to revolve freely and the other wheel simply does the driving. The action in this respect is not identical with that of a differential gear, nor, theoretically, can it be contended that it is so good when driving a car round corners. Many claims are made to the effect that the driving is more steady and that the chances of side-slip are minimised. These claims will doubtless be dealt with by the Technical Committee of the Automobile Club at the conclusion of the trial.

Word comes from Melbourne anent the new automatic puncture sealing compound, "Miraculum," which, when injected through the valve into the inner tube of a pneumatic tyre, renders it quite impervious to puncture. A test recently made by Mr. Carty Salmon, M.H.R. gave those present a complete demonstration of its value. An inner tube of a motor tyre had been treated with the preparation as far back as last March, when, after various tests, it had been allowed to lie about the room unused. A few days ago this tube was placed in a cover, and used in a trip to Mornington, with all its many punctures unrepaired, and went through the journey without attention. This tube, which was used in Mr. A. E. Langford's car, was then detached from the cover, but not before the tyre was pierced through and through, much to the amazement of those present. An inspection of the tube showed very many punctures, through which the compound, a semi-liquid, milk-white substance, slowly oozed. The tube was then replaced, and, after a thick 4" nail had been hammered into the tyre and withdrawn, the chauffeur was ordered to take the car round the streets. On his return the tyre was found to be perfectly hard and firm This test, however, proved more than that the preparation would seal punctures. It showed that the substance did not lose its efficacy, and that it had no deleterious effect on rubber, which, perhaps, is the most important point of all. On the contrary, it is asserted that it acts as a preservative, and it is, to all appearances, similar to rubber in its native state.

Lead Pencils.

Lead pencils have no lead in them. The heart of a pencil is graphite, sometimes called plumbago Such pencils have been in use over three centuries, but began to become popular about a hundred years ago. Henry D Thoreau, of Concord, a literary man of recognised ability, made pencils, but he lacked enterprise The firm of Faber, Nuremberg, Germany, was the first to establish a great pencil factory. Several firms flourished in England, the great Barrowdale mine furnishing a superior quality of graphite.

West Australian Timber.

A recent report from the Premier of Western Australia to the Agent-General gives striking evidence of the immense forest wealth of that colony. The total wooded area of the colony is estimated at 98,000,000 acres, and the extent of merchantable timber has been reckoned to be, approximately, as follows Jarrah mainly (with blackbutt and red gum interspersed), 8,000,000 acres; karri, 1,200,000 acres, tuart, 200,000 acres; wandoo (white gum) and allied timbers, 7,000,000 acres; gum yate, sandalwood, and jamwood, 4,000,000 acres; total 20,400,000 acres. This represents a forest area of merchantable timber four times greater than the whole area of Wales. The total value of timber exported from Western Australia for ten years ended 1904 was £4,800,000.

Concrete Wharf.

An important coal wharf is being built for Messrs Cory and Co. on the River Medway, at Rochester. It was designed by Mr. H Shoosmith, M.Inst. C.E., in Hennebique ferro-concrete. The wharf has a river frontage of 340 ft., connected with the shore by two return ends 180 ft. and 100 ft. long respectively. It is founded upon 200 ferro-concrete piles, connected longitudinally and transversely by ferro-concrete girders, horizontal and diagonal bracing, and a continuous decking of the same material covered by tar macadam laid upon a foundation of Thames ballast. This wharf is one of the largest structures of its kind hitherto built, although, so far as design is concerned, it does not differ essentially from the various ferro-concrete wharves and jetties upon the same system which are to be found along the Thames and at many places on the South Coast.

THE VALUE OF MECHANICAL DRAFT.

Low grade fuels can be burned only by steady and intense draft. Thus, it is difficult with a chimney to obtain sufficient blast to burn the smallest size of anthracite coal, which require a strong and concentrated draft. The lower efficiency of poorer grades of fuel may readily be offset by the decrease in their cost, provided the fuel is burned under proper conditions; and these conditions can scarcely fail to be supplied by mechanical draft. It has been stated that a simple change in grate bars is all that is required to adapt a boiler to burn practically clear yard screenings by means of forced or induced draft. In general, better results may be expected with automatic stokers when they are used with mechanical draft, on account of the positive and, perchance, automatically controlled air supply.

With the chimney damper wide open, an increase in draft and resulting additional output of the plant can be secured only by adding to the chimney's height. The admission of a little more steam to the cylinder of the fan engines solves the problem with mechanical draft. A further advantage lies in the fan's independence of outside weather and temperature conditions. Additional economy in fan-engine operation may be secured by utilising the exhaust steam for heating purposes.

Mechanical draft finds a special field of usefulness in connection with power plants which are operated wholly by water-falls during part of the year, and which are reinforced by steam engines in the dry seasons. In most cases it is much cheaper to install a fan system for the allowable purpose of forcing the boiler output for a comparatively short time than it is to invest in additional boilers. As a substitute for the chimney in case of accident, artificial draft may be quickly and easily applied.

In solving the draft problem it is wise to provide every possible precaution to obtain continuous service This is far more important than an increase in operating efficiency. A flexible arrangement is a combination of chimney and mechanical draft, each of which will serve as a supplement and relay in case of trouble or even in regular operation. Probably the greatest simplicity is secured by driving fans for mechanical draft by steam engines. It would seem that the possible greater economy of an electric motor drive would be somewhat offset by the increased complication of the regulating and controlling mechanism. Published information in regard to motor-drive draft fans, their economy, and cost of operation in comparison with the single-fan engines largely in use to-day would be welcome to designers.

Enough has been said to indicate the importance of thoroughly going over the draft question before deciding off-hand to use either the chimney or its rival If more space has been given in these comments to the advantages of mechanical draft over chimneys, it is only because the good points of the artificial method are as yet unrecognised in many places Experience is not wanting with either method, and there would seem to be no excuse for not analysing both sides of the draft problem in deciding which combination to use.

A NEW CAST IRON.

It is reported in the *Times Engineering Supplement* that a member of the well-known firm of William Sellers & Co., of Philadelphia, sent recently to the Journal of the Franklin Institute an account of some experiments made by him concerning the effect of adding a small percentage of high-grade ferro-silicon to molten cast iron after tapping from the cupola into the ladle. The results were so encouraging as to lead to an extension of the experiments, and the facts as determined by a large number of these are reported in the *Iron Age*. In test bars of foundry iron treated in the ladle with small quantities of ferro-silicon containing 50 per cent. silicon there was found an average gain of about 15 per cent. in strength, accompanied by a somewhat larger average gain in ductility or bending quality, accompanied by a marked increase in softness. "The silicon in untreated samples ranged from 1.7 to 2.25 per cent., and in the treated specimens from 2 to 2.75 per cent. The addition of even so little as 1 lb. of the alloy in powdered form in a ladle containing 200 lbs. of foundry iron produced a remarkable effect not only as a softener, but invariably increased the strength and resilience of the metal, this occurring with an addition of a little less than 0.25 per cent. of silicon to the iron. By adding four times this amount of the alloy to a very hard iron mixture in a ladle, which ran quite white when cast in thin section, and was therefore entirely unsuitable for small castings requiring to be machined, it was found that a soft grey metal of good strength and ductility was produced, having a low shrinkage and being suitable for casting pulleys and other light work." It is expected that on a lowering of the present price of the powdered alloy, which is shortly anticipated, the method will become of value in general foundry work.

THE STRATFORD-EGMONT RAILWAY.

New buildings erected in Wellington during 1905-6 numbered 814, valued at £574,000, against 614, valued at £350,000, during the preceding year.