As it seems to be impossible to abolish statute labor, the question that confronts us now is, what is the best system, coupled with this labor, to use in the maintenance of our roads? Splendid results have been accomplished by Montgomery and Dallas counties in Alabama, by putting all road work in the hands of a few regularly employed foremen who give all of their time and attention to the work, instead of leaving it to many beat overseers who work when it suits their convenience, or do not work at all when that suits them, as it usually does. These foremen are furnished with two or three teams with regular drivers, wagons, scrapers and grading machine, road drag and necessary small tools, and as many beats or districts assigned to each as he can work. A census is taken in each foreman's territory, at the first of the year, of all men subject to road duty, and he is furnished with a list of the names and is required to work every man who has not paid the required amount of cash into the county treasury in lieu thereof. No foreman is allowed, under penalty of dismissal, to receive cash from work hands, but such hands as desire to pay, must make their payments to the proper county official at the court house. This method has proven good for several reasons:

First, and most important, this foreman, unlike the average overseer, knows what he is trying to do and does it.

Second, not being a resident of the community in which work is to be done, he plays no favorites among the hands and all have to work alike or show their receipts for money paid.

Third, he works his force the full number of hours required by law.

Fourth, the requisite amount of road tools and machinery for one foreman is much less than that required for many overseers, and such tools and machinery are taken care of and not loaned to other persons as is the case when in the hands of the average overseer.

Fifth, he makes weekly reports to some county official, who has the roads in his charge, and the work accomplished is tabulated and a comparison made with that of other foremen.

In conclusion let me say, that if our farmers do not take a community interest in the improvement of the roads and put their shoulders to the wheel, we will surely remain "stuck in the mud."

SOME COMPARATIVE CORROSION TESTS OF STEELS AND IRONS.

The subject of corrosion of steel received very interested consideration at the recent meeting of the American Society of Testing Materials. Three papers describing comparative corrosion tests gave figures which bring out important characteristics of corrosion tests, and we therefore reproduce the substance of these papers herewith. The most prominent characteristic is the great variability of results under seemingly identical conditions (as in the figures given by Mr. A. W. Carpenter), and the influence of very small variations in test method or composition of metal (tests of Mr. C. M. Chapman and Prof. W. H. Walker).

The unavoidable factors of variation in metals and corrosion as well as in tests of corrosion resistance are so great that it is doubtful whether greater clearness of knowledge will be attained within measurable time. Yet the extreme importance of the subject justifies strong effort to reach better knowledge. The development of uniform, reproducible test methods having positive and invariable relation to what might be called "commercial rusting" is the first essential; the papers given below are directly concerned with this problem.

THE MARKED INFLUENCE OF COPPER IN IRON AND STEEL ON THE ACID CORROSION TEST.

By William H. Walker.

In investigating samples of iron and steel which had withstood corrosion for years and which notwithstanding dissolved in acid very readily, together with samples which withstood solution in acid in a remarkable manner and yet were rusting at the ordinary rate, it was found that the acid-resistant specimens contained in every case a substantial amount of copper; that is, the presence of copper seemed to be the controlling factor in the resistance to solution in acid.

Upon examining the literature of the subject, sufficient data to justify this conclusion were found. A number of investigators have studied the matter, and the results of all are fairly well presented in the Carnegie Research Report of Pierre Breuil on Copper Steels, in the Journal of the Iron and Steel Institute of Great Britain for 1907. It is here found that small amounts of copper in iron or steel reduce enormously the tendency to pass into solution in acid.

In order to determine whether there is any foundation for the alleged fact so widely disseminated, that a highly acid-resisting iron or steel is also therefore a very pure product, the writer succeeded in having made a number of heats in a basic open-hearth steel furnace, under ordinary conditions, and using ordinary materials, into which metallic copper was added a little before or during tapping. The treatment of the product in the bar and sheet mills, and the annealing operation, were in every case as nearly identical as could be maintained. Although, as the work developed, many heats were made, the results were so uniform that but few will be here presented.

Composition and Acid-Loss of Open Hearth Steels Containing Copper.

	A.	A2.	B.	C.
Carbon, per cent.	.08	.08	.10	.09
Manganese, per cent.	.50	.50	.41	.31
Sulphur, per cent.	.018	.018	.027	.031
Phosphorus, per cent.	.017	.017	.026	.063
Copper, per cent.	....	.21	.19	.19
Loss in weight in 20 per cent. sulphuric acid in 3 hours, grams...	.2235	.0075	.0082	.0095

The influence of small amounts of copper in these heats is truly remarkable and shows conclusively that this wonderfully slight tendency to dissolve in acid is not indicative of great purity.

Inasmuch as the presence of metallic copper in contact with iron increases enormously the rapidity with which such iron will dissolve in acid, it at first seems surprising that in this case copper should retard this action. But we have a direct analogy in the case of zinc and copper. Zinc free from iron dissolves in acid very slowly; mix with it some metallic copper, however, and solution is greatly accelerated. But make an alloy of the two, namely brass, and the solvent action of the acid is negligible. So long as copper is not added to iron or steel in excess of the amount which can remain homogeneously alloyed therewith, the writer can see no reason why there may not be an advantage in its use. But such advantage cannot be ascribed to purity, but rather to what we may call a ferro-brass of small copper content. Reasoning from analogy with zinc, pure iron should dissolve in acid very slowly; but the converse is here shown not to be true, namely, that a slow-dissolving iron or steel is on this account to be considered an exceptionally pure product.