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Engineering Work of the Post-Office

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IN the preparation of state and country or post route maps, the Post-Office Department is performing a useful work for the public from an engineering standpoint. Up to the present time, there have been 1,207 of these maps compiled by the Department's map-makers, and some 1,500 others are reaching the stage of completion.

The states of Alabama, Georgia, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, Pennsylvania, Tennessee, and Wisconsin, have been practically completed so far as these county maps are concerned, as but few remaining sections in these commonwealths remain to be compiled.

Those maps of the Department show all post-offices, railroads, star routes and some rural delivery routes. They differ in scale, however, for the reason that the postal information in places is very congested, calling for a large scale, and it is then sometimes necessary to make insets. The general scale is from four to ten miles to the inch. The body information of the maps is printed in black, the streams in blue, and the county boundaries and infrequent star routes in red, the combination making a very readable map.

In the compilation of these maps, the geodetic points located by the Geological Survey, Coast Survey and Corps of Engineers are used as a base to which all other survey information is adjusted. All Geological Survey quadrangles are reduced and placed in proper position. These, with the geodetic points, give satisfactory location of points throughout the map.

Between locations, the Railway Valuation maps of the Interstate Commerce Commission are reduced and adjusted to these points. The Railway Valuation maps show an accurate alignment of the railroads which they represent, giving the position of all stations, stream crossings, county and other boundary lines and, in sectionized country, the crossings of the land lines of the General Land Office surveys. The location of the land lines on the various railroads provides a convenient method of adjusting the land survey network which, being truly placed, gives a means of locating with sufficient accuracy any town in sectionized country, as postmasters are required to give the location of their offices by townships, range, section and distance from the nearest large stream.

So, it will be seen that a good state map may be compiled before a thorough topographic survey is available. In country which has not been sectionized, a postmaster is required to give his location relative to surrounding towns and nearest large streams. This is also checked by information from these surrounding towns, through which means a fairly good location of a town is made. The railroad distances are shown between towns and on the postal routes.

All county lines are platted from the statute books of their states and, upon new counties' being formed, information is obtained from the Secretary of State of that state, and the new county will be shown on the next edition of the map.

From the fact that the Post-Office Department is the only governmental organization which has the information at hand by which any town may be



located with reasonable accuracy, these maps are the only government state maps which are kept up to date as far as possible. They should serve well under war conditions and will be especially valuable in imparting diagrammatic and general information. The corrections on these maps amount to about 9,600 a year for the 48 maps. An edition of from 25,000 to 30,000 copies a year about meets the demand for them.

Each 30-minute rectangle on these maps of the coordinates of latitude and longitude is a unit with a fixed number. These are called parcel post zone units. The zone distance from any center is calculated by a circle struck from the center of the unit from which a parcel is forwarded. All towns within this 30-minute rectangle are considered to have the same starting point, which is the center of the unit in which they are located. The circles described are 50, 150, 300, 600, 1,000, 1,400, and 1,800 miles—the first to the seventh zones inclusive. All distances beyond 1,800 miles are in the eighth zone. Any unit cut by the circumscribed circle is said to be wholly within the zone to which the radius of zone distance applies.

The rural delivery county maps are compiled on tracing-cloth and blue lines printed from negatives as are necessary. This is done because the changes in service are frequent and any large number printed at one time would cause many copies to become obsolete before being used. These maps are on a scale of one mile to the inch, and are compiled from U. S. Geological Survey, Soil Survey and other sources which are found to be reliable. All towns, roads and houses are shown with principal drainage. The well-known road corners are named and the routes over which the rural carrier travels are shown by filling in roads with a solid line. The Middle West is fairly well covered by these maps, as are most of the populous states of the East.

As these county maps cover more continuous territory than any other system of uniform maps, and as they are very plain and simple, the tracings could be readily transferred to metal plates and large editions printed if required in case of an emergency.

Those in the plains country, which has no great relief in topography, would be more valuable. The maps are kept up to date as far as possible, new roads being added when called for by new postal service, a sketch or rough traverse of the road being furnished by the postmaster or by a Post-Office inspector. This is adjusted to the base map.

The local center maps, with a scale of one inch to the mile, are compiled where no county map has been made, and consist of sketches and information forwarded by inspectors or postmasters. These are rather diagrammatic in character, except in sectionized country, and are made to serve the postal service until county maps can be compiled.

Highway Transportation

While the Post-Office Department takes no actual part in the building of good roads throughout the country, it is, nevertheless, deeply interested in this engineering work. In transporting the United States mails throughout the country, the Department operates 84,974 vehicles, both motor trucks and horse-drawn, every day of the year.

Of the total number, 44,631 vehicles are operated on rural routes, 20,705 used in connection with rail-

road and steamboat service, transfer service between depots, over bridges or ferries and between post-offices and branch post-offices, besides 10,868 in the maintenance of the star route service. In addition, 8,770 vehicles are used in the collection, transportation and delivery of mail in cities under the First Assistant Postmaster General's jurisdiction.

The Air Mail Service

In its night operation of the air mail service, the Post-Office Department was confronted with a great number of engineering problems, perhaps the foremost being the question of lights. Most of the suggestions received were for some sort of high-powered beam, shining directly and vertically into the air. Experiments were made by the Army Air Service with such lights and they were found anything but desirable.

A search-light system was decided upon and installed in two forms, one a large 36-inch arc-light search-light, the other an 18-inch incandescent search-light. In each of these two types of lights, the search-light revolves, shining its beams practically horizontally. They revolve six times a minute. The larger of these two lights is visible on an ordinary night for over 150 miles, while the smaller can be seen for over 40 miles. The larger lights have been located at approximately 250-mile intervals, and the smaller at approximately 25-mile intervals. The larger lights are mounted on substantial towers. The smaller ones are mounted on ordinary wind-mill towers, 50 or 60 feet high. The larger are placed on previously established fields; the smaller on emergency landing fields at intervals approximating 25 miles and, in every case, at fields upon which our pilots may land if occasion requires.

These two types of lights gave us the skeleton of a lighted way. We found it necessary to put border lights around each of the emergency fields so that the pilots might know just where the fields lay. We have also put similar border lights around our regular landing fields. In some instances, these border lights are acetylene; in other instances, they are electric.

Notwithstanding the distances from which we found it possible to see these revolving search-lights, we have also placed small flickering acetylene lights at 3-mile intervals across our lighted airway, shining directly upward and flashing more than 100 times a minute. These serve to keep the pilot on his route between emergency fields.

It has been found necessary to intensify our ground organization for night flying. We have had to arrange for instant telephone connection between our control stations and several emergency landing fields. We have had to arrange a system of signals between the ground and the air so that the pilots flying into bad weather might be brought down before they actually find themselves in trouble.

Through the installation of this lighted airway, extending from Cleveland, Ohio, to Rock Springs, Wyoming, night flying has been made possible by our air pilots and the two oceans have been connected with unprecedented mail service.

The work has been materially assisted through the cooperation of the Army Air Service, which, in turn, is provided with a splendid body of reserves in the Air Mail pilots.