passed through. The mileage of each road is shown in table form, and district men make their reports from this map.

The following suggestions are offered to those who have not yet started making a county map:

1. Before starting to trace the map, determine whether you will want to use it in the size drawn or in reduced form. If the map is to be reduced, width of lines and size of lettering must be made of such size as to be legible when reduced.
2. Use different kinds of lines and symbols (with key if necessary) to show boundary lines. Remember that if different colors are used for this purpose, each print from the original map will have to be colored.
3. Make the map as small as possible to show clearly the information desired.
4. Choose the kind of prints that will enable you to correct the tracing without undue expense.
5. Correct any errors found in the map immediately upon discovery.
6. If possible secure some mechanical device for keeping letters and figures uniform in size and design. This is particularly desirable where more than one person is working on the map and will aid in making corrections more neatly.

OFFICE RECORDS AND OFFICE HELP

By Howard C. Grube, Marshall County Surveyor

In every well-regulated office it is essential that a complete and accurate record be kept of activities pertaining to all required duties of the office. This is a prerequisite to successful administration of public office. In the average surveyor's office there are so many matters continually arising that without such a system there is danger of confusion and delay of work in progress. Frequently matters that need prompt attention are overlooked and sometimes forgotten. You may remember the main facts concerning a certain case while important details have escaped your memory. If your record