

THE FRENCH SYSTEM OF ROAD MAINTENANCE.

AT the recent Good Roads Congress in Montreal and elsewhere frequent references have been made to the systematic organization of forces which has attended the construction and maintenance of roads in France. The superiority and completeness of the French road system has world-wide recognition. The technical and administrative organizations in charge of road development in that country are looked upon throughout America as being of the most efficient, and it is generally maintained that such is an evidence of the advantages arising from a systematic organization properly trained and properly equipped for such work.

This French road system was described by Mr. Jean de Pulligny, chief engineer, bridges and roads, and director of the "Mission Francaise d'Ingenieurs aux Etats-Unis," New York City, in a discussion on road construction and maintenance before the American Society of Civil Engineers last year, and appearing in the Proceedings of the Society for September, 1913. From it the following synopsis is given:

The national main highways which connect Paris with the large cities and the frontiers are constructed and maintained by the central government. These main highways (Routes Nationales) were built more than 100 years ago, when scarcely any roads were to be found in other countries, for military purposes and for carrying the royal mail. Their total length is about 24,000 miles, and the annual appropriation for their reconstruction and maintenance is \$6,500,000. Since the completion of railways the national main highways are not considered as having as much importance as the other roads of the country, which amount to 339,500 miles in length, and require an annual expenditure of \$37,400,000. These roads include mainly Chemins Vicinaux de Grande Communication, connecting the cities and villages, and the less important Chemins Vicinaux Ordinaires, which connect farms with the next village or the nearest city. The Chemins Ruraux are roads connecting one farm with another or connecting farms with more important roads.

Technical Organization.—France, which has a gross area of 207,000 square miles, is divided into 86 territorial units called Departments, having an average area of about 24,000 square miles. The 86 Departments (plus Belfort territory) are divided into 275 Arrondissements and the 275 Arrondissements are composed of 2,325 Cantons, which are divided into 36,222 Communes. Each Department is a political unit, and is a unit for several public services. It has a governor appointed by the central government, called a Prefet, and an elective body called the Conseil Général. It has also certain revenues produced by taxes, the appropriation of which is decided by the Conseil Général.

All the road system of Chemins Vicinaux is managed by the Prefet, and the expenditure is voted by the Conseil Général, the central government having practically nothing to do with it. The Prefet, of course, does not manage the road system himself, but through a centralized body of competent technical men. In about half the Departments the work has been entrusted by the Conseils Généraux to the body of government engineers—Ingenieurs des Ponts et Chaussées—to which the writer has the honor to belong. These roads comprise only a small part of their work. They also have in charge the national main highways and the various civil engineering works which are administered by the French government, including all the inland navigation works, canals and canalized rivers, all the ports, docks, harbors, sea shores

and lighthouses, and the close inspection maintained by the French government over the railroads, with reference to safety, regularity and rates, and also to secure a proper maintenance of the railroad property which is only entrusted to the railroad companies for a definite period, at the expiration of which such property will be returned to the government.

In the other half of the Departments (exactly forty-six) special technical bodies have been organized, which are, of course, quite outside of politics. They include a chief road engineer, residing at the capital of the Department, near the Prefet, and having charge of all the Chemins Vicinaux of the Department.

Each Department is divided into three or four political districts headed by a Sous Prefet, and called an Arrondissement. In each capital of each district there resides a district road engineer, who is under the orders of the chief road engineer and has charge of all the Chemins Vicinaux of the Arrondissement.

Each Arrondissement is divided into eight or nine judicial districts, named Cantons, each of which also has its small capital, in which resides an assistant road engineer who has charge of all Chemins Vicinaux included in the Canton. He is under the orders of the district road engineer. Finally, all roads in a Canton are divided into sections, each having an average length of 4 miles, and on each of these sections the celebrated French Cantonnier, or road patrolman, works constantly with his pickaxe, shovel, shrub and wheelbarrow. These Cantonniers are under the orders of the assistant road engineer. A few of them have shorter sections and they look after the work of their neighbors, as foremen (Chefs Cantonniers). The Cantonniers are simple laborers, generally of agricultural training, and are not required to have any special knowledge in order to enter the service. They are only expected to be of respectable behavior, to be able to read and write, and to be steady and trustworthy workers.

It is evident that every square yard of French roads is under the permanent care of a patrolman, of a chief patrolman, of an assistant road engineer, of a district road engineer, and of a chief road engineer. All these men form a hierarchy, with a Prefet as the head. Any complaint by the people, or their representatives, to the Prefet is properly attended to. All members of the road service, from the patrolman to the chief engineer, work under a civil service law. When they have once entered the service they can only be dismissed in case of serious misbehavior. They are promoted at regular intervals, with better pay, and when they retire, after thirty years' work, they get an old age pension. Most of the patrolmen lack sufficient knowledge to become assistant engineers. The latter are recruited by public competitive examinations, taking place every two or three years, from among young men who have studied, by themselves or in school, the necessary subjects, such as the elements of mathematics, surveying, drafting, designing, and road construction and maintenance. The boys employed as helpers for drafting, designing and surveying in the offices of road engineers also generally undergo these public examinations. Their practical experience serves them well, and most of them succeed. The district engineers are generally chosen from among the most able and experienced of the assistant engineers who have had many years of service. The chief engineer for the whole Department may have been previously a district engineer, but it is not obligatory. In some cases he was formerly a civil engineer, a graduate from one of the principal schools, an architect, or an Ingenieur des Ponts et Chaussées.