PROGRESS

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THE SCIENTIFIC NEW ZEALANDER.

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Progress

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The Scientific New Zealander.

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EDITORIAL COMMENT.

The Timber Supply of New Zealand.

This was written by the Washington correspondent of a British newspaper syndicate in February, 1907 :—

Nothing in this country is growing by leaps and bounds like the timber properties. The pinch is coming. The prodigal waste of years is creating a paucity of desirable timber tracts. A piece of land in W. Virginia, covered with spruce and hemlock, and purchased five years ago for 12,000 dols., was recently sold for 500,000 dols. Think—£2400 turned into £100,000 in five years! And without an hour's labour or a shilling expenditure. And the fool Governments of Australia are following the same course. Timber is cut down and rushed away by the square mile without the slightest attempt at re-forestation being made. Australia is living on its forest capital just as it has done on its land asset.

In 1875 Captain Campbell Walker, of the Indian and New Zealand Forestry Departments, had written :—

It is incumbent on the Government to take early steps to secure adequate reserves for future supply and climatic considerations, reduce waste to a minimum, and secure a proper share of public revenue from the valuable wooded area remaining in its hands, a portion to be devoted to replanting hillsides and plains destitute of timber. By this means we shall virtually transfer the wealth of timber, from places where it is superfluous to where it is most required, and benefit both localities, both directly and indirectly, by doing so. No forest is inexhaustible unless systematically worked on principles which insure the capital not being trenched upon, and the income alone utilised.

Our sketch (to-day) of the timber industry of New Zealand shows, on the best official authority, that the forests must be exhausted in seventy years. The area of annual denudation is 40,000 acres, while that of re-planting is 1,400. The surveyor-general, Mr. Marchant, in his report of 1904, wrote :—

It will be admitted that this colony should never be allowed to drift into the position of having to look for its supplies of timber to other countries, which, at the best, are very distant, and in all probability will have in the interests of their own inhabitants to prohibit the extensive exportation of timber I have therefore to recommend that the operations of the Forestry Branch of this Department in tree-planting be conducted on a scale at least equivalent to the estimated requirements.

The position is pathetic in one respect: we had ample warning thirty years ago of what was coming, and we took strong measures then to cope with the requirements of the position. One of the most brilliant ideas of the late Sir Julius Vogel—who had so many brilliant ideas the fruit of his very able far seeing intelligence—was the creation of a Department of Forestry, and the appointment of Captain Campbell Walker at its head, who was selected from the Indian Forestry Department which had then reduced forestry to a fine art, controlled by a set of splendid officers, of whom the Captain was one of the ablest. He served a year or so, and was succeded by the late Professor Kirk the eminent authority, whose writings on the subject of the flora and the forestation of the country are standards to this day. But the cheeseparing policy of the early eighties, for which Parliament was collectively responsible, put an end to the good work, and, for a time, waste and neglect worked their will in the forests of the land. After a few years the seriousness of the position was once more realised by the Government, and the forest laws were enacted of which a brief sketch will be found in an article published elsewhere to-day. A Forest Department was created within the Lands Department and Mr. Matthews was appointed Chief Forester. He has done some excellent work, as we propose to show in a future article.

The double necessity, economic and climatic, for immediate re-forestation has been proved with startling emphasis. It has also been proved that enlightened forestry is most profitable, directly and indirectly, to the State. Political authority, moreover, is in its favour.

The country has not forgotten the emphatic pronouncement of the late Mr. Seddon on the need for nursing the forests that remain, and the planting of the forests of the future. In addition we have in the present Minister of Lands a man devoted to the cause of enlightened and vigorous forestry. The time is more than ripe, and the circumstances are most favourable for a forward policy in the right direction of substantial, that is to say of colossal proporions, on the basis of the established system. It remains for the people and the Legislature to see that such a policy is inaugurated.

High Speed and Economy.

NEW ZEALAND may be reckoned amongst the countries of the world which have experienced the remarkable feats of motor-cars, not specially built to withstand the extraordinary wear and tear of running on cattle tracks. True, the roads between Wellington and Napier are in many parts excellent—grade and surface being easily conducive to speed—but in the main they are as unfit for fair going as it is possible to conceive. In the ordinary course, we find grade upon grade of 1 in 15 down to 1 in 4; the decking of bridges some four or five inches above the road level, an almost total absence of direction signs, and a great lack of courtesy on the part of traffic impeders. Still, in the face of these deterrents, it is possible to achieve some excellent results with a good car in capable hands.

The "Gladiator" may be fairly termed an aristocrat amongst motor cars. Small wonder then that under the charge of Mr. J. Wilkinson, who commenced his tour of the world with NewZealand, a 4-cylinder18-28h.p. machine of this make should complete the distance between Wellington and Napier, which, with unavoidable deviations amounted on this occasion to 240 miles, in 10 hrs. 20min. The running was also of great interest from the point of view of fuel economy. With a tank containing a mixture of benzine and petrol, the entire journey was completed on 10 gallons, or at an average of 24 miles to the gallon. No stop was made to rectify a tyre trouble—French Dunlops are famous for their reliability—nor was there occasion to use a spanner or tool on any part of the engine. The best times on the flat were accomplished easily at a consistent 40 miles per hour. The return journey was made without a stop in nine hours, and Mr. Wilkinson, from the experience gained, stated he saw a possibility of doing it in eight.

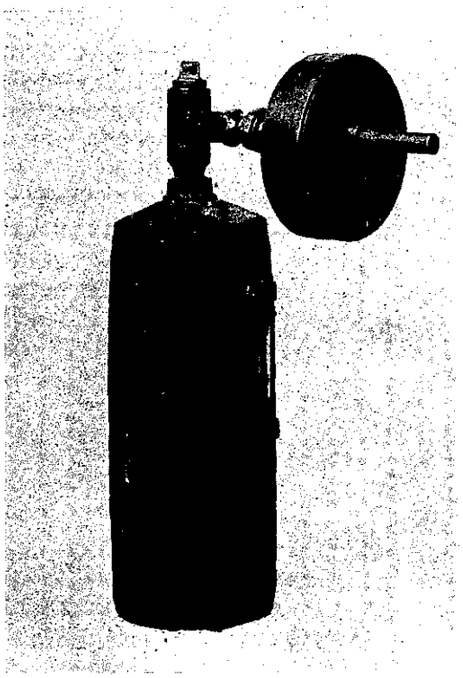
Mr. Wilkinson proceeds from here to Australia, thence to China, Japan, India and Europe.

THE ELLIS MOTOR.

THE DEVELOPMENT OF AN INTERESTING INVENTION.

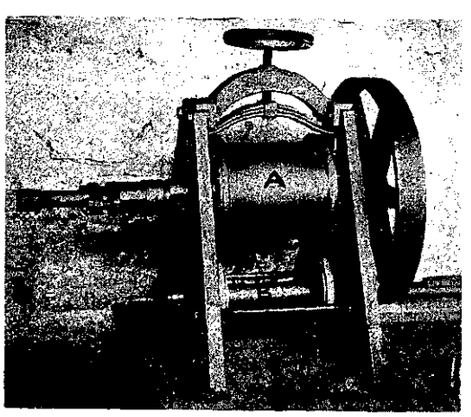
Most inventions of value have a gradual evolution from the embryonic to the mature stage, sometimes passing through extraordinary phases in the process. We illustrate herewith the gradual development of the "Ellis" motor which is now showing remarkable results, and is commanding the attention of engineers. The engine shown in *Fig* 6 is working at Messrs. Luke's Foundry in Wellington, and was built by Messrs. Andrews and Manthel of that city.

Taking the invention at its commencement, *Fig.* 1 shows the first small model, the boiler being constructed out of an old quicksilver

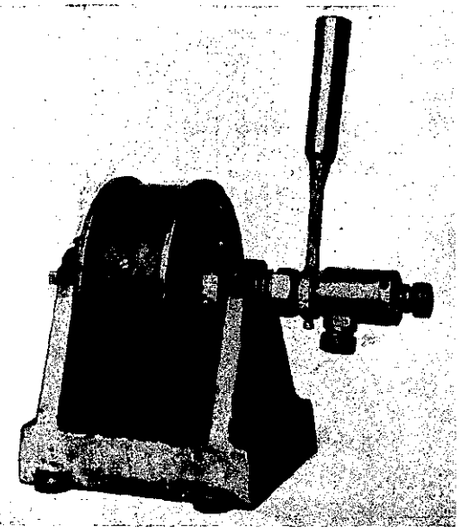


THE ELLIS ENGINE: FIG. 1.

bottle. This crude apparatus was fitted up to test the principle which the inventor had hit upon. It was found to work and reverse its motion, thus realising his sanguine expectations. The principle is founded on the fact known to every school-boy:—that a wheel will run down hill by the force of gravitation acting at the centre of the wheel, which centre is always in advance of the point of contact of the rim of the wheel with the road. See sketch *Fig.* 4. Now, by putting this principle into a piece of mechanism whereby



THE ELLIS ENGINE: FIG. 2.



THE ELLIS ENGINE: FIG. 3.

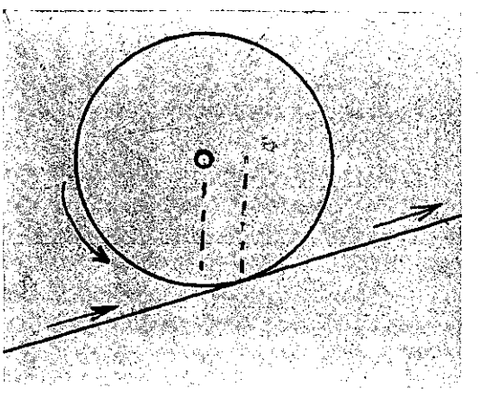
the periphery of a cylinder acts as the road, and the motor (within the cylinder) as the wheel, substituting the force of steam for gravity, a corresponding effect is produced; with the advantage that the periphery of the cylinder is *an endless road* for the wheel to run upon, the position of the wheel with respect to the *cylinder road* forming an artificial incline reversable at will. Although the engine is exceedingly simple, it is somewhat difficult to describe without a model, but the drawings will enable some idea to be obtained of its construction.

Fig. 1.—Shows the embryonic motor as already mentioned.

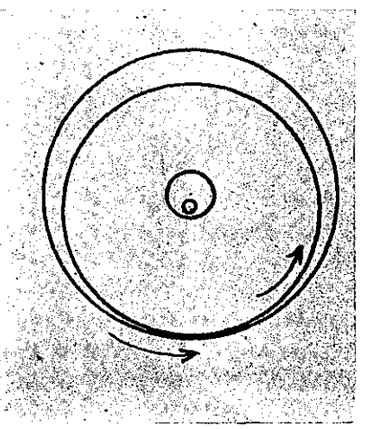
Fig. 2.—The next stage fitted up to show its application to locomotive driving; the outer cylinder or drum (A) having its ends shaped like locomotive wheel tyres to run on rails; rollers (B) being substituted for rails—or the railway track—for the sake of experiment and demonstration, and a fly wheel placed on the shaft for momentum.

Fig. 3.—The next stage, when extraneous abutments (such as shown by the rollers *Fig.* 2) are dispensed with, the shaft passing through bearings eccentric to the bearings for the outer drum. It should be stated here that this outer drum revolves in the same direction as the inner wheel or motor. For instance, if a wheel is running on a road or railway, the road or railway may be considered as running in the same direction as the wheel, see sketch (*Fig.* 4). In the engine the rail or road becomes circular and therefore endless as shown by sketch (*Fig.* 5).

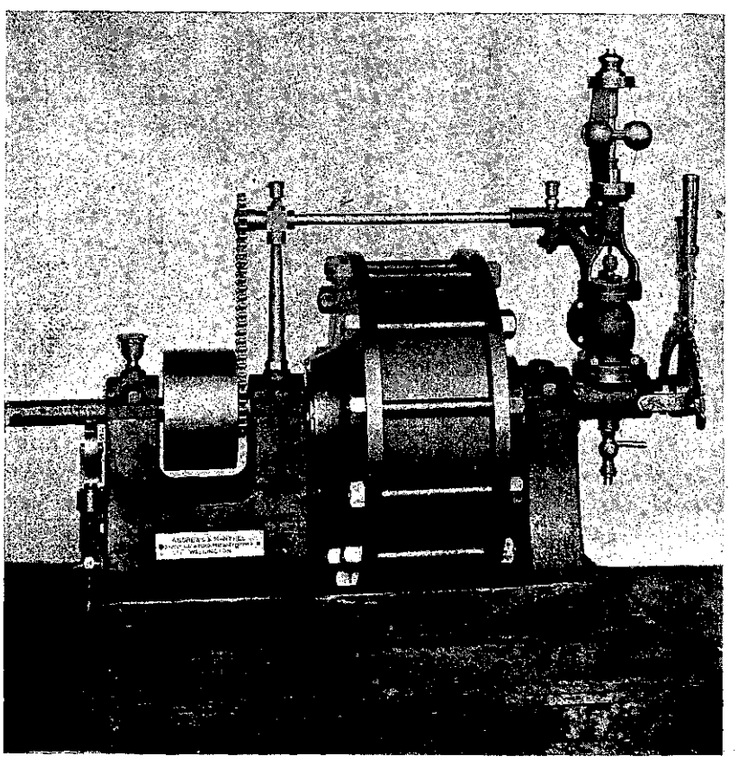
Fig. 6.—Shows the latest model arranged for marine, or stationary driving; the engine is reversible at full speed. Further developments are obvious now that the principle has been proved workable, and it is hard to say to what length these developments may reach, the inventor having in mind several applications with a long vista of probabilities. In his own words "The changes may be rung to an almost unlimited extent on the same general principle." From what has transpired with the trials already made, important results may reasonably be expected from future developments.



THE ELLIS ENGINE: FIG. 4.



THE ELLIS ENGINE: FIG. 5.



THE ELLIS ENGINE: FIG. 6.

THE PATENT OFFICE.

With a fine library of technical literature (patents) stowed conveniently for reference of the promptest order, and a hall open to the public at all business hours for the use of the same, the Patent Office is hardly as well known to the public of this State as it deserves to be. To the inventor, the institution offers two advantages—protection for his invention. and information enabling him infallibly to avoid repetitions and errors, on the one hand, and on the other, to guide himself on the road towards perfection. Situated on the first floor of the Magistrates' Court in Lambton Quay, the institution will well repay a visit as one of the most remarkable and useful established by the State. It was first housed in the Government buildings; it passed on to the Governmen Printing Office; its presence in the present quarters is probably but temporary. The Patent Office was constituted by the Patents Act, 1860, and commenced operations on the first of January of the year following. The progress of the office under that Act, and also under the Act of 1870, was slow, but applications for patents increased in number under the Act of 1883, which reduced the fees and simplified the procedure. The growth was further accelerated by the "Patents Designs and Trade Marks Act, 1889," which brought the law on these subjects in New Zealand into line with the legislation of the United Kingdom. The greater facilities under this Act quickly found favour with the inventors of the colony, and the rapid increase of the applications has since been very marked. In 1865 one application was received; in 1875 the number crawled up to 16; in 1885 it swelled to 240; in 1895 it leaped to 816; in 1895 it rushed up to 1601; and it is estimated that the applications for the current year will exceed 1800.

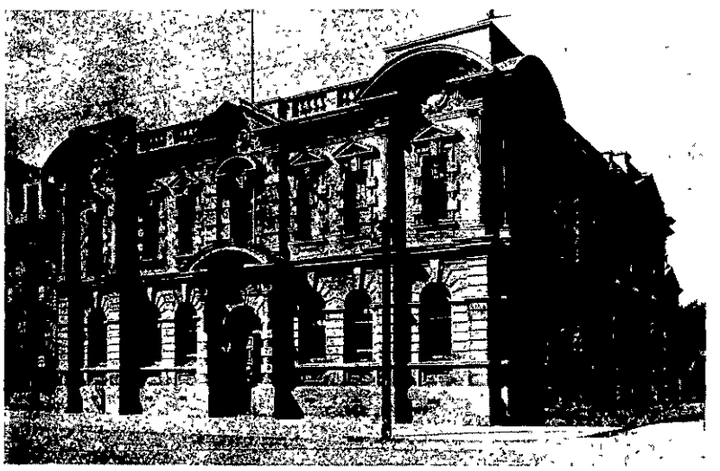
The act of 1889 also provided for the registration of useful and ornamental designs; a form of protection which has, however, so far not found favour, only 321 being registered to date. In England, 23,000 designs were registered in the year 1905. It is a big contrast.

Trade Marks, formerly under the control of the Colonial Secretary's Department, were placed under the Patent Office by the Act of 1889. Up to that time 1222 marks had been registered, but as the result of lower fees and increase of trade, the number registered annually has since greatly increased. In 1895 the number registered was 254, in 1905 it was 607, and the estimate for the present year is 682.

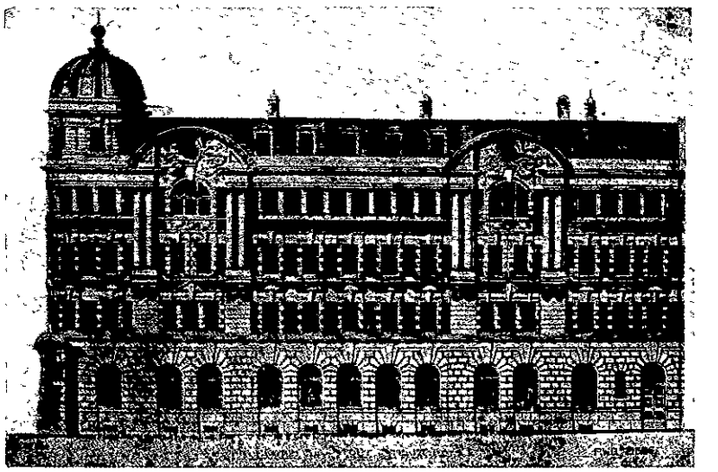
The revenue of the office for the year 1890 was £1900; for the year 1905, £4,000, and the estimate for the present year is £5,750.

The aim of the office has been to place every facility in the way of those who wish to avail themselves of the benefits of the Act. Local Patent Offices for the reception of applications for patents are established at the principal towns; and forms of information, with printed sheet of particulars concerning the fees and procedure, are obtainable at these offices, as well as at all Money Order Offices throughout the colony. A Patent Office Supplement to the Gazette, published fortnightly at an annual subscription of 10/-, contains particulars of applications for patents, illustrated abridgments of inventions, and full copies of specifications and drawings are supplied at a nominal cost. To enable inventors to ascertain whether their inventions have been already patented, specifications and drawings of the patents in the Colony, as well as in the United Kingdom and in the United States of America, can be seen at the Patent Office Library; while illustrated abridgements of inventions of the United Kingdom may also be inspected at Auckland, Christchurch, Wellington and Dunedin. The Office is in the Justice Department. Sir James Prendergast, when he was Attorney-General, was appointed the first "Patent Officer," and when he became Chief Justice, in 1875, Mr. W. S. Reid succeeded him as Patent Officer, resigning shortly afterwards. From the first the clerical duties of the office had been performed by Mr. C. J. Haselden, who, on the resignation of Mr. Reid, was duly appointed to the vacancy. He held the position until his retirement from the service in 1896. Mr. Waldegrave who succeeded Mr. Haselden in the post of Under-secretary for Justice, also succeeded to the Registrarship of Patents. The present Registrar is Mr. Lewis, who was appointed a few weeks ago, on the resignation of Mr. Waldegrave.

Of all these various Patent Officers, Mr. Haselden is the one of whom it may be said that he was of the office "Magna Pars." It was he who by a system of judicious, but strictly official advertising, such as making full annual reports to parliament, sticking up posters in all Court Houses, and Post Offices, and other ways, first got the public to learn the advantages of obtaining patents in the colony for inventions. He also induced the



MAGISTRATES COURT WELLINGTON. PATENT OFFICE ON FIRST FLOOR FRONT.



PUBLIC TRUST OFFICE, WELLINGTON IN COURSE OF ERECTION, TO COST £40,000.

LIBRARY OF THE PATENT OFFICE.

Government to reduce the fees, and to increase the facilities for obtaining protection for inventions. He it was who heard of, and unearthed from their burial place at the old Mount Cook barracks, many cases of British specifications and got them bound. Moreover, he got the government to get the London Patent Office to renew the practice, which had been discontinued, of sending out the specifications and other publications of great importance to inventors. He was also the means of getting out similar publications from other countries, and thus was begun the formation of the large and valuable library now in our Patent Office.

In conjunction with the late Mr. Curnin, Mr. Haselden drafted the subsequent legislation mentioned above, keeping it on the lines of the British statute law, and his work in drafting the regulations of the office is well known. When it was found, in consequence of the increased business, largely due to the energy of Mr. Haselden, that the staff required to be added to, Mr. Lewis was first appointed, and speedily won his way to the front by the industry, care, and ability so well appreciated by all the numerous clients of the office, to whom his promotion the other day to the chief position did not come as a surprise, and with whom it is exceedingly popular.

Some years ago Mr. Haselden's restless energy did full justice to the policy ordered by the House of Representatives (on the motion of Mr. O'Neill) of printing all the specifications in the Patent Office and lithographing all the drawings. But retrenchment, the spoiler of so much good work in the public service, becoming insistent, that beneficial method of spending the surplus revenue of the Patent Office was put a stop to, and the money was diverted to the ordinary work of the State. Mr. Haselden thereupon started the plan of publishing a list of applications, and other particulars, in a fortnightly supplement to the *N. Z. Gazette*, and his successor was able to improve on that plan by publishing extracts from the specifications, with reduced illustrations. The study of such information must be an education to mechanics and others, and must lead to further inventions which will add to the power of the Colony, and its wealth.

Until the passing of the present Act there was no appeal from the decision of the Patent Officer. This was felt to entail too great a responsibility on him, and to be likely to cause serious injury to litigants. One result was that it was the custom to grant every application, unless there was the clearest evidence against it, which was very seldom. Under the present law there is a right of appeal to the Supreme Court. The statistics of the office, however, show that appeals have been few and have generally ended in the decision of the Registrar being upheld. The office is an important one, being both executive and judicial, and as free from political control or interference as that of a Judge.

Do our people take advantage of the Patent Office?

The following table supplies an answer. It shows the number of patent applications sent from various countries to the United Kingdom and the United States.

	U.K.	U.S.
Canada	156	392
New Zealand	130	48
Victoria	109	36
New South Wales	60	21
India	54	5

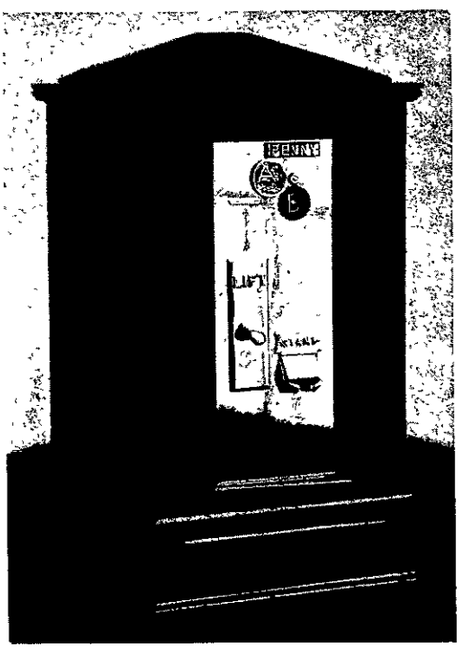
Proportionally New Zealand is easily first.

As the number of patents issued in the United Kingdom every year is something like 30,000, and the number issued in the United States is similar, and all these are reviewed more or less effectually in the literature of the Patent Office Library, the advantage of that institution can hardly be overrated.

As to the protection internationally enjoyed for patents, it is well to know that by the agreement of the International Convention it is provided that twelve months protection is guaranteed, to every patent applied for in any country, in all the other countries of the Convention.

These countries forming the union are, Belgium, Brazil, Cuba, Curacao and Surinam, Denmark with the Faroe Islands, East India Colonies of the Netherlands, Dominican Republic, France, Algeria and Colonies, Great Britain, Italy, Germany, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal with the Azores and Madeira, Queensland, Santo Domingo, Servia, Spain, Sweden, Switzerland, Tunis, United States of America.

The Australian States (Queensland excepted) are, it will be seen, not in the list; neither is Canada. However, separate arrangements have been made between the



THE DICKIE-BROWN STAMP-SELLER.

other States and New Zealand to the above effect. Canada is, moreover, sure to come in shortly.

The credit of being the first New Zealand inventor is shared by Messrs. G. G. Purchas and J. Ninnes, of Onehunga, who made an application for a Patent as joint inventors for the preparation of New Zealand flax. This application was the forerunner of a large number of inventions of the same class.

The Library in connection with the Patent Office is open to the public during the hours of business, and contains the printed specifications of Great Britain, Australia, and United States.

The English specifications alone now number about 30,000 a year. They are contained in 150 large volumes, which occupy approximately 1,000 feet on the shelves of the Library. These specifications date from 1617 to the present year, and every year they are sent out almost as soon as they are published. Australia has also recently started to print her specifications.

The abridgments of specifications of Canada, United States of America, and the complete text of United States specifications since 1905 are also in the Library.

British methods are sometimes decried as old-fashioned, but in regard to Patent publications they compare very favourably with those of the United States. British inventions are divided into illustrated abridgement classes, which give a fair outline of the invention with a small illustration. This is sufficient to enable anyone to tell at a glance whether the invention is the same, or similar to the one that he is searching. In addition, these abridgements are accurately indexed, and are right up-to-date. The United States has no such printed, classified abridgements. The annual index of English Patents for 1906 is now to hand, but the corresponding American index for 1905 has not yet been received.

The Dickie-Brown Automatic Stamp-Seller.

A Successful Invention.

We read in *The Times* that, "with the approval of the Postmaster-General and the First Commissioner of Works, there was placed in the Members' Lobby of the House of Commons a penny-in-the-slot automatic machine for the sale and delivery of postage stamps."

"The contrivance, which is enclosed in a handsome oak case specially designed for its reception by Mr. Ridge, the Clerk of Works of the Houses of Parliament, stands near the entrance to the Legislative chamber, between the letter box and the telegraph counter."

Since the above (which refers to the Dickie-Brown-Stamp seller) appeared, we learn that the machine has been placed on test at the Street Post Offices, the latter instalment being as much for the convenience of the members of the London stock Exchange as for the general public. In view of the fact that Messrs. Dickie and Brown are New Zealanders, a few details regarding the mechanism of the invention, which has passed through every test satisfactorily, and the course adopted for its exploitation, cannot fail to interest our readers.

On reference to our illustration, it will be seen that the machine is unpretentious, but compact, being 13in. in height and 7in. in width. The leather shield, A, has been raised in order to show the slot, B, for pennies. On placing the penny in the slot the handle, C, is lifted in the direction indicated by the arrow, whereupon the stamp falls on to the delivery shoot, D. The mechanism is so finely adjusted that it rejects all spurious, overworn, or foreign coins. Thus, if a French or Italian penny be dropped in the slot, it is promptly returned to the would-be purchaser through the delivery shoot, D. Further, if the supply of stamps should become exhausted, a small metal disc makes its appearance bearing the words "empty."

In Wellington the machine sold 7886 penny stamps in three weeks, and while in use in London each machine had more than trebled the local takings for the same period. We learn that Mr. J. H. Brown recently left for London on business connected with the Dickie-Brown Company, which has been registered in that city with a capital of £60,000, its objects being the manufacture and sale of the invention. Mr. R. J. Dickie proposes to follow his partner about the middle of this month, and we may conclude that the machine has come to be regarded as commercially possible.

The ....Motor.

MOTOR NOTES.

BY "ACCUMULATOR."

The Ford.

The very latest Ford sensation is Ford Model "R" which is "an edition de luxe" of the familiar 4-cylinder 15-18 h.p. "W" Runabout; the body is larger and more highly finished.

Clutches.

If a clutch is fierce, scrape down the tacky polished surface–and, to do it thoroughly, unship the whole device–immerse in water (just warm) for say 24 hours, and then dress with some good clutch dressing-oil—not castor oil or mineral oil; it pays to buy the speciality.

weather was fearful, and the aquatic deeds of the Mitchell are quite the talk among the "squattocracy."

The Car of the Future.

There is no doubt that the car of the future will be the 2-cycle air-cooled motor using a lower grade of fuel than heretofore, or else the steamer, which latter has already "arrived." One has only to experience a run on a White or Turner–Miesse steam car to understand thoroughly the "poetry of motion." It is a wonder the steam car has met with so much opposition so far.

Combination Racer and Cruiser.

This boat "Slim Jim" has developed a great turn of speed. She is 35ft. long by 5ft. beam with seating for eight passengers in the cockpit besides the steerman, is a good sea boat and has reached sixteen knots an hour with only 15 h.p., and has never been beaten by any boat of her size, power and displacement. Her engine is a 4-cylinder Monarch running at 750 revolutions per minute. When first built this boat (about two years ago) was the fastest boat in Australasia, easily beating her only competitor in the speed class, a boat of greater length and double the horse power. Since then she has been beaten by Mr. Whitney's "Grey Witch," 50 h.p., which is a knot faster.

About Radiators.

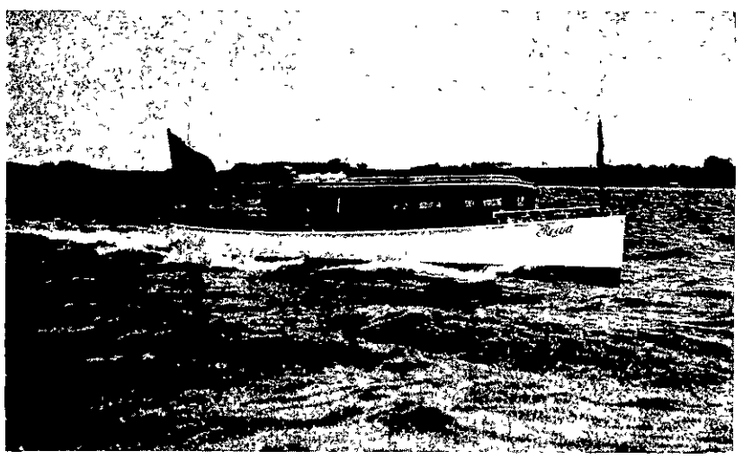
A radiator often gets excessively hot and occasionally the water boils in it. A very frequent cause of this is a defective pump, which results in poor circulation. Also I have found that the necessitous habit of filling up at odd creeks causes a certain amount of sludge and foreign matter to collect inside and clog up the tubes. To clear this out, throw in a few handfuls of washing soda, run for a few hours hard, and then drain off the water while the engine is going.

A Good Device.

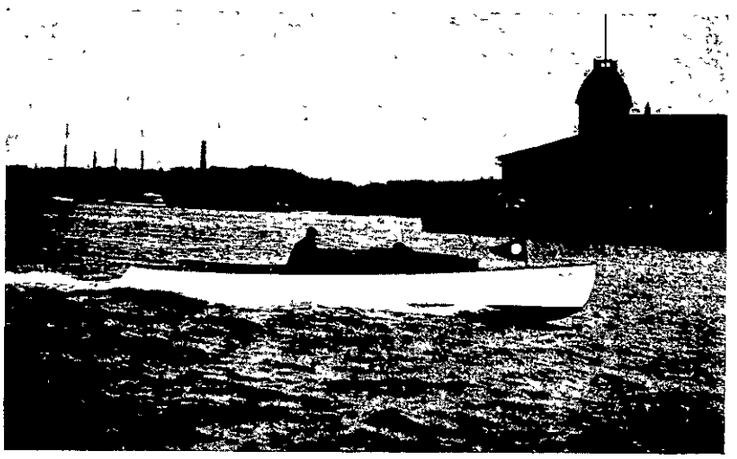
The Stepney "Spare" wheel has become standard in Europe. It consists of a rim provided with adjustable clamps. This is carried on the footboard with a blown up tyre on it; should the motorist get a blow-out or puncture, all he does is to clip the Stepney on to the rim *alongside* the deflated tyre, and then proceed on his way. It is essentially a temporary device, and should be run not more than say 30 to 50 miles. However, instances have been known where they have covered quite long distances.

A Canterbury Tribute.

Mr. Geoffrey Porter, of Ashburton, writes as under: "My Ford 'W' has now completed 3,500 miles, and been subjected to some very severe trials. crossing rivers and river-beds, and hill climbing, and has behaved splendidly. In Timaru recently car negotiated all the stiffest grades I could find; crossed the Pareora River on several occasions with 18 inches to 2 feet of water, without a fraction of trouble; most hills were taken on high gear; they are remarkably easy on tyres; up to present have not had single puncture or slightest worry."



CABIN-CRUISER "REWA."



CRUISER-RACER "SLIM JIM."

Rewa.

A fast cabin cruiser built by T. M. Lane & Co., Auckland. She has a 3-cylinder engine of 15 h.p. ("Monarch,") is very strongly built with three skins of planking, and can negotiate any weather with comfort. She has a speed of over 10 knots, the engine running over 500 revolutions per minute.

The Steering Gear.

Often the steering gear is a faithful servant which is generally neglected. All the various joints of the steering rods must be thoroughly well oiled; and if there is excessive back lash at the base of the steering column it should be corrected. A moment's thought as to the danger attending a breakage here will emphasise how vital these parts are.

Good Motoring.

The 18/20-h.p. Mitchell owned by Messrs. Holmes & Allen has seen some rough service lately—down in Canterbury it toured the whole province, and immediatelly on its return made a second visit to the Wairarapa, where it covered about 400 miles. The

Lubricate.

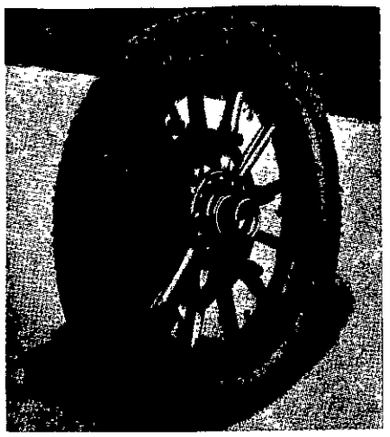
Leaf-springs should be lubricated, as well as all other moving parts of a car: it is a point very often neglected, but which, if attended to, conduces to easy running. The first sign that anything is wrong is rust showing at the edges—a quick way of remedying this is to run an old knife in and out between the leaves—then work in some kerosene in a similar way; afterwards anointing with lubricating oil.

Good Reading.

It is quite natural that a rather hazy idea should exist among motorists as to the why and wherefore of the electrical side of the car. I can recommend "Electric Ignition for Motor Vehicles" (W. Hibbert 2/–) as filling a long felt want. It is couched in simple language and makes easy reading; a copy should be kept on your car. Another good book dealing with the motor-car generally is "The Motor Manual" (1/6) published by the proprietors of the "Motor".

The Brown Car.

Yet another car has to be added to the vast multitude already in the market, in the shape of the car from the establishment of Brown Brothers, of London, who make it a speciality to turn out cars for road service. With that end in view, the car is in every way as simple as possible; chassis engines and other parts being remarkably free from complications. Their claim is that this elimination of all, except really essential parts, must result in greater reliability. Another point to be emphasised is the accessibility of all the working parts. Thus should any roadside adjustment become



GUTHRIE NON-SKID.

necessary it is effected very quickly, and with practically no trouble worth speaking of. The claim is also that the simplicity of design decreases the cost of the upkeep as much as it increases the reliability. The new car has come to stay, and ranges from two cylinders to four, with h.p. of 10-12, 18-20 and 20-22.

Unseen Firing.

Multi-cylinder cars are the usual thing now-a-days, yet one often notices uneven firing in the cylinders. This may be due to a variety of causes—sooted plugs, uneven intervals between the making of contacts in the commutators, faulty carburetter and faulty adjustments of same accumulators run down, faults in the coils, and trembler blades sticking or points pitted, valves blowing back, etc.; all of these can be remedied by testing and adjusting. There is another cause which I have known to puzzle one—there are several pipe joints between the carburetter and the inlet valve. If one of these is leaking ever so slightly, it results in an excessive amount of air being sucked into one cylinder or another, and consequently too poor a mixture to explode. To test for this, pour a little thick oil on each joint in turn and watch if it is sucked in. If so, it will be necessary to take down the pipes and carefully remake the joints with sheet asbestos served with Dixon's pipe-jointing solution.

Some Don'ts.

Don't buy " cheap " sparking plugs.

Don't stop your car and leave gears in mesh.

Don't meddle with adjustments when everything is going well, just to see if you can improve things (that is, when you have friends on board—*they* don't appreciate this).

Don't go out of Wellington without *knowing* the brakes are right—there are too many declivities in and around the City for this; also think what a mess you would make of your car.

Don't, when you get a puncture, run home on the deflated tyre—use one of these " spare " wheels—the Stepney is one of the best.

Don't smoke when you are near the carburetter, or filling the tank.

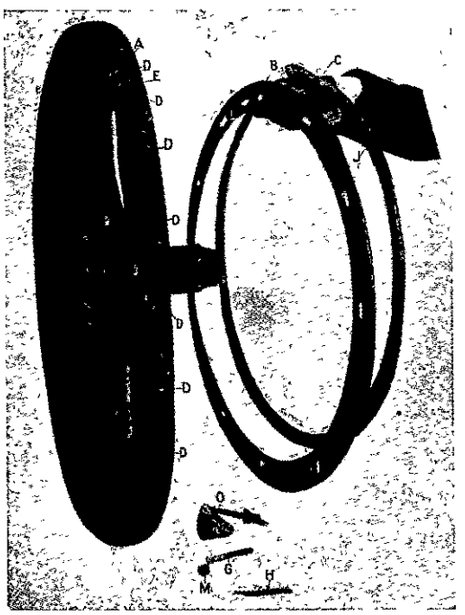
Recklessness ?

One hears so much about the recklessness of motorists, and especially their alleged ways of driving in traffic. If ever there was a subject with two sides it is this one. Primarily it is self evident that no motorist willingly endangers a valuable car which, in the event of a collision with a vehicle, is certain to suffer damage, and risk a fine more or less heavy. In the second place, we who have been behind the wheel know the quandaries one is faced with so constantly in town; due to carriages and carts appropriating whichever side of the road is convenient to them; while as for pedestrians, I cannot help thinking that it must be the bucolic element who imagine that Lambton Quay is the main street of Featherston, and therefore straggle anywhere and everywhere across the right of way. I should like to take our City Inspectors for a drive through town, and can warrant they would speedily change their views.

This is perhaps not the class of journal in which to air the motorist's grievances, still perhaps my remonstrance may catch the eye of those who have authority over us—let us hope with some good effect.

The Turquand Detachable Rim.

A simple and ingenious detachable rim has been invented by Mr. Turquand, Broad Street buildings, E.C. By its use a tyre may be removed in an incredibly short space of time, and, moreover, it can easily be adapted to any set of wheels, since all that is necessary is to saw off the outer edge of the rim and a small portion of the felloe. Referring to the illustration, it will be seen that the wheel has the outer edge of the rim A removed, while at intervals round the felloe hooks D are situated. In these hooks steps are cut, there being a short step on one side and a long step on the other. The tyre to be fitted has the partly inflated tube placed inside it, and the valve is inserted in the hole in the rim meant for that purpose. The tyre can then be slipped over the outside edge of the wheel. The circular plate B is then placed near the felloe so that the slot I is opposite the square hole in the wheel F. It will then be found that the other slots L correspond with the hooks D. The plate is now placed with its edge against the beading of the tyre, and a piece of iron to act as a lever (anything will do provided it is not too large) is inserted through the slot I, and moved towards the left. The effect of this is to force round the plate for a short distance so that the slots L are forced underneath the short steps on the hooks D. The tyre is now fixed in position to take some of the strain off the plate D; a circular D-section tube C is provided in which slots J similiar to L are cut. This is placed in the same manner against the plate B. But the lever is moved in the reverse direction, thus moving the outer plate against the long steps of the hooks in the felloe. As the slots are cut only on the inner surface of the top plate C all the hooks are covered, and there is no chance of wet reaching the inner portion of the rim. Also, since there are no outer projections, the wheel may be scraped against the kerb without fear of damage. The tyre is now as rigidly fixed as if it were on a solid rim, and it only remains to insert the square bolt H in the slot I, and the bolt G through the hole E, and to complete the inflation. Since the two plates move in different directions against the hooks, the locking action is perfect, while the two bolts referred to are more as a precaution than as a necessity. Mr. Turquand has thoroughly tested his rims on his own car, and declares they have given him absolute satisfaction. There is no doubt that the device is delightfully simple. All that is required to unship the tyre is the removal of two bolts and two short movements of the lever. Mr. Turquand's theory is that security bolts are most wanted in close proximity to the tyre valve, and in wheels of his design one is placed on each side of the valve as shown. O represents a novel form of security bolt made by the inventor of the rim. It will be seen that the stem is hinged close to the valve head, which results in the device being more readily placed in position than the old type, with less fear of nipping the tube.



THE TURQUAND RIM

The Latest Non-Skid.

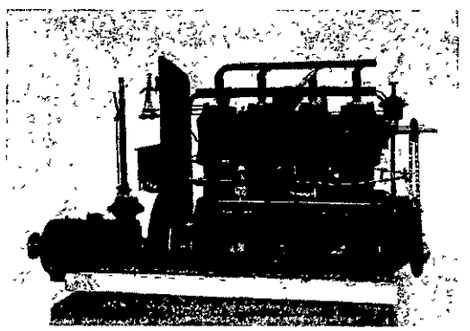
This is said to be a sure preventive of any evil experiences. The Guthrie Non-skid is its name. The illustration depicts a non-skid device which is shortly to be placed on the market. As shown, double curb chains are employed, and placed across the tyre, these being fixed with spring hooks to an endless curb chain round the edge of the tyre tread. The patentee claims that not only will the idea prevent skidding, but that punctures are well nigh impossible, and that the chains act as a general protection to the tyre. Tests carried out over greasy roads have given highly satisfactory results. The completely fitted cover presents a pleasing appearance to the eye, and many are looking forward to the results of extended tests of the device, when further information will be given respecting it.

A Welcome Motor Coat.

Who has not felt cold against the breeze ? Who is not sighing at the approach of winter ? To the people affected the best consolation

A MOTOR COAT.

lies in a good coat. Here is one. The accompanying illustration serves very well to convey a notion of the manner in which this coat is made. The front is formed with a double flap lapping over fourteen inches at the top, and twenty one inches at the bottom, thus giving ample knee apron room for driving purposes. The coat itself is warmly lined with camel fleece, and an air resisting material is introduced between lining and cloth. In order that draughts may not penetrate beneath the flaps, the coat is made with three elastic bands, as shown in the left-hand picture, which are easily attached, and serve to keep the inner casing of the garment comfortably close to the body. The pockets in the outer portion



BRITANNIA MARINE ENGINE.

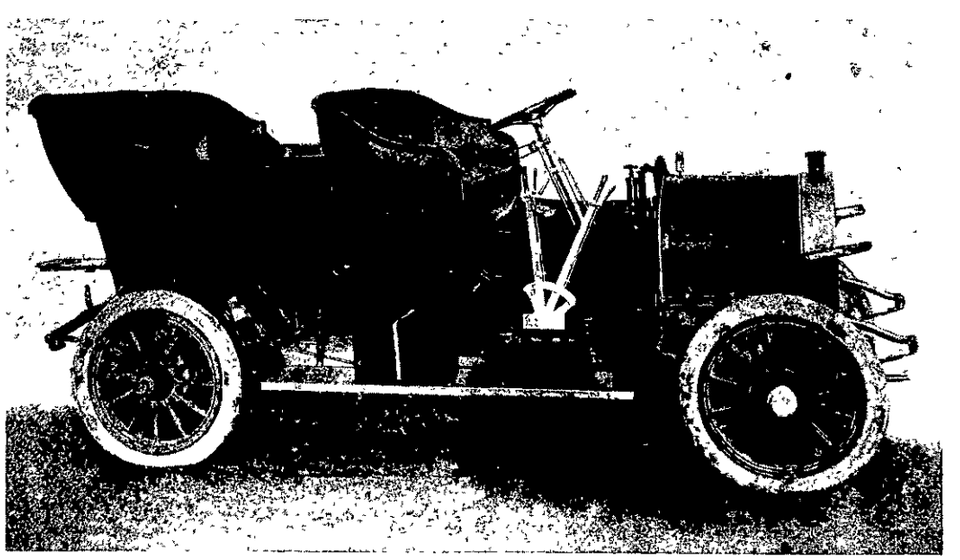
of the coat are gaped, so that the trouser and coat pockets are made accessible without unbuttoning the garment. The skirt of the coat is secured with an accessible tag, which precludes any possibility of gaping. The lower part of the flaps forming the inner skirt can, if required, be buttoned round the leg so as to form a loose kind of breeches. This arrangement makes for exceptional comfort when driving in cold and windy weather.

Brittania Marine Engine.

This cut shows one of the most up-to-date engines built for cruising work. It is of very neat and compact design and the highest grade of British workmanship, and is fitted with all the latest improvements. The control board at rear centres all levers and adjustments within easy reach of pilot seat, so that a forty-foot cruiser can be easily operated by one man. The engine photographed is from Lane & Sons launch works, King's Drive, Auckland. The makers claim that it has a range of speed almost equal to steam, and great ease of operation. The engine may be slowed down to a barely perceptible motion, remaining so for an indefinite time, or it may be opened up to 800 or 1,000 revolutions per minute.

Cheapness and Lightness in Cars.

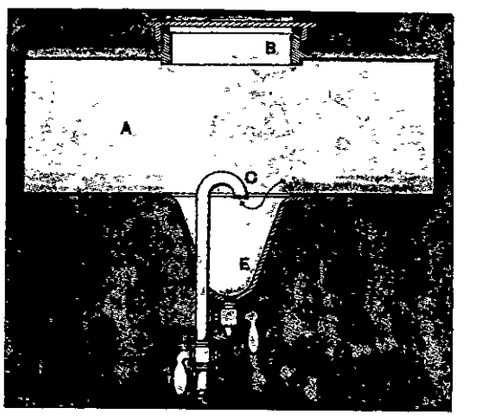
We illustrate what might be termed the forerunner of the cheap light car in New Zealand, *viz*:—the Airex 9 h.p. 2-cylinder motor. A few particulars of this machine will be of interest. The back axle is of the Renault type having steel differential box, ball bearings on road wheels, and thrust bearings behind differential bevel pinion. The transmission is by silent direct drive, and the clutch is leather lined with specially designed stops for ease in speed changing. The carburetter is spray with constant level, while the motor is 1,500 revolutions per minute; the control by handy and convenient levers on steering columns; ignition electric by accumulator and coil; cooling by radiator, and pump driven by friction on the fly wheel; wheels of the artillery type and size 28″ x 3″; body of the standard pattern, side entrance, of specially stamped sheet metal, superbly finished with high-class fittings and upholstery and rubber mats. The wheel base is 6′ 6″, wheel track 4′, total length 10′, and total width 4′ 6″. The frame is of pressed steel with under carriage and "demi-pincette" springs at the back. The gear box has three speeds forward, and one reverse, by means of a train of gears sliding on a square shaft. On the top speed the drive is direct, the square shaft engaging the cardan shaft by means of a claw with three projections fitted with ball bearings. When on top speed the secondary shaft remains stationary, while the first and second speeds are obtained by two different positions of the sliding gear. The three speeds and the reverse motion are actuated by one lever. All the shafts are of steel, case hardened and ground. In the differential gear the motion is transmitted from the gear box to the back axle by means of a shaft with two cardan joints, driving a small pinion in gear with a large bevel wheel. This wheel is fixed to a case containing the differential pinions which drive the axle carrying the wheels. On each side of this car is fitted a ball bearing, which can be adjusted from the outside by means of a screwed cap. The axles carrying the wheels are mounted on a ball bearing with a double row of balls, with convenient means of adjustment.



THE AIREX CAR.

Water and Petrol.

No one need tell the average motorist that water must be kept out of his petrol. He knows that well enough. What he does not know, or rather might know better, is how to keep the two irreconcilables apart. To help him in this direction, A. Foster, of New Zealand, has written a sensible suggestion



SAFETY PETROL TANK.

which we find in a contemporary, and hasten to reproduce with the accompanying illustration.—Mr. Foster says:—

Having witnessed the struggles of an unfortunate friend who had had his tank filled with water instead of petrol, I became interested in the problem of how to guard against such trouble.

Of course, care, and a fine gauze-lined funnel will solve the problem, but what is wanted is an apparatus always in use that requires no attention. I have seen all sorts of traps and catch boxes fitted to carburetters, but they would all be useless if once a few tablespoonfuls of water gained admittance.

What happens is as follows: water always falls to the bottom of the tank, so does most dust and dirt. Yet nearly all tanks are fitted with a petrol supply pipe and drain tap that have a back nut projecting above the floor of the tank, and so it is impossible to empty the tank by these means. Even inverting the tank generally reveals much the same arrangement at the screw cap.

By referring to the accompanying diagram it will be seen that a funnel-shaped projection, capable of holding about half a pint, is riveted to the tank floor. At the apex of the funnel a drain tap is fitted. Thus if the work is well done, and the joint to the tank properly made, all water quickly collects, and can be drained off from the tank.

The supply pipe passes up to the level of the floor of the tank after taking a curve, so that the opening looks downwards, and thus prevents dirt falling directly into the pipe. By filling the funnel full to the level of the tank floor, no water can enter the carburetter, and any grit or dirt trying to enter the supply pipe must jump across the base of the funnel to gain admittance.

Of course there is one essential thing to remember, and that is to turn on the drain tap after filling the tank, and make sure that it runs petrol and not water. I have fitted this arrangement to my car, and often invite sceptical friends to pour a half-can of water or so into my tank, and show them how I turn the drain tap to get rid of it. In fact,

I often put water into my tank, as it collects all grit and rubbish into the funnel, and I can thus keep it clean.

I sent the idea to one of the largest English makers, and invited him to use it free of charge, as my experience of patents for the amateur has been very bad, but as they seem quite indifferent I am making a present of the idea to motorists at large. I see no reason why the fitting should increase the cost of a car more than a few shillings, as the publication of this article will prevent any patents being applied for.—A .Foster, New Zealand.

The Dash for the South Pole.

PARTLY BY MOTORS.

Lieutenant Shackelton, who is to be shortly in Antarctic Latitudes making for the South Pole, has explained his plans. He says :—

"For our attempt to reach the South Pole with sledges, we are taking Siberian ponies and a motor car. The ponies, of which there will be six or eight, are to be shipped to Lyttelton from North-east China. Their work will be to draw the sledges. We will take some dogs down with us but not for the journey to the Pole. A pony drags as much as eighteen dogs, and consumes only 11lb of food per day, as against 36lb of food required by eighteen dogs. You will see this means a great saving of food on the journey.

"The motor car will be used as far as possible to relieve the ponies on the first stage of the dash for the Pole. It is level ground, and the motor, which has been specially designed for us by the Arrol-Johnston Company, of Paisley, should be able to negotiate it. Alcohol will be used instead of petrol, and special arrangements are to be made for keeping the engine hot.

"The motor will drag a row of sledges, while the ponies walk on ahead. There will be only three men in the party—one driving the car and the other two travelling on ski. We ought to cover twenty-five miles a day in this fashion. The ponies would keep about two hours' journey ahead of the man in the car, and choose a route for him. Every 110 miles a sledge will be dropped with its load of provisions and a depot formed, so that there may be a line of retreat right from the very farthest south back to our winter quarters."

A Simple Warming Arrangement.

May 1st, and getting cold. Motoring people will be glad to learn that a suggestion has recently been made for using the warm air in the proximity of the engine for warming the occupants of the front seat. The idea was to separate the floor boards, leaving a space of suitable width, and to suspend a baffle or deflector from the back floor board in such a way as to divert the warm air, which passes through the bonnet and underneath the car, up between the floor boards and into the space between the dashboard and the front seat. When a rug is used this warm air fills the space underneath the rug, rendering the front seats very comfortable in cold weather.

Motors First—The Rest Nowhere.

Last January a correspondent, who is much interested in the motor car, wrote :—

"To see motor cars—of not abnormal power—literally ploughing their way through snow up to the axles, as was the fact during the Yuletide holidays, was an object lesson in the superiority of motors over horse traffic."

Skidding Experiences.

Winter is the time for skidding—any high or rough country the place. When the combination is strong the experiences are the reverse of colourless. A correspondent writes :—

I shall never forget my feelings of astonishment when my first car, a small high runabout with smooth tyres, turned round suddenly and faced the opposite way. We were driving on wet wood blocks on the level. The car repeated the performance, describing a huge figure eight from kerb to kerb, on the same road, on another occasion during rain. There was no damage done, although the wheels (wire) fetched up with a shock against the kerbstone. My next bad skid was on ice. I was driving a powerful petrol car, 36 h.p., on a frost bound road. All four wheels were fitted with Grose non-skid bands. A farmer's cart obliged me to run off the crown of the road where there was snow, the rest of the road being rough ice. As soon as two wheels touched the snow the direction of the car was changed. The front wheel ploughed up the bank, and struck a glancing blow at the wall. The back wheel at the same time struck the bank, and the shock was somewhat distributed, the result being two bent axles, straightened at the cost of £8, and a damaged front tyre. My last skid was the most serious. I was driving a large car weighing some 25 cwts. down a hill on granite. The driving wheels were fitted with Desclée non-skid bands. A tramcar was sighted some eighty yards below on a single line, and I moved to the left. The car skidded. I got it straight; it skidded again, and the tram driver pulled up, but my car swung completely round, and the left hand hind wheel swung into the front of the tramcar with sufficient force to project my only passenger on the back seat out of the car into the front portion of the tramcar, where he cut his head. The tool box on the step was smashed to atoms, the car body was seriously damaged, tension rod, etc., broken, and the tramcar was sufficiently punished to require assistance in surmounting the hill. As there was a cemetery handy, I left the car in a shed, and got my passenger to the doctor in a cab. He was sitting at the time of the collision with his hands in his pockets. The granite was so greasy that it was difficult to stand on it with my golfing boots on. Luckily, I am insured, but it is evident to prevent skidding, non-skids should have projecting rivets, and not smooth steel bands. On ice, these smooth steel protectors are a source of danger. I have had my car stopped on a hill with the driving wheels spinning round all the time, polishing the ice still smoother. On greasy granite and wet tram rails they are as dangerous as smooth tyres. I have been motoring for four years, and am hoping to do without horses eventually; but living 950 feet above the sea level, in a very hilly district, I have not yet found a non-skid that I can depend on for winter work. If one could screw studs, blunt or sharp, to suit the weather conditions, into a strong non-skid band, as one does into horses' shoes, the motor car may be depended upon. Can any reader make a suggestion that will enable me to get rid of three hungry harness horses, and use to the fullest extent two powerful cars ?

Frost and Water Cooling.

The long foreshadow of winter ought to make motorists think of things :—*inter alia* of the fact that water at the moment of freezing expands. Messrs. Rolls & Co. circularised owners in the United Kingdom last winter in a manner so much to the point and so generally applicable that we hasten to reproduce their counsel for the benefit of motorists as a body, more especially of those who travel in Central Otago, or roam the Canterbury Plain, or journey in the Northern interior about the Hautapu Valley, Taihape, Waiouru, or follow the Taupo-Napier road, and skim through the Rotorua Country.

1. Be sure that before starting the engine the water system is at least sufficiently filled to cover the upper plate (*i.e.*, fill the radiating tubes).

2. In case of the slightest chance of frost all water should be drained from the system by the cock provided.

3. In refilling the system in cold weather always use hot water. This should melt any ice formed by the freezing up of any water lodging or cementing the pump to its casting.

4. In case of the slightest likelihood of frost, take care not to turn the engine round until the hot water suggested has been put into the system.

5. The water in the cooling system should be prevented from becoming acid, either by frequently changing the water, or by addition of a small amount (say a handful) of common washing soda, otherwise the ironwork or electro metals may be dissolved or corroded away.

6. Should the pump stop through the bearings seizing or some foreign substance getting into it, the car need not be stopped, as the water can still flow through the pump, and as long as the water system is nearly full, even of boiling water, the cylinders will be sufficiently cooled for all ordinary purposes.

British Motor Cars.

£15,000,000 IN WAGES.

More than £8,500,000 was subscribed by the English public for motor car and associated ventures last year, and the outlook for British makers has never been brighter.

British motor cars to value of £3,500,000 were sold during the twelve months. Continental competition has at last been met successfully, and the British cars are now more than holding their own.

Some interesting figures have been compiled showing the present position. There are now 250,000 men engaged in motor occupations, 120,000 motor cars (tyre value at about £4,800,000) on British roads, 813 motor omnibuses in London, 157 motor makers in the London Post Office Directory.

More than 5,000 omnibus horses disappeared from the London streets last year. There has been a decrease of nearly 500 in the number of horse omnibuses licensed, and an increase of 565 motor omnibuses.

There are now twenty newspapers, weekly and monthly, in London devoted to motor topics.

In the county of London there are 21,000 registered cars, £25,000 having been spent on driving licenses last year.

The amount paid in wages to the 100,000 chauffeurs, and the 150,000 men employed in various ways in the motor industry, is estimated at over £15,000,000 for the year.

Our Industries.

No. XV.—THE TIMBER INDUSTRY OF NEW ZEALAND.

(ILLUSTRATIONS BY COURTESY OF NEW ZEALAND DEPARTMENT OF LANDS.)

A VALUABLE, INCREASING INDUSTRY DRIFTING FAST TOWARDS EXTINCTION.

The Past.

TIME was when the forests of these islands appeared to be destined to a permanence almost eternal. So great was the profusion of the timbers, so vast the extent of the forests, and so impenetrable the growth of the underwood. These forests were of exquisite beauty, of great variety, and adorned with ferns, vines and orchids as rare in quality as they were abundant in quantity. They sheltered a bird life of considerable extent and unique character, and their flora was enriched by a profusion of blossoms of rare attractiveness. They covered the hill-sides; they filled the valleys; they spread over the plains of large areas of both islands. In the north the Kauri and Puriri had their habitat; the Rimu, though seen everywhere, was most conspicuous in the southern districts of the North Island and in the west of the South Island, while the white pine was common to all the country, and the birches flourished particularly in the south. The explorer filled his reports with the variety of the timbers, and narrated the wonders of the bird songs which awoke him in the early morning; the poet dilated on the stateliness and beauty of the forest, the painter revelled in the marvellous woodland scenes, and the practical farmer cut down the timber whenever he got the chance. Years passed; much of the forest disappeared before the march of settlement, until whole areas lost their woods, and it gradually began to dawn upon the minds of the thoughtful that the days of the forest primeval were gone.

The Present.

At present the contents of the forests remaining for the use of the colonist are approximately known, the census of the various timbers having been taken in the year 1904, and the result embodied the following year in the Parliamentary paper-C-6. From this it appears that the total quantity of milling timber standing at the end of the year 1904 in the forests of the colony, public, private, and Maori-held, was about 41.724,574,800 feet.

Now another table in the same paper showed the rate of consumption, by the various sawmills of the colony, to be in the aggregate 336,470,000 superficial feet. But 400 million will hardly suffice as an estimate allowing for accidents At that rate per annum of consumption the supply visible as brought to book above will last a little over a century. But the rate of consumption is sure to increase: for example, the output of 1905 exceeded that of 1904 by the respectable total of 41,000,000 sup-feet. The rate of consumption, it is safe to assume, is an increasing rate. On the other hand there is an idea among the experts that the official computation of the supply requires supplementing, so that it is safe to allow for some increase on the figures of the official table. Still again there is the danger of fire, which yearly destroys a quantity of the forest, particularly of the Kauri timber, which is peculiarly inflammable. The departmental estimate of the duration of the supply, after consideration duly given to all these matters, is seventy years. It is a rough computation at the best, but even if it be an underestimate, there is no comfort in the fact, as it leaves undisturbed the conclusion that the once glorious and apparently eternal forests of the country are within a distance of extermination

KAURI TREE.

CROSSCUTTING THE FELLED TREE.

HAULING LOGS TO CREEK FOR "DRIVE."

SLEDGE "CATAMARAN" ON GREASED SKIDS.

which is but a small span in the history of a nation.

The supply of the different varieties of timber in the above total is as follows:—

Rimu	..	22,384 millions s. feet.
Kahikatea	..	5,247 millions s. feet.
Birches	..	4,673 millions s. feet
Matai	..	3,802 millions s. feet.
Totara	..	1,149 millions s. feet.
Kauri	..	1,112 millions s. feet.
Miscellaneous		3,405 millions s. feet.

(Miro, maire, silver pine tanekaha, tawera, mangaio, hinau, kamahi, birch.)

Summary of Sawmills in 1905.

Land Districts.	Number of mills	Horse power.	Annual Capacity
Auckland ..	49	2,528	244,320,000
Hawke's Bay ..	61	1,632	81,888,400
Taranaki ..	31	612	39,500,000
Wellington ..	73	1,324	100,330,000
Marlborough ..	16	252	15,722,000
Nelson ..	58	675	55,333,200
Westland ..	51	913	88,990,000
Canterbury ..	9	101	3,363,000
Otago ..	10	137	5,984,000
Southland ..	56	1,323	69,500,000
	414	9,497	704,930,600

The output of sawn timber was returned at the census of 1906 at 336,470,930 super feet.

It is noteworthy that the estimated capacity of these mills is in the aggregate more than double the present output.

The Future.

The output of the sawmills represents an area of 41,000 acres. To this must be added a certain percentage for accidents such as bush fires and other causes of denudation. Now the State Forest Department planted last year 1,435 acres, and the year before nearly 1,700 acres. It is something to know that the department has raised some thirty two million trees since it first began to plant, and that it has in its nurseries a total of fifteen millions of young trees ready for planting out, or nearly so, of two to three years old. But it is not enough to overtake the wants of the future which, if something is not done at once will have to be satisfied from elsewhere. At the same time it is perfectly clear to anyone who reads his contemporary history that most other countries are more or less in the same plight.

The situation is grave enough for the most energetic application of the farthest-reaching measures. (1) The planting rate must be increased at least tenfold. (2) Existing timber must be preserved with the greatest vigilance. (3.) The question of prohibiting the export will have to be faced. (4.) As the denudation will greatly diminish firewood and fencing timbers, the settlers must devote a large amount of attention to growing timber for household and fencing requirements.

Distribution of Timbers.

The Kauri District.—The kauri tree is found nowhere but in that part of the North Island north of a line drawn from Waikato Heads to Tauranga. At Aotea, to the southwards, and elsewhere, kauri trees are found, but so few that the above line has been recognised always as the kauri boundary.

In some parts only single trees are found, in others they occur in clumps or groups, sometimes forming extensive groves, or even large blocks, almost to the exclusion of all other trees. Most frequently the kauri will be found mixed with rimu, kahikatea. tanekaha, miro. totara, totara-kiri-kotukutuku, northern rata, puriri, tawa, tarairi, matai, and many other trees, the tawa as a rule being most abundant. The nikau, or southern palm, is plentiful all through the district, and is everywhere accompanied by noble tree-ferns and palm-lilies. The underwood is composed of various shrubs, and the ground is carpeted with a rich growth of delicate filmy ferns. A large kauri forest is one of the grandest sights to be found within the entire range of the vegetable kingdom: massive columnar trunks, 4ft. to 8 ft. in diameter, clothed with smooth grey bark, rise close together, often to the height of a hundred feet or more, their spreading arms and deep-green leaves presenting a picture of the greatest luxuriance and vigour. At the base of each tree is a large mound of humus, formed by the decay of bark through successive centuries. The surface soil as well as the humus is charged with resin that has exuded from the fallen leaves or twigs. Some of the most ancient specimens are among the oldest trees in the world, and must have originated in a period long before the Christian era. yet they exhibit all the life and exuberance of early youth.

The great question is as to the date after which this splendid timber will be no more. According to the table of distribution, the kauri left standing on the 31st March, 1905, represented an aggregate of 1,112,000,000 superficial feet. Now in the year 1903-4, the thirty-six mills dealing with kauri cut up 144,000,000 ft. of it. At that rate the kauri forests will not last more than eight years.

RIMU END, TOTARA BUSH WORKINGS.

Kahikatea (White-pine).—In the extensive swamps by the Northern Wairoa and other rivers the kahikatea forms forests of remarkable character. The uniformly straight naked trunks often exceed 100ft. in height, carry very short branches at the tops, and are so close together that at a distance of a few yards the view is completely blocked, and nothing is to be seen but the column-like trunks, from 2ft. to 5ft. in diameter, the undergrowth being insignificant.

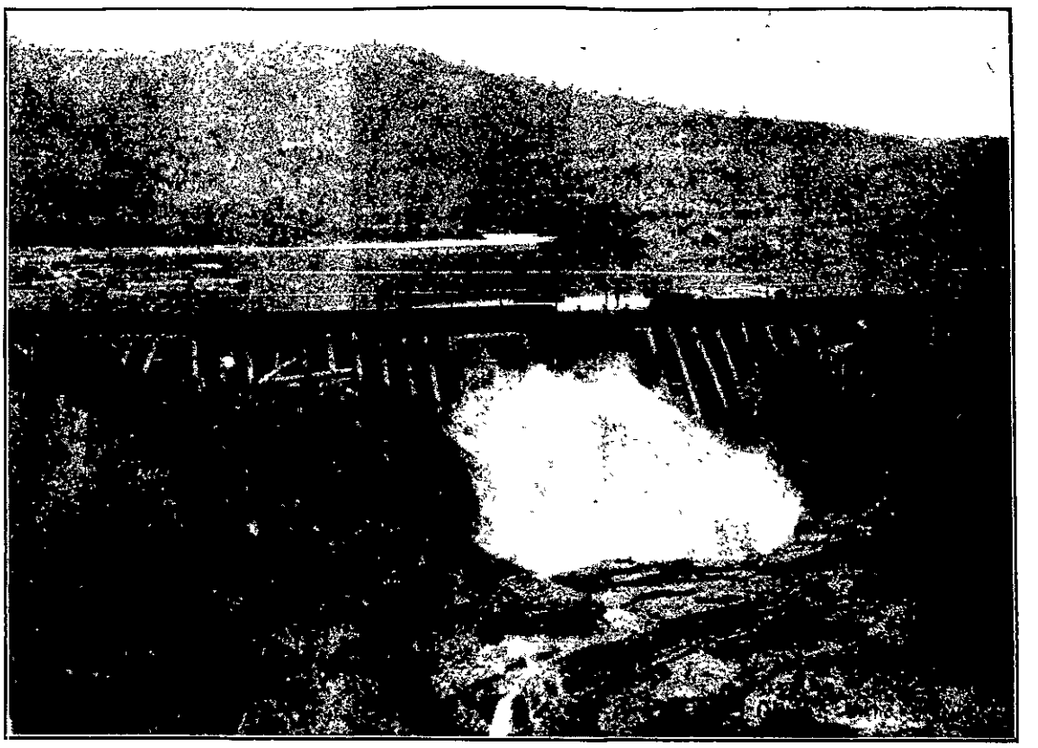
The tree is found in great abundance back from Whangarei in the North, and occurs all over the forest country of both Islands.

The Totara District.—This extends south from the Waikato Heads to the mouth of the Mokau; thence inland diagonally southward by the slopes of Ruapehu to the start of the Ruahine Range; thence south along the eastern watershed of the Ruahine Tararua, and Rimutaka Ranges to Cape Palliser; from Palliser along the coast to Tauranga.

The totara is everywhere in the forests of this region plentiful, especially on the eastern side, and it is, on the whole, the best to be found in New Zealand.

Large areas in which it is the prevailing tree are found in many parts south of the Lower Waikato, more especially in the southern parts of Hawkes Bay, the northern portion of the Wellington Land District, and the Seventy-mile Bush.

A well-grown totara forest has an imposing effect: majestic trunks, sixty feet or eighty feet to the first branch, tapering with the greatest regularity, grow so close together that very little top is developed. and the yield of first-class timber is enormous, sometimes amounting to 80,000 or even 100,000 superficial feet per acre. Usually, however, the trees are of smaller dimensions and the trunks are often distorted, and cannot be converted without a large proportion of waste.



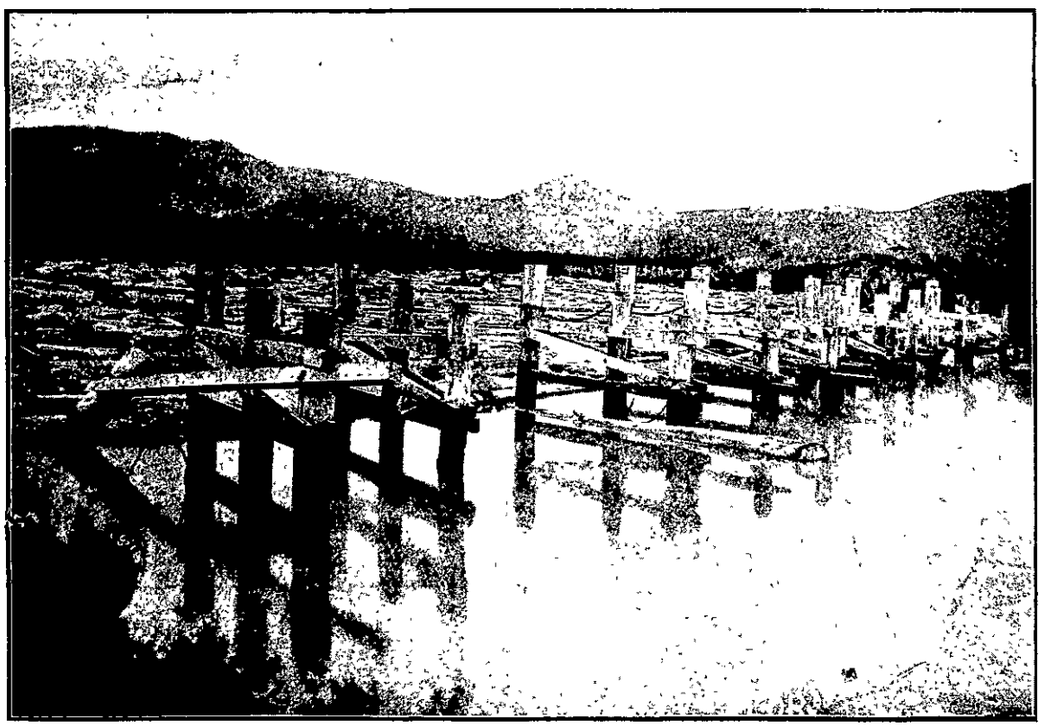
TRIPPING DAM FOR "DRIVE."

North Island Red Pine District.—This comprises all the country lying between the sea on the west and the eastern boundary of the totara district—*i.e.*, a line south-south-west to the top of the Ruahine, and along the summits of the kindred ranges to Palliser Bay. There is totara in this district, but it is not so plentiful, nor in general so valuable, as it is in the other.

The red-pine (rimu), which is found in appreciable quantity in the other districts, is the predominant tree in this, and all other varieties abound. except the kauri, and with the exception of a patch near New Plymouth, where the rainfall is the highest in the district, puriri and pohutukawa.

Large portions of these forests consist chiefly of rimu, tawa, and kahikatea, which are extensively converted throughout the district.

Southern Red Pine District.—In this is comprised the whole Middle Island between the altitude of 1,000 ft. and sea-level, and also Stewart Island. There are several treeless tracts on the eastern side of the dividing range, the largest of which are the Amuri and Canterbury Plains, and Central Otago, lying between a line drawn from the Waitaki mouth to the southernmost point of Lake Wakatipu, and thence due north to the old Canterbury border. The only trees in this region are the forests on Lake Hawea and the tributary streams to the north. There are also patches of woodless country in eastern Marlborough and southern Otago. In the rest of this district in nearly all localities the forests are of a mixed character, yet from Marlborough to Stewart Island the rimu must be considered the predominating tree. and is the most extensively converted. The kahikatea stands next in abundance, and is closely approached by the kamahi; while the miro, matai, totara, Halls' totara are generally distributed; but the northern rata and pukatea scarcely occur south of Greymouth. The Westland silver-pine, yellow-silver pine and quintinia, although not peculiar to Westland, are more abundant there than in any other part of the country; while the southern rata, which extends to Stewart Island, is especially plentiful in the Tautuku Forest, where it attains very large dimensions. Cedar, or pahautea, pokaka, and hinau are not unfrequent, while most of the beeches are plentiful, especially in the southern parts of the district. The undergrowth contains large variety of shrubs or small trees, many of which afford timbers suitable for ornamental cabinet work and inlaying.



AFTER THE "DRIVE"—LOGS CAUGHT BY MAIN BOOM

Southern Upland or Beech District.—This takes in everything in the Middle Island between 1,000 ft. and 4,500 ft., above which the beech, the predominating tree in the district, disappears, as the last survivor of the ascending forests.

The rimu and kahikatea are often found above 1,000 ft., yet they rarely occur in any great quantity, or exhibit great luxuriance; so, on the other hand, the different beeches occasionally descend even to the sea level, although rarely forming any large portion of the forest at extremely low levels. The most valuable forest tree is the tooth-leaved beech, which attains exceptional luxuriance and large dimensions in the neighbourhood of Te Anau Lake, and many other localities.

Silver-beech and entire-leaved beech are found as far south as Preservation Inlet and Tautuku Forest, while the mountain beech prefers higher levels, although occasionally a few specimens descend to the rimu district. None of the beeches extend to Stewart Island, which in many parts is covered with a dense growth of rimu, kamahi, and rata, the kahikatea being extremely rare.

RAFTING LOGS.

The Forest Laws.

The forests of New Zealand are under State control, as provided by the State Forests Act of 1885, and the Land Act of 1892. There are 20,500,000 acres of forest lands—of course not all fit for milling. They are divided by law into

(1) State Forests proclaimed under the Act,

(2) All other forests or bush standing on Crown lands undealt with.

After the marketable timber is cleared off, the land is usually disposed of under the ordinary provisions of the Land Act. Large areas of bush are reserved for various purposes, such as shelter, scenery, protection of water supply, &c. From these reserves the tenants of the Crown, who are entitled by the terms of their leases to get timber from the waste lands of the Crown for improvements and domestic purposes, can only take the same with the permission of the Crown Lands Commissioner of the district and under conditions prescribed by him.

The law regulates such matters as felling, trespass, especially during the dry months of the year, protection against injury of all sorts, particularly damage by fire, the securing of way leaves, water rights and the erection of dams, booms and all things pertaining to the work of floating timber down to market; licenses for sawmilling, both by machinery and by hand, splitting, access to road tram and railway, cutting firewood, rails, sleepers and the rest; the avoidance of waste, and the enforcement of compensation for injury. Every forest tree is under the special protection of the government. The sawyer, the logger, the splitter, all are, by license, or agreement of one k'nd or another, under the dominion of the Department of Lands whose Minister is the head of the forestry department directly and indirectly, according to whether the forests are State forests or otherwise. Timber lands may be disposed of by lease or license, and standing timber may be sold after due notice when not under any of these agreements. There is a settled and well understood scale of royalties to be paid for the taking of timber.

The Working of the Timber Industry.—There has been a very great development of this industry since 1901. 110 additional mills were returned as working in 1906, and hands employed increased from 6,812, to 9,111 and the (first cut) sawn timber from 261,583,518 ft. to 336,470,930 ft. an addition of 74,887,412 ft. The figures given for re sawing, &c, also show an increase from 34,824,246 ft. to 51,588,812 ft.; those for moulding from 9,152,598 ft. to 12,148,474 ft.; while the number of doors and sashes made increased from 91,376 to 143,100. The total money value of all manufactures or produce of the sawmills reached the sum of £2,128,766, as against £1,268,689 at the previous census; almost doubled in five years. The value of the plant largely increased. The plant is up-to-date everywhere.

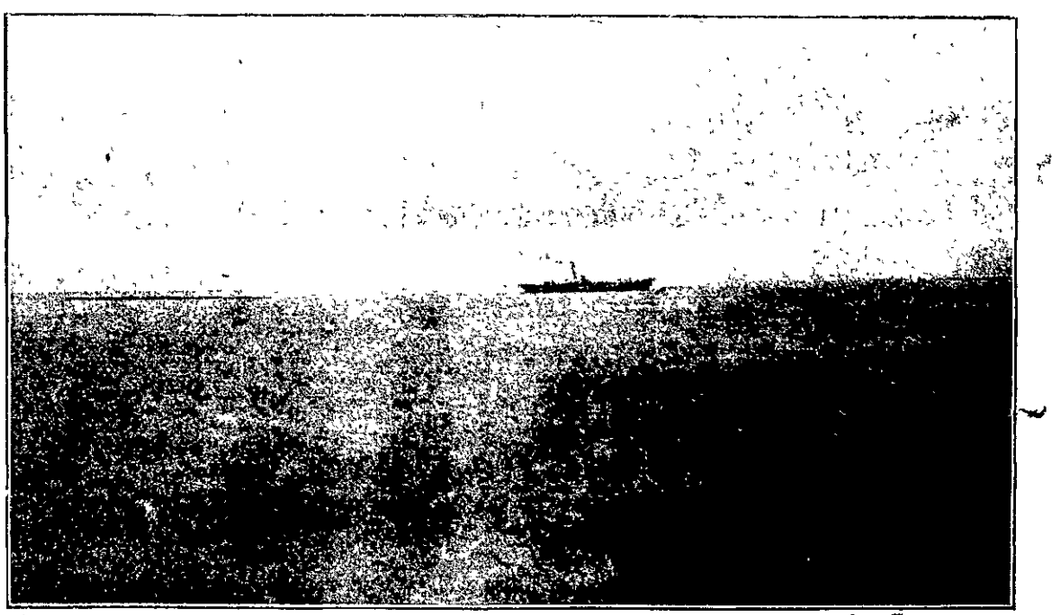
The value of the output for the mills for the year 1905 was far greater in the Auckland Provincial District than in any other, the order being as follows :—

Auckland	£1,078,233
Wellington	339,481
Otago	234 693
Hawke's Bay	138,668
Westland	117,104
Taranaki	97,401
Nelson	65,784
Canterbury	29,912
Marlborough	27,490
	£2,128,766

Of this total there was exported a value of £318,895.

The total output of all the mills, of first and second cut, stands divided in the census returns (1906) as follows :—

Sawn timber	£1,442,950
Posts and rails	12,297
Skirting	517,954
Moulding	56,027
Sashes and doors	99,538
Total	£2,128,766



S. S. "STELLA," WITH RAFT IN TOW.

SAWMILL AT WHANGAROA.

Railway Accidents.

HOW TO TAKE THE STING OUT OF THEM

A DESIRE to minimise accidents in future is the first feeling that takes possession of the average human breast when the news of some great railway disaster is published. It is the feeling with which thousands in this country are to-day looking at the pictures of the two engines which rammed each other the other day near Rakaia. The accident appears to have inspired the same feeling in the Glasgow community, where a prominent railway man was interviewed on the subject and responded to some purpose. He said —

"My candid opinion is that the Board of Trade will step in some day and compel us to run a specially designed vehicle at the front of the train next the engine, and also at the end behind the guard's van. The intention is, of course, that these vehicles should, by means of strong springs, or otherwise, take up most of the force delivered as the result of one train crashing into another. One thing that militates against the project is the unprofitableness of running stock of this sort. Now this seems to shunt the proposal into the background altogether. But it does not. A way out of the difficulty will be found, and I may mention something I heard of recently. Everybody acquainted with Glasgow stations is aware that at some of them hydraulic buffers are placed at the ends of the platforms to reduce the force of a collision in the event of a train coming in too fast These long buffers, of, say, nine feet or so, are driven into their sockets against an accumulation of water, which acts the part of cushion until the weight of metal acting against it has forced the water to escape from its containing chamber. An application of this principle is suggested for all trains in the following manner:—Each train to carry, as already described, a vehicle at the front and at the rear end. The said vehicle is to have the shape and form of a van, but to be strongly built and to contain water, lying on the top of which would be coverings of a collapsible nature ready to fall with the decrease of water, but not to rise with any pressure of the same unless it be when the van is getting re-filled at a station water tank. Such vans could permit of a certain proportion of their contents being available for the engines, and in this manner the abnormally large tenders on express trains at present in use could be dispensed with in favour of a smaller type. The vans being of a collapsible and telescopic order, both in body and frame underneath, would, in the event of a collision, help to save the fearful effects, as such an arrangement would permit the water to make an excellent cushion. It, of course, would pour out through the valves provided for the purpose under the heavy weight of a colliding train, but it is hoped that with such a van on each of the trains involved, the safety of the passengers would be assured."

WAITING TO LOAD AT NORTHERN WAIROA.

England's Failures.

The record of the year's failures is the reverse of favourable, says St. James's Budget. The total number of failures appears, it is true, at 10,231, as against 10,240 in the year 1904; but any comfort we may derive from that fact is more than nullified by the increase in the number recorded for the wholesale trade—916, as against 883. Thus, though the aggregate of failures is less, the actual loss without a doubt, has been greater. In this connection, it may be noted, that the total for 1904, was £9,371,780, showing an advance of upwards of £2,000,000 on that of 1903. As regards the retail trade, it is of interest to remark that the grocers and provision dealers contribute the greatest number of failures, with a total of 1114, while builders and architects, 600; farmers 522; publicans 447; and bakers, 258; figure high up on the list. Not a single banker, discount or bill broker, or sugar refiner has been compelled to appeal to his creditors.

A Three League Boot.

After the motor-car comes the motor-boot. M. Constantini has invented a pair, and has careered on or in them through the streets of Paris at the rate of 25 miles an hour. The invention consists of tiny motor-cars fitted to Wellington boots, fifteen inches long. Each boot has four wheels. Power is derived from 1¼ h.p. motors, and accumulators are carried in a belt connected by wires to the motors. The cost of a pair of motor-boots is about £20. They are capable, it is said, of a speed of thirty five miles an hour.

Record Whaling.

The last whaling season was a particularly good one for English boats, every ship having done much more than paid its way. In several instances the shareholders would receive handsome dividends. One of the boats, the "Snowdrop," is only a fishing lugger fitted with a motor. But she captured a whale worth at least £2,000. Another obtained a cargo of the value of about £25,000.

THE TIMBER INDUSTRY: HAULING LOGS TO MILL—LUXFORD'S PATENT

A Race in 1907.

The Chambre Syndicale de l'Automobile has decided that a race is to be organised in France next year. Opinion has been so much divided upon the advisability of holding a race, not so much on account of the value, or otherwise, of such a contest to the industry, as of the huge expense of organisation, that the A.C.F. determined to leave the matter in the hands of the maker's association, and to promote the race if the manufacturers felt that it was necessary, and would suggest the ways and means of carrying it into effect. As the Chambre Syndicale approves of the principle of a race, it may be taken for granted that one will be organised. As to the question of ways and means the maker's association recommends a permanent small circuit which will be available for one race every year. It is probable that this circuit will be selected in some district offering a sufficient variety of road and gradient to test the cars as much as possible, and as the race will always be in one place over a small circuit, the cost of organisation will be comparatively small. The Chambre Syndicale has not yet come to a decision upon the point of whether there is to be any change in the racing regulations, notably in fixing a limit of cylinder capacity, but as some such restriction has become an absolute necessity, if racing is to be of any value to the world, there is no doubt that something of the kind will be adopted.

Low Grade Oil.

Mr. J. A. Hanan, M.H.R., has recently been in correspondence with the Hon J. A. Millar, Minister for Trade and Customs concerning the importation of low-grade kerosene. It had been brought to Mr. Hanan's notice that quantities of low flash-point oil are being introduced into the colonies from America, and he drew the attention of the Minister to the matter, and inquired what regulations were in existence by which the traffic could be regulated or prohibited. The Minister replied that there are no provisions requiring all kerosene for importation to be of 150deg. fire test, but that mineral oils which vaporised at a lower temperature than 110deg. were regarded as explosives by harbour authorities in handling them as cargo. Further than this the law made no provision. Dangerous goods could not be prevented from landing, but the Harbours Act, 1878, gave power to regulate the landing and shipping of them.

In the Dark.

Professor Reickenbach is said to have proved that 30 persons in 100 can see, in the dark, coloured rays from the human body and flashes from a magnet.

The Luxury of Burglary.

The motor-car seems to be almost as indispensable to the new burglar as the "jemmy" was to the old. Two men captured near Leicester early last month, after attacking it is alleged, a safe containing £500, were said to be members of a gang which travelled to the spot in a car to avoid being seen in the train. Two escaped in the car.

Sport v. Books.

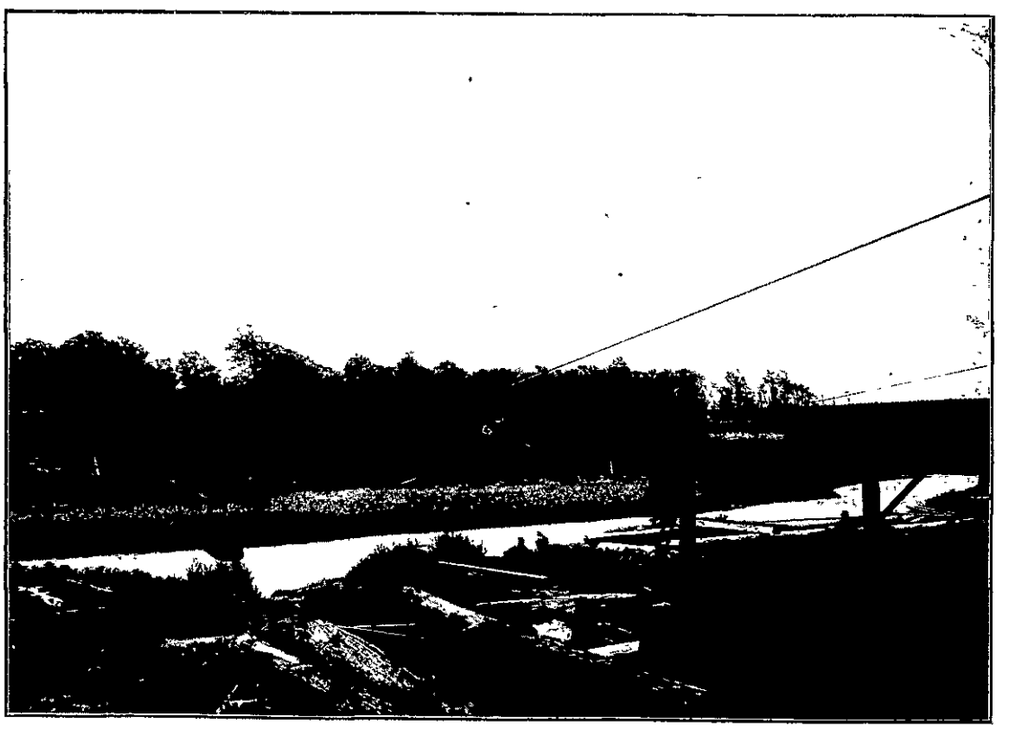
"Tynesider" writes to *T.P.'s Weekly* as follows:—"I work in a factory on the banks of the Tyne, employing, I should say, about 2,000 men and boys. In my own department there are 200 working. Out of that 200 I only know two who have the slightest love for books. The remainder can go on for hours discussing football or horse-racing, but as to literature, never a word."

The Sun and the Flowers.

For 35 years Camille Flammarion has kept a record of the dates of appearances of leaves and flowers on the chestnut trees near the Paris Observatory. Comparing these dates with the sun-spot cycle, he finds a remarkable coincidence, leaves and flowers being earliest at sun-spot maxima.

Fruit in New Zealand.

"Yes, I am of the opinion that there is no country in the world more particularly suited to the cultivation of canning fruits than Nelson in the South Island and such parts of the North Island as Hawke's Bay and the warmer lands above Auckland. Sweet, rich-flavoured fruits you cannot grow; but considering that the Commonwealth itself—a market right at your very door—imports something like £750,000 of tinned fruits annually, all of which could be grown here, you have quite sufficient to occupy your attention without troubling about the choice of early varieties. It is from this aspect of the thing that it behoves those interested in the fruit-growing industry of New Zealand to ask at the beginning for drastic measures for the eradication of fruit pests and disease."—(*Government Fruit Expert, N.S. Wales.*)



THE TIMBER INDUSTRY. HAULING LOGS OVER MANAWATU RIVER.

Electricity Notes.

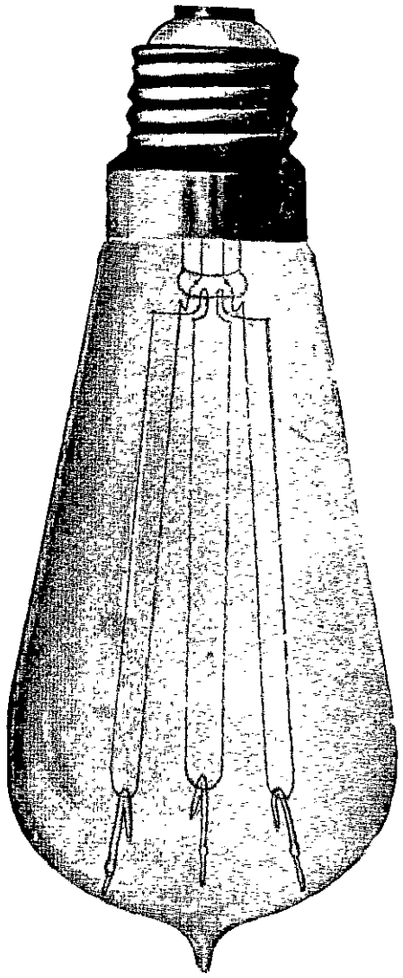
Electric Illumination.

Review of 1906.

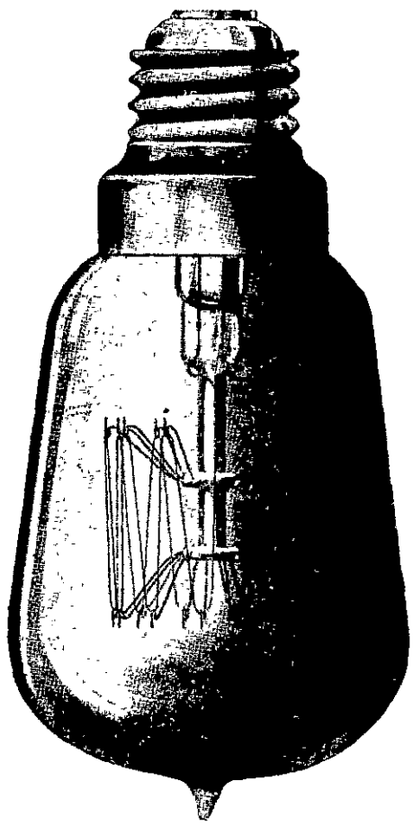
NEVER has greater interest been displayed in new methods of electric illumination than during the past year, 1906. If the promise held out by the inventors of metallic filament lamps are fulfilled we may soon witness the passing of the carbon filament bulb. Although the Nerst lamp, on which great hopes were based, because it only requires half as much current as the carbon filament, has proved too costly, and the osmium lamp has been found wanting for the same reason, and for the additional reason that its voltage of 47 is too low for ordinary circuits, the tantalum and tungsten lamps seem likely to be successors to the standard incandescent lamp. The tantalum consumes about as much energy as the osmium lamp, but its long filament renders its use possible on a 110-volt circuit, and on currents of even higher voltage. Its useful life of from 400 to 600 hours, and its maximum life of 1,000 hours and more, compare favourably with the best electric incandescent lamps in use. The filament is very delicate but able to stand greater variations than the carbon filament. When broken the ends readily fuse, so that the tantalum lamp's usefulness, although impaired, is not utterly destroyed. The present low cost of construction (50 cents) coupled with its high voltage, gives it a decided advantage over the osmium filament. Guelcher's irridium lamp is made only for low tensions (24 volts): it consumes, it is claimed, only 1 to 1.5 watts per candle power, and costs about 87 cents. What its life may be it is impossible to state, inasmuch as no figures have been published. It is open to many of the objections levelled at the osmium lamp. More promising is the tungsten lamp, which is now made by four European firms using as many different processes. The normal tungsten lamp of Just and Hannaman seems to give about thirty to forty candles at 110 volts and consumes 1.1 watts per candle. Kuzel's tungsten lamp is said to show an efficiency of 1 to 1.25 watts for 19 to 32 candle lamps with a useful life of 1,000 hours, at the end of which the loss in candle power is said to be but 10 or 15 per cent. When broken the filament automatically welds together as in the tantalum lamp. The osmium-tungsten lamps have shown from 1.026 to 1.047 watts per candle at 110 volts. Whether these new lamps will fulfil the new hopes placed on them can of course only be determined by thorough tests under conditions approximating those of actual service. At present the metallic filament lamp is in the experimental stage. The necessity of using the tungsten lamp in the inverted position may perhaps be regarded as a defect; yet quite recently the inverted gas mantle has invaded the extensive field hitherto monopolised by the electric light. —*Scientific American.*

The Tungsten Lamp.

The Wolfram or Tungsten incandescent lamp was put on the market about the end of last year. It is the invention of Dr. A. Just and Mr. F. Hanaman. In appearance and design it closely follows the lines of the familiar carbon filament lamp. These inventors were the first to make a tungsten filament, and their method of manufacture enables them, they claim, to make lamps commercially as low as 25 c.p. consuming one watt per candle,



TUNGSTEN OR WOLFRAM LAMP.



TANTALUM LAMP.

and with only three filaments. The life of the lamps is put at no less than 1,500 hours. The European manufacturers are bringing on the market a standard tungsten lamp of 40 hefners c.p. consuming 40 watts. After tests Professor Reithoffer of Vienna says, in his report of last January, "A like efficiency has never been reached by any incandescent lamp, this efficiency, in fact, very closely approximates that obtained by arc lamps, and indeed, seems to have reached the limit of what possibly can be achieved in incandescent lighting." These lamps burn well on direct as well as alternating currents, differing in this respect from the tantalum lamp, which does not stand up so well on alternating current as on direct. The filament in ordinary sizes is 17 inches in length.

The Tantalum Lamp.

Unlike the ordinary carbon spiral the filament of the tantalum is threaded up and down between two series of hooks arranged in circles, and connected with two terminals. This arrangement gives a large extent of glow and enables a more powerful distribution of light. Its chief merit, however, lies in the economy it effects. It consumes only half the current of a carbon arc of similiar voltage and candle power. When new its consumption is about 1.7 watts per candle power, as against 3.5 to 4 watts used by an ordinary lamp. It is claimed that its ordinary life is between 400 and 600 hours, but this is allowing considerable margin, as sometimes it endures for more than 1,000 hours. It is only where there are continuous circuits that full satisfaction can be obtained from the tantalum lamps, for, when on alternating circuits the results are somewhat irregular. Moreover, where local circuits run on 220 volts it is necessary to burn these in series, using two 110 volt lamps. The inventors claim that with these two minor restrictions, the tantalum lamp still has strong claims on the score of its efficiency and economy.

The above lamp was discussed at the last meeting of the Institute of Electric engineers, on which occasion it seems to have come in for a very large share of attention. The discussion was upon a paper by Mr. Swinburne on "Metallic Filament Lamps." Its scope may be gathered from the following letter published in a contemporary, which besides throws some interesting light on the tantalum and the work it has done already, as well as its position in the market, which is, after all, the proper practical test.

As there was not any opportunity to reply to several points raised by various members at the recent discussion at the institute on Mr. Swineburne's paper on "Metallic Filament Lamps," I should be grateful if you would allow me this opportunity of commenting on these points raised.

"I note that nearly every one who spoke discouragingly of the tantalum lamps has used them on alternating currents in distinct opposition to the makers' recommendation It is, therefore, scarcely surprising that the results they obtained were not encouraging. As one having experience extending over two years with the tantalum lamp, I beg to state there is no doubt that the makers' claims are more than justified if the lamps are used under fair conditions. The "pairing" of the lamps is a matter of great importance, and when this is given proper attention, and the lamps are installed of voltage sufficiently high to cover the fluctuations of the supply (a fairly large order in some circumstances), the average useful life of the lamps on direct current circuits comes out well above 750 hours

with a reduction of not more than 25 per cent. to 30 per cent. in candle-power at the end of 1,000 hours.

I was interested to hear from the carbon-filament lamp makers that there was nothing to prevent their placing a lamp (carbon filament) on the market of practically the same life and efficiency as tantalum. Why don't they do it ?

There appeared to be an incubus of doubt as to the tantalum lamp being a commercial article. I find, on enquiring at the makers that they are selling about 60,000 per month in this country, and could probably double this if they could obtain the lamps quicker.

The Osram Lamp.

On the subject of this lamp the well-known contractor and electric lamp retailer, Mr. Cuningham, of London, gave the same contemporary, by way of illustration of the discussion, some very useful information. He says :—

I installed at a double-fronted shop, in one window 24 16-c.p. carbon filament lamps, and the other window, 8 50-c.p. Osram lamps (metal filaments). The supply was 100 volts 60 periods.

The Osrams now have been in use about 500 hours, during which time they have consumed about 250 units, which at the price charged, 5d., amounts to £5 4s. 2d. Two lamps gave out in the first 150 hours, therefore, allowing for 10 lamps at 5s. each—£2 10s.—we have a total cost of £7 14s. 2d. for energy and lamps.

The 24 Royal Ediswan lamps consumed 750 units, thus showing a cost, for current alone, of £15 12s. 6d. If I allow 24s. for the cost of these lamps, the total cost of these and the energy is £16 16s. 6d. (as against £7 14s. 2d. in the case of the Osram), showing an actual saving of no less than £9 2s. 4d.

Had the cost of the supply been 4d., 3d., or 1d. per unit, there would have been effected a saving of £7 0s. 8d., £4 19s. or 15s. 8d. respectively.

The Osram also had the advantage as regards quality of light. In the matter of candle power the Osram gave 400 as against 384 of the Royal Ediswan. The latter, also, have all but ended their economical life. One of the Osrams requires renewing because it has blackened, but the rest appear as good as new.

I have found these new Osram lamps satisfactory, and consider the small 2 and 4-volt ones excellent.

The Tantalum lamps I have found also very good, when burnt on a direct current.

I believe we shall even yet see great improvements in incandescent electric lamps, and will give any new type a fair trial and accord the makers every encouragement."

The Mercury Vapour Lamp.

This lamp is considered just as efficient, and is known as the "Cooper-Hewitt." Hitherto having been confined to indoor illumination, it is now being adopted for street lighting as well. The terminals are conducted to a small glass tube containing mercury, and a vacuum is formed in the tube, which is then sealed up. In operation the lamp has to be mounted in a lantern which must be tilted to obtain the light. This action causes the mercury to flow from one electrode to the other in a small stream in the enclosed tube. The efficiency of this lamp is claimed to be about twice that of the enclosed arc lamp, and six or seven times greater than that of the incandescent lamp. Further, it requires less attention to maintain, and its life is longer than any form of glow lamp. Like the tantalum, it is more adapted for direct circuits.

The Tantalum.

There are immensely valuable deposits of tantalum ore at Wodgina, West Australia.

Tantalum is worth about 2s. per ounce, and its properties are numerous and valuable. It makes an admirable filament for electric lamps, and tantalum lamps are now on the market. It makes good nibs for fountain pens, and is far less costly than gold or radium. It is not acted on by acids or air, and thus has many of the qualities of platinum, which now costs £7 per ounce.

It is a hard, grey metal, heavier than iron, and can easily be worked. When hammered it becomes exceedingly hard, so that its use has been proposed on drills, replacing the diamond. Its properties in alloy with steel render it of great metallurgical importance. It gives a strong, hard, and tough metal, specially suitable for high-speed lathe work.

The *Times* correspondent adds that "there is little room for doubt that tantalum will be used for armour piercing shell points and for armour plate," and urges that its export should be forbidden, "pending investigations as to its military value by the British Admiralty." Krupp's firm are known to have experimented with it. It is quite possible that by the use of tantalum alloyed with steel, the resistance of armour plates might be increased 25 per cent., or even more.

It is curious to note how attempts are being made to secure a monopoly in the rare metals. Radium is virtually an Austrian monopoly, yet no great commercial importance as yet attaches to it. The sources of supply of thorium found in Brazil with a salt, of which gas mantles are prepared, are in German hands. Osmium, of value for the filaments of electric lamps, is more or less controlled by German finance. American financiers have tried, not unsuccessfully, to obtain control of the Canadian deposits of cobalt and nickel.

Tungsten.

Tungsten is a very hard and brittle metal which is sold in the form of a black powder, or as ferro-tungsten. It was for a long time considered unfusible, but the electric furnace showed of course that it could be melted. The powder is difficult to squirt, even mixed with a good deal of tragacanth. Kazel has invented what seems to be an admirable way of getting out of the difficulty. He gets the tungsten in the form of an exceedingly fine powder by employing a method that was used by Brederg for getting what was known as colloidal platinum. An arc is made to play under water between tungsten electrodes, and this is said to produce a very finely divided form of metal. This is collected and worked up into a stiff enough paste and squirted. Tungsten is not an expensive metal, so the only cost is in making the filaments. Whether the filaments of this paste can be squirted so as to be fine enough for 200 volts will be a matter for the future to decide.

Osmium.

Osmium is a crystalline metal which cannot be drawn into wire. It is very hard, scratching quartz. The Welsbach osmium lamp is said to be made by making a paste of finely divided osmium and an organic binding material, and squirting it. The filaments are then baked and heated electrically to a very high temperature to eliminate the carbon. The osmium lamp so far produced is for low pressures as might be expected, but it has a very high efficiency. There is some doubt whether the lamps known as osmium are made of osmium or an alloy of osmium and tungsten. Tungsten is a curious metal, and it is not very easy to get into alloys, but it may alloy with osmium perfectly, though there is no record to that effect.

Probable Effect of the New Lamps.

In the first place, they will increase the output of stations, just as machinery increases labour. But there is more difficulty in foreseeing the result of high efficiency hampered with low pressure. A probable solution is that people will gradually take to using large lamps taking the same pressure, and about the same power as carbon lamps, but giving, say, four times the light.

As to the lamp-making industry, one might prophesy without much danger that the present makers will merely alter their manufacture and make metal lamps. This will pay inventors better, because the existing makers have their commercial organisations and their facilities for distribution. Besides, all the works, except the parts devoted to the making of filaments, will be available. It is possible that new works will be set up to make filaments, and that the lamp-makers will buy the filaments and make them up into lamps. There are so many possible ways of making metal filaments, that it is doubtful whether large monopolies can be secured by patents; and it is much more likely that most of the present carbon lamp makers will work out particular processes of their own, and will put their own metal lamps on the market.—*Electric Engineering.*

Wireless Telegraphy.

(*Scientific American*, January 6, 1907.)

In the past twelve months wireless telegraphy has maintained its hold upon the public, because of a number of interesting conditions, scientific and otherwise. Early in the year both Fessenden and De Forrest made extensive essays to give us cableless telegraphy, but the result of their experiments, like those previously made by Marconi, were futile in so far as transoceanic work is concerned, and the submarine cable still holds its own. The constant litigation that has been waged betwen the opposing interests over patent rights has awakened the hope that an end might finally be reached in which limitations of the various claimants would be clearly defined, and the question decided whether or not the Marconi Company was to have an absolute monopoly on wireless transmission. One of the untoward features, at least on this side of the Atlantic, is the sale of their securities by several of the largest companies. The majority of the companies that are engaged in this practice are overcapitalised and have not earned, and are not now earning, dividends. The promoters of these companies have in many instances led the public to believe that the system they advocated was perfect, and that a means of selectivity had been evolved. For this and other reasons the transmission of messages overland has not been so much of a success as some of the more optimistic of the quarter of a million shareholders had hoped for. The interior stations scattered throughout the country have been utilised to educate the masses in the possibilities of wireless telegraphy, rather than for the interchange of telegraph business. Among those who are engaged in the practice of the art—and this includes not only numerous operating companies, but also the armies and navies of the world as well—the lack of selectivity has brought about a state of affairs that borders on chaos, for only one or two stations in the

active zone of radiation—and it often means a radius of 1,000 miles—can send at the same time.

To circumvent this extinction of messages by interference and other difficulties that arise from it, was the purpose of the International Wireless Telegraph Conference which convened within the last two months of 1906 in Berlin. But even if all its recommendations were adopted, the fundamental problem would in no wise be solved. It is interesting to note that at this conference Poulsen exhibited his newly developed selective wireless telegraph system, which he believes, and we all hope, will be commercially selective, instead of theoretically, as has been the case with its predecessors. Should the new system ring true, then the past year will go down in the history of wireless as the most progressive period since the beginning of the art.

The Fell Brake.

This brake for tramways is the result of the wide attention drawn to the insufficiency of brake power by recent accidents in London. Several brakes have been brought out by inventors accordingly, a circumstance which the public all the world over will find very satisfactory, in view of the growing suspicion of all existing tram brakes, and this is one of the best of them. The new brake is a combined mechanical and magnetic track brake. Having once overcome the inherent obstacles in the way of attaching a comparatively rigid system of levers to the almost freely floating magnetic shoes, the advantages of the new combination are obvious. It is said that the same leverage is obtained as with the ordinary mechanical slipper, so that the mechanical and magnetic effects when superimposed must be much more powerful.

The two functions of the brake are independent of each other, so that the failure of one does not affect the other.

The designers suggest that the magnetic function should be utilised for speed regulation and service stops on the level, and presumably on slight inclines, but that on more dangerous inclines the present practice of stopping the car on the brow, and applying the track brake mechanically, should continue in force. That is advisable, for two reasons, the chief being that, in case of a failure of the magnetic force in the middle of a steep hill, the car might gather such speed before the driver could bring the mechanical force into action, that no leverage at his command would serve to stay it; and the other is that it is undesirable to alter radically the habits of the drivers.

The objection to relying on a mechanically operated slipper brake for stopping or even for slowing up a car which has begun to run away—*i.e.*, has reached a speed in excess of 8 to 10 miles per hour, on a really dangerous grade, of which there are plenty of instances on the tramways of this country, may not be well founded. In Britain and America there is in tramway circles the same feeling of uncertainty, and this will not be dispelled until a series of tests at high speeds on grades of 1 in 8 to 1 in 16 have brought out the track brake triumphant.

All admit that the same remarks can be, and are, applied to the magnetic brake in a lesser degree, and by fewer competent critics, but there is a general hope that Mr. Fell will take care to make the tests sufficiently stringent and exhaustive so that they may throw much light on these matters.

Varnish on joints, ground or packed, is better than the average red lead. It dries hard and makes a good joint.

Wireless Telegraphy.

When the British Act was before Parliament the reasons given in support were that Legislation is essential in the interests of the naval and military requirements of the Empire. The Post Office, therefore, intends to retain for itself the following powers.—(1) The control of the transmission of messages; (2) the prevention of installation of unauthorised stations; (3) the disposition of stations in the most advantageous way, so as to obtain the best results in working, free from interference, accidental or intentional. The latter clause had a commercial significance, and it was pointed out that, if wireless telegraphy is to be developed and applied with the greatest advantage to the public, it is desirable that the position of the stations and their interference with one another should be regulated. Wireless telegraphy, therefore, may only be practised—it was concluded—under license from the Post Office. These licenses, therefore, have the sanction of the Admiralty, War Office, and Board of Trade, the last named being included "as the progress of wireless telegraphy affects the trade and commerce of the country." There was nothing unduly restrictive of enterprise in the Act, and no reason was anticipated why wireless telegraphy should not progress as quickly under license as without it. On the other hand, not much has been done in the interval.

Belgian Trade.

Belgium has adopted a scientific tariff by which raw materials are allowed to enter her markets free, and the gradation of duty on manufactured articles is so arranged that luxuries are taxed at much higher rates than the goods likely to be used by the poorer classes. In twenty years the bulk of imports at Antwerp has risen from 2,800,000, tons to 7,500,000,tons or an increase of 160 per cent. As remarkable has been the growth of home trade and population, whilst the number of workmen and the wages they earn have shown the same progressive improvement. Between 1880 and 1890 the workers in the industrial classes increased 33 per cent., whilst the rate of wages rose 21 per cent, or more than 4s. in the £. The native spinning and weaving industries are encouraged by a graduated duty on the imported article, with the result that they have been firmly established. In short, the scientific tariff of Belgium, sufficient but not prohibitive, has enabled the manufacturers of that country to compete in the home market against all rivals, "and," says the Consul-General, "it is certain that under this policy there has been a large increase in the volume of trade"

Electricity and Warships.

Of the development of electricity, the well-known engineer M. S F Walker of Bath recently said—(looking through rose-coloured spectacles)—"What electricity will do, is to enable every source of power to be used at great distances from the source where necessary, and it is here that it will have such an important bearing upon the future of navigation. At present a steamship's radius of action is strictly limited by its coal carrying capacity. Without coal it is absolutely helpless The idea of a battleship in a gale of wind on the lee shore without coal is pitiable. On the other hand if a ship be driven by electricity, stored in accumulators, by a proper arrangement of wind-engines, every puff of wind can be made use of. On the supposition that ships are driven by electricity, every wind swept island, such as St. Helena, becomes the equivalent of a coaling station, without the necessity of carrying the coals there; while the power could be stored on the island, when not required, just as easily as coal is at present. Instead of coaling, the time will come when ships will go alongside a wharf, or in certain cases, where cables can be laid with safety, will moor to a buoy, and connect to a source of electricity, filling up their accumulators quietly and without the dust and general annoyance incidental to the operation of coaling

The Telegraphone.

Speaking recently of this instrument, the famous electrician, Sir William Preece, ex-president of the Institute of Civil Engineers, said that "It is one of those things which is going to open the eyes of all our physicists and scientists and theoretical men on the question of the molecular character of all magnetic and electrical apparatus operations" The fundamental principle of the machine is essentially dependent upon magnetic changes set up in a steel recording-medium, when acted upon by sound vibrations, during its passage through a magnetic field. The actual record, being magnetically induced, is, of course, invisible. Nothing whatever is impressed *upon* the recording medium, the record being obtained by an inscrutable rearrangement of the molecules throughout that portion of the recording-medium operated upon at any given moment. In much the same way that a piece of iron may be rendered permanently magnetic, or may be demagnetised so records taken on the telegraphone can either be secured in a permanent form, or can be obliterated at will.

OF TECHNICAL LITERATURE.

By W. M. M., in *Electrical Review.*

(concluded.)

Let any engineer who thinks I have undervalued the importance of reading technical books ask himself to what he is indebted for his own knowledge. I fancy he would find himself compelled to put first and foremost his practical experience in workshop and laboratory. Second would come what is picked up in conversation with his friends and fellow engineers. There is no more foolish prejudice than that against talking shop; premising of course, that no one is shut out of the conversation thereby. Third in importance are lectures, debates (which are mere formal conversations, and all the better the less formal), and the floating literature of papers and journals Last of all, *longo intervallo*, would come technical books, rather a storehouse of what has been otherwise acquired, than a means of acquiring; useful for reference, but deceptive as a basis of knowledge. For the engineer is indeed a man who works with his brains, but he must think with his fingers. Those whose knowledge comes mainly from books have their minds filled with eidola, and are out of touch with realities, which perplex and annoy them. A boy learns more engineering from his bicycle, especially if it be a motor-bicycle than from all the primers and diagrams with which he may be crammed and learns it in a much pleasanter way. The motor-car, as Mr O'Gorman once said, is making us, men and woman alike, a nation of engineers.

It follows that technical literature should be mainly theoretical The bridge of the text-book should be a diagram, or if some special pattern be described it should be merely by way of illustration. Details of manipulation, the cleaning of connections, how to put the wire round the binding screw, &c., should be taught orally in the laboratory Too often the text-books pile one pattern on another till the thing looks more like a maker's catalogue than a book.

Writers of papers should make sure they have something to say worth saying before they rush into print The great majority of papers reminds one of Millar's picture, "Now all turn round an see me jump" The egotism is charming in a child, but disgusting in a man. We don't want to see them jump, unless they can jump further in some direction than anyone else In short, every paper should constitute a record in its particular line. There might be fewer of them, but what discussions we should have! In the highest department of technical literature of all, that of pure theory, it is above all things requisite to have ideas to have some message to deliver.

Rosin on the blacksmith's forge improves and toughens steel. When the tool is hot, dip it into the rosin, then hammer.

Building & Architecture.

The Architectural Editor will be glad to receive suggestions or matter from those interested in this section. Address: Architectural Editor, Progress, *Progress Buildings, Cuba Street, Wellington.*

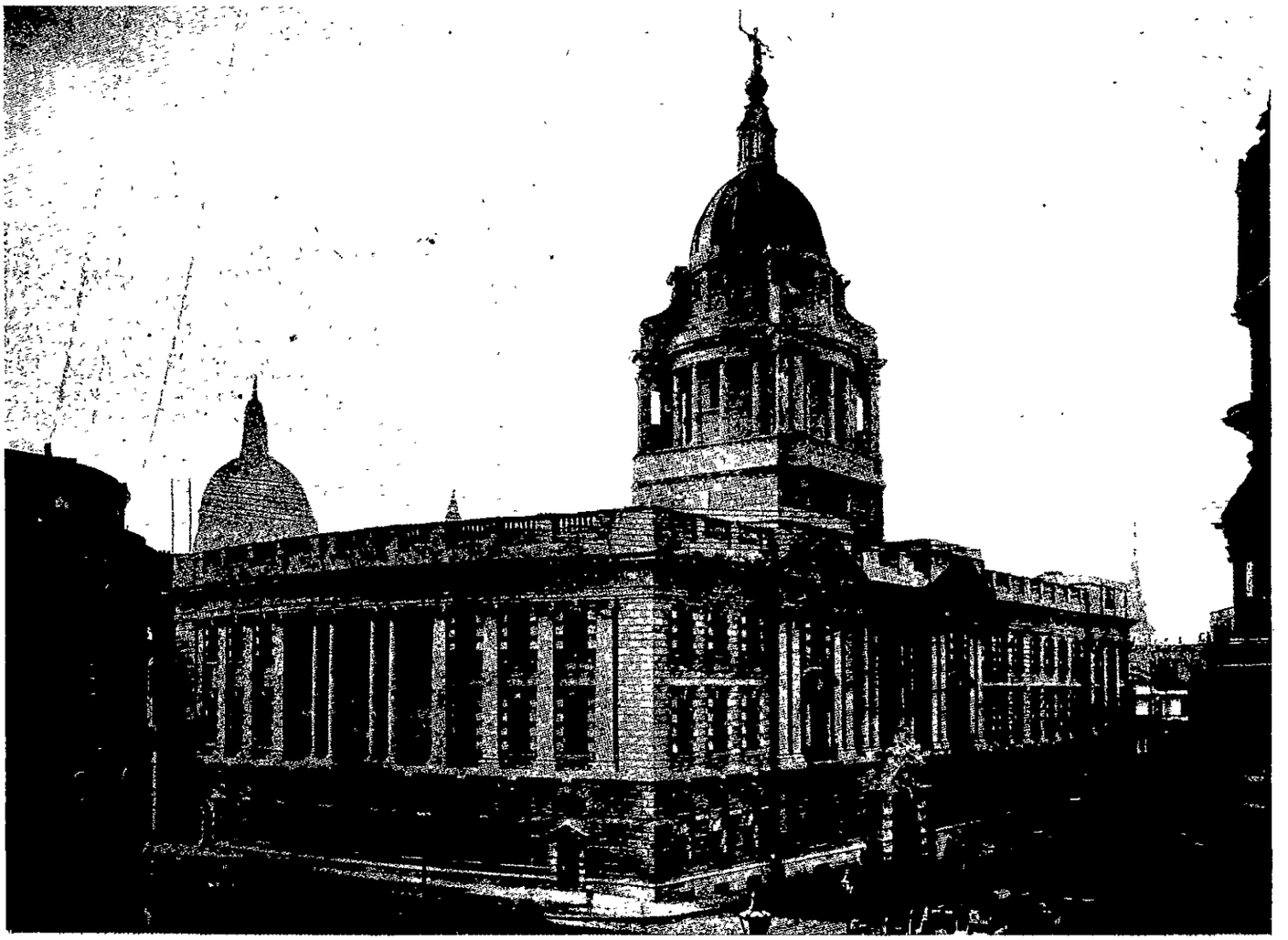
The Central Criminal Court

(London)

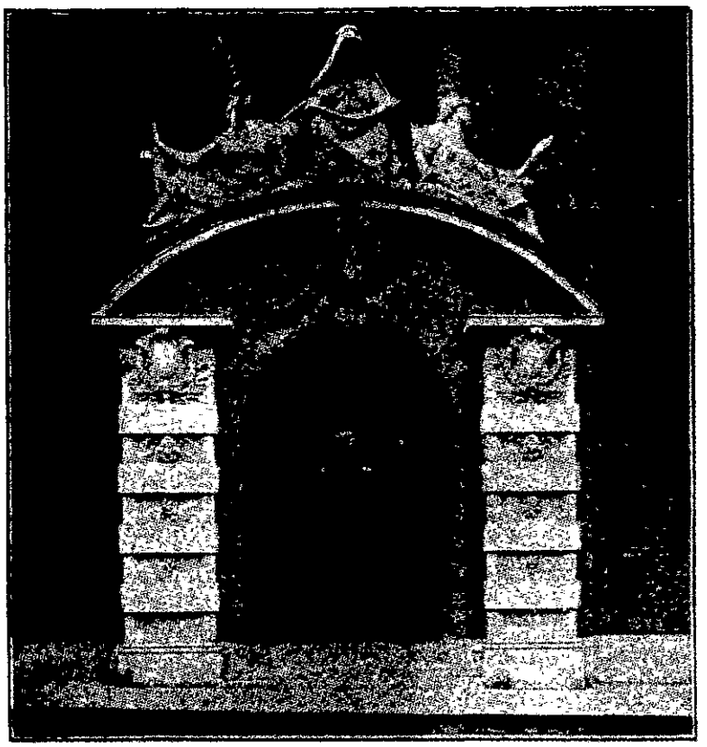
Who has not heard of the Old Bailey, and who has not been thrilled by accounts of the great prison of Newgate? The New Central Criminal Court occupies the place of the first in the administration of the Law, and the site of the second. His Majesty the King delicately referred, during the incidental ceremony, to the past, as the period in which extremely drastic punishments were deemed necessary for the protection of society. He did not refer to the type of Old Bailey lawyer who grew out of the proceedings of those days, and maintained an exceedingly unsavoury reputation for many generations. The new building is, at all events, a sign that both these institutions of the past are gone, to return no more to add to the pains and perplexities of mankind. From the illustration in our columns it will be seen that, regarded simply as a building, the new Court ranks among the few notable works that have been carried out in England within recent years. Architect, says a contemporary, sculptor, and decorative artist have given their best; and the result, though not, perhaps, a supreme work of genius which future ages will regard with the admiration we give to St. Paul's cathedral, is yet a worthy presentment of the level which architecture, and the arts and crafts subsidiary to it, have attained in the opening years of the twentieth century. Such is the new Palace of Justice. The building is in the Renaissance style, freely treated—a mode of building fast becoming the characteristic style for English buildings of any importance.

The central hall is undoubtedly the finest portion of the building. The dome, which, as an external feature, is of somewhat doubtful value, gives a remarkably fine interior effect, and provides means for the display of some notable sculpture and painting decoration. The sculptures in the pendentives consist of four allegorical groups by Mr. Pomeroy, representing Justice, Mercy, Charity and Temperance. They are admirable examples of architectural sculpture, strictly subordinate to the architecture, though fine works of art in themselves. The stone in which the sculptures are carved is Ancaster, which is softer and of a browner tint than the Portland of the exterior. The paintings on the panels of the dome are allegorical figures by Mr. Moira, symbolising Truth, Wisdom, Knowledge and Labour. To the right and left of the central dome-covered space are extensions of the hall, each of which is covered by a domical skylight, supported by arches. The lunettes contained in these arches are decorated in the one case by Mr. Moira, in the other by Sir William Richmond, R.A.

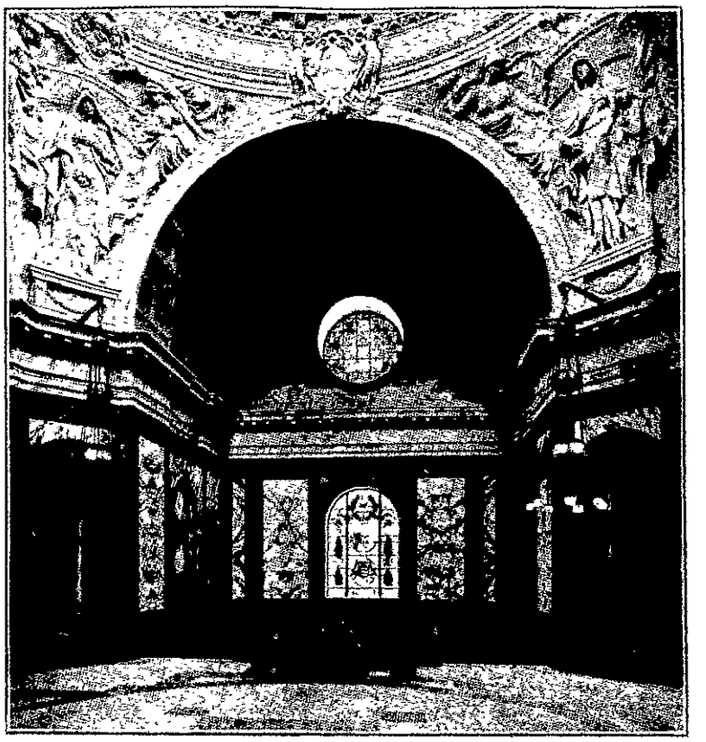
The wing of the hall, for which Mr. Moira is responsible, is completed, and affords a very beautiful example of decorative work. In one of the three lunettes King Alfred is represented administering the law. In the background is a shadowy suggestion of Stonehenge. On the frieze beneath is the motto "Right lives by Law and Law subsists by Power." Another picture shows Moses, a white robed figure, surrounded by the Elders of Israel, to whom he is giving the tables of the Law. Behind rises the frowning mass of Sinai. On the frieze below are the words: "Moses gave unto the people the laws of God." In the third picture, representatives of the various classes of Modern English society—the Army, the Law, the Church, Statesmanship, Labour, &c.—are depicted paying homage to Justice, who has St. Paul's cathedral in the background. This picture has a special interest, from the fact that the artist has introduced into it portraits of eminent men, some of whom are still living, while others have only lately passed away. The figures of Lord Roberts, the late Lord Salisbury, Archbishop Temple, Cardinal Manning, Lord



CENTRAL CRIMINAL COURT, LONDON: THE FRONT.



CENTRAL CRIMINAL COURT: ENTRANCE GATE.



CENTRAL CRIMINAL COURT: STAIR HEAD.

Halsbury, and Dr. Adler, the chief Rabbi, can be clearly discerned. The motto beneath the picture is :—

" Poise the cause in Justice equal scales."

These paintings were executed in oils, on canvas, in the artists studio, and affixed to the wall in sections. They have a lead backing, which will, it is believed, render them quite permanent.

The front looks as if it had been designed to face a wide open space, and one feels that the building would have presented a stately appearance if it could have been placed, for example, where the National Gallery stands, facing Trafalgar Square. As it is, one is inclined to think that this treatment of a frontage which must face a mean and narrow street is a mistake, unless, we are to credit the architect with a seer's vision of the day when a broad *place* shall have been constructed in front of his building. Above a granite base is a first story of rusticated stonework, in which are a series of arched windows, and the main entrance also arched and surmounted by a boldly sculptured group. The sculpture is by Mr. F. W. Pomeroy, A.R.A., and consists of three symbolical figures of large scale representing Law, Justice, and Truth. Above the main entrance, marking the first and second storeys, are two pairs of Ionic columns flanked by triangular pediments resting on pilasters. The tympana are filled with relief sculptures —Law and Justice respectively— and on the centre portion of the frieze is carved the motto " Defend the children of the poor and punish the wrongdoer." Above the parapet rises the copper-covered dome, completing a fine central feature, albeit it is not literally in the centre of the facade, being nearer the Newgate-street end than the lower end.

The dome is the boldest thing about the design. It argues no little courage to build a dome so near to the great dome of St. Paul's, probably the finest architectural feature in all London. Comparison is inevitable. The comparatively small and light cupola of the justice hall altogether lacks the extraordinary dignity and impressiveness of Wren's mighty dome, yet it is not an ineffective feature of the design, and the great gilt figure of Justice which surmounts it has furnished London with a new and striking landmark. This great figure is also the work of Mr. Pomeroy. It stands 22ft. high, and represents Justice, with arms extended, holding in one hand a drawn sword, and in the other the traditional scales.

The exterior of the building, it may be here stated, is entirely of Portland stone, the most suitable of all stones to withstand the weather and the smoke of London, and is a good example of sound masonry. Indeed, the structural work throughout the building is of the most solid and lasting character.

The courts are mostly panelled in unpolished oak ; the furniture is of the same material, the seats of the judges being upholstered in green leather. The accommodation is ampler and the aspect brighter than is usual in most law courts, but little attempt is made at architectural or decorative display. The architectural interest of the interior is. in fact, concentrated on the entrance hall, the main staircase, and the central hall on the first floor.

Through the main entrance in the Old Bailey, where the gate is a fine example of wrought iron and copper work, one passes to a great marble hall or vestibule with its great staircase flanked by massive columns of green marble—the shafts of richly veined cippolino, the bases of the darker verde antico. The balustrade is of alabaster and verde antico, the walls at the side of the staircase are lined with various coloured marbles, and under the arches, which support the ceiling of the staircase, are two stained glass windows by Professor Gerald Moira.

Insurance Losses at San Francisco.

The fire loss at San Francisco, through the calamity of last April, is not likely to be ever accurately known. Probably the most reliable estimate yet given is that furnished by a special committee of the Board of Trustees of the San Francisco Chamber of Commerce. They put the value of the buildings and contents destroyed in the fire at about 350,000,000 dols. (say £70,000.000). This figure is arrived at by the consideration of insurance liability, the known ratio of insurance to value being about seventy per cent., and by estimating that about five per cent. of the property was insured. The total area burned was about 3,000 acres, or about 4.7 square miles, containing 520 blocks and about 25,000 buildings, one-half being residences.

A New Range.

The Prince of Wales, when visiting the model dwellings erected by the Chelsea Borough Council, remarked to the architect, Mr. Charles S. Joseph, what an advantage it would be if the tenants could utilise the same fire for cooking and for heating the living room. The upshot of this chance remark is the " Prince of Wales " range, which Mr. Joseph has invented, and which the *Morning Leader* illustrates and describes. The fire is placed in the division wall between kitchen and sitting-room, and extends from room to room. One flue serves for both fires. An iron shutter divides it in the middle. If you wish to transfer the kitchen fire to the sitting-room, you simply raise the partition, and also the false bottom of the range. You can then shoot out the fire into the sitting-room grate, and close the partition again. It sounds very simple, and if it proves also to be efficient, there should be a decided future for the Prince of Wales range.

The Building of Churches.

" If you have to build cheaply, you should at least build solidly, and not waste money on moulded dressings of Bath stone, or even baser materials. Simplicity in design is the best way of securing cheapness. Simplicity is consistent with dignity. but the use of shoddy material can never be anything but mean."

(Sir C. Nicholson and Mr. Corlette before the R.I.B.A. on a recent occasion.)

N.B.—Many red columns in N.Z. Parliament House are of tin.

Builders and Speculators, &c.

There is a disposition to condemn severely the speculative builder, for no other reason than that he is a speculator. But the fact happens to be that every builder builds for what he can make out of his venture, in the same way as the man who sells chairs does so for profit. That governs all things in the world of work and wages and contracts. It is unfortunately true that many speculative builders have shown themselves utterly reckless, unscrupulous, and incompetent. But the calling itself is as honourable and useful a one as could be found, and among its practitioners are many men whose character and abilities would make them a credit to any calling. Especially at a time when the supply of cheap and sanitary houses for the working classes is recognised on all hands as one of the pressing needs of the day, the man who does anything to meet the demand for such houses, at the same time paying all his just debts, may reasonably claim that he is filling a useful place in the social economy, and that his is the last calling which should be the object of contemptuous animadversion.

The Palm to Desert.

To Mr, J. Belcher, G.Y.A., falls the high honour of being this year the recipient of the Royal Gold Medal. The medal is awarded annually by the King, on the recommendation of the Royal Institute of British Architects, to some distinguished architect or man of science or letters who has designed or executed a building of high merit, or produced a work tending to promote or facilitate the knowledge of architecture, or the various branches of science connected therewith. Few will dispute Mr. Belcher's claim to this recognition of his genius. He is a leading representative of the most influential school in English architecture at the present day—that which adopts Renaissance forms, but treats them with freedom. His most notable buildings in London are Electra House, in Finsbury-pavement, and the Chartered Accountants' Hall, in Moorgate-place.

A Warning Against the Skyscraper.

A citizen of Wellington, just returned from his travels abroad, discourses about many things he has seen. *Inter alia* here is a word of a certain experience in New York :—

" In stormy weather so great is the velocity of the wind, which eddies always curving upwards, which beat around the base, that experienced pedestrians avoid the skyscrapers as much as possible. During a gale it is one of the most pathetic spectacles of this city to see inexperienced ladies from the country captured by the eddying winds which sweep around the base of the skyscrapers, blowing their skirts over their heads and hurling them pell-mell down the street, until they reach a less disturbed region."

Cost of Concrete.

The *Public Health Engineer* quotes the Liverpool city engineer as having said that concrete buildings can be built on a large scale for twenty-five per cent. less than brick buildings of the same size.

Restoration.

The restoration school had a long innings during the nineteenth century. The more conservative school is now in the ascendant. But to suggest that people who object to drastic restoration are indifferent to the charm and interest of ancient buildings is quite beside the mark. Quite likely the very opposite is the fact.

An Interesting New Departure.

Near the village of Bedenden, in Kent, a large building is approaching completion, which is interesting, not merely from an architectural point of view, but on account of the conditions under which it is being erected and will be maintained. The building in question is a sanatorium for consumptive patients, and the cost of its erection—about £50,000—and of its maintainance, is defrayed by about thirty working men's unions and societies. The levy per member of the contributing bodies is one halfpenny per week, and this sum insures for the members the right to treatment under the most favourable conditions that modern science has devised, should they be so unfortunate as to contract the dreaded disease. The site on which the sanatorium is being built is 250 acres in extent. The building is crescent-shaped, and has been designed by Mr. A. William West, who acted as honorary architect, to accommodate 200 patients of both sexes. Though naturally it is not planned on such luxurious lines as the Edward VII. sanatorium at Midhurst, it is believed that nothing which the best hygienic authorities regard as essential has been omitted.

"GWAVAS," TIKOKINO: THE RESIDENCE OF MR. A. S. G. CARLYON. [*Architect: C. Tilleard Natusch*.

Dangers of Reinforced Concrete.

Many have sung the praises of reinforced concrete as building material. Mr. Richard L. Humphrey, in his presidential address to the American National Cement Users' Association, sounds a note of warning. Notwithstanding its many advantages, reinforced concrete, he said, "has its weaknesses and limitations, and these should be faced squarely by its advocates and pointed cut emphatically." He showed, moreover, that, unlike the steel internal armouring, which is carefully supervised at the factory, the cement concrete which forms the external shell of the structure is fabricated on the spot, "subject to little, or at the best indifferent, inspection," and is left to the mercy too often of the unintelligent labourer. Mr. Humphrey maintained that a frequent source of failure in concrete construction is the lack of attention to details, especially as regards connections in the erection of a structure. Too often, while the reinforcement is ample in amount, there is danger that the building may be rendered fatally weak by the character of the connections used in the armouring; and it must not be forgotten that it is not enough to imbed the ties and straps in a solid mass of concrete, but provision must also be made to unite and properly to anchor the reinforcement, on which the strength and stability of the building so greatly depend.

Cheap Cottages.

It is a subject much discussed here in connection with the government policy of building cottages for the workers. The general opinion has been so far against the possibility of doing the work at a cost remunerative to the worker, for whose benefit the work is designed. The following extract from the *Essex Weekly News* throws some interesting and hopeful light on the question. Number one says :—

"There are few social questions of more importance than that of providing decent houses for artisans and labourers at rents bearing a reasonable proportion to their means, and any experiments in this direction are always interesting. A good deal was made of the cottages erected in the Garden City; but Mr. Sanger Tucker, of Glencairn, Sandon, claims to have gone one step further and demonstrated in practice the possibility of erecting a commodious detached cottage for £160, apart from the cost of the site. The building contains three bedrooms upstairs, two sitting-rooms, and out-offices. The water has been laid on, and proper sanitary arrangements have been provided. All the floors are in pitch pine, and the rooms are well lighted. The cottage is not quite completed, but it is not too early to ask why that which is possible at Sandon should not be possible elsewhere." Why indeed ?

In the second extract Mr. R. Mawhood, architect, of Chelmsford, refers to several pairs of five-room cottages which have been built in various villages—*viz.*, Chignall, Good Easter, Blarkmore, and the Woodhams, each containing a living-room and kitchen, 12ft. square, a large front bedroom, and two small ones at the back; with pantry, coal and wood house, and cesspool and drainage, the cost of which has varied from £275 to £325 per pair. He adds that he also could have a single cottage of five rooms built for £160, provided the bricks, gravel, and sand were within two miles of the site.

CENTRAL CRIMINAL COURT, LONDON. ENTRANCE HALL.

The Smoke Nuisance.

A controversy appears to be going on in every town of Great Britain for the suppression of the smoke nuisance on account of the extraordinary damage it does to the city architecture. In many instances the controversy has been followed by drastic municipal action and the disappearance of the nuisance, to the manifest advantage of the architecture. This, in spite of the known and much commented fact that the makers of smoke in some cases were the controllers of the municipal council. A little of this wholesome spirit in the practice of the chief centres at all events, would do a great deal of good. In Wellington, for example, the defacement of public buildings, notable examples being the Town Hall and the Hill Street Basilica, is the remark of every visitor. There are many beautiful examples of building with the fine white stone of Oamaru, and these are disfigured in some instances almost beyond recognition.

The Vexed Question of Apprenticeship.

Mr. W. Nicholson, the senior vice-president of the National Federation of Builders, speaking at the annual dinner of the Yorkshire Branch of the Federation, advocated the old-fashioned seven years' apprenticeship for lads entering the building trades. If every master, he said, would take a reasonable number of apprentices and bind, control, and take care of them, they could put upon the labour market in due course a regular supply of well-trained and competent tradesmen. That, no doubt is true. But unfortunately, employers of the present day are not willing, speaking generally, to give that care and attention to the training of apprentices which Mr. Nicholson desiderates. It is the failure of employers to realise their responsibilities to their apprentices, quite as much as the unwillingness of the lads to be bound for a long period, which has led to the breakdown of the system. It is doubtful whether it can now be extensively revived. The trade school and the polytechnic will, probably, become more and more the training grounds of the skilled craftsman of the future.

In our issue of April the name of the firm represented by Messrs. C. A. Hamlin & Co. should have read "The Miracle Pressed Stone Co." in place of "The Miracle Compressed Stone Co." Messrs. Hamlin & Co write informing us that the method of making the Miracle blocks is by tamping, not by compressing.

Mr T Parsons mentioned at a recent meeting of the N Z Farmers Dairy Union, at Woodville, that Mr Lowe, representative of Messrs. Weddel and Co (London), has recently visited Eketahuna and inspected the local factory He said that this factory is the best he has ever seen, and he has visited Africa, the Argentine, and other parts. The plans of this factory which were prepared by Mr. L G. West, of Palmerston North, were on view at the exhibition and there met with a good deal of favourable comment.

Building Notes.

A contract has been let for a grain store at Rakaia, for Mr. Colin Stewart. Architects, Clarkson & Ballantyne; contractor, S Ashton

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Messrs. Myres and Illingwood were the successful tenders for the erection of a new hotel on Lambton Quay. The contract price is about £14,000.

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Tenders are being called for a handsome brick and stone building, to be erected at the corner of High and Lichfield streets, Christchurch for Mr E Reynolds. Architects Clarkson & Ballantyne

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Additions are in course of erection at Mr. R Ballantyne's residence in Ilam road Riccarton Architects, Clarkson & Ballantyne; contractors, Butler & Sons.

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A contract has been let for alterations and additions to Mrs. Gray's house on River road, New Brighton. Architects, Clarkson & Ballantyne; contractor J. Hammett.

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Additions are in course of erection to Mr. J J. Kerr's house in Gordon street, Sydenham, Christchurch. Architects, Clarkson & Ballantyne contractor, J. Rowe

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The work of finishing portion of the top floor of the Sacred Heart Convent at Island Bay is being carried out; the contract price being £690 Architect, J. S. Swan; contractor John Moffat

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Mr. S D. Cronin, architect, has accepted the tender of Mr. J Greig for the erection of a residence at Kilbirnie Thirteen tenders were received The contract price is about £835.

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A contract has been let for a warehouse and factory in St Asaph street, Christchurch, for Messrs Craddock. Simes & Co., electrical and mechanical engineers. Architects, Clarkson & Ballantyne; contractor, A. Swanston, junr.

* * * * * *

A contract has been let for a block of buildings—six two story shops in brick and stone, at the corner of Gloucester and Manchester streets, Christchurch, for Mr Charles Hulston Architects Clarkson & Ballantyne; contractors, Rennie & Pearce.

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A contract has been let for repairs and sundry improvements to a residence at Blackbridge, Lower Hutt, for Mr. Herrman Lewis. The contract price is £653 Architect, John S. Swan; contractor W. Jennings

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Mr. C. Tilleard Natusch, architect, gives notice of change of address to new ground floor offices in Messrs. Menteath & Beere's building, opposite the Supreme Court, in Ballance street, Wellington. Although Mr. Natusch only opened an office in Wellington last June, he has instructions for some £50,000 of work in Wellington already.

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A contract has been let for extensive additions and alterations to Messrs Sargood, Son & Ewen's warehouse at the corner of Jervois quay and Hunter street, Wellington The new roof will be the largest flat roof in the city, the area being over 11,000 sq ft. The work will cost about £7,000. Architect, John S Swan; contractors, Campbell & Burke

* * * * * *

A neat brick building has just been completed in Feilding for Mr. A. G Carty, Solicitor, and contains a well-arranged suite of offices, of nine rooms, strong rooms, and conveniences planned for the special requirements of the owner and occupier The contract price is £1,200 Architect, John S. Swan; contractor, H. Newman.

* * * * * *

"Gwavas," Tikokino, is probably the finest of the Hawkes' Bay residences The house stands on a commanding rise, and is approached by a broad drive winding up between beautiful lawns, which, with the whole of the large gardens and plantations are kept in fine order. The house contains a 15ft. wide panelled and lofty hall about 40ft long, at the end of which is a lead light window, in the centre of which the coat of arms of the owner has been painted. The 5ft staircase is all of black heart of rimu, and is massive in design From this hall and adjoining corridor are approached very large drawing and dining rooms, library, smoking room, billiard room and two spare bed rooms The domestic offices are very complete, and there are also ample bed and bath rooms, etc., all up-to date. This residence was originally a single story one, but the architect was entrusted with the work of adding another story and designing all the improvements to bring it up to the beautiful residence it is admitted to be. Architect, C. Tilleard Natusch. *See page 266.*

Mr. POULSEN'S DISCOVERY.

£100,000 Paid for the English and American Rights.

Cable messages lately reported that a discovery of far-reaching importance in wireless telegraphy had been made by Mr. Waldemar Poulsen, a young Danish electrician. Home files state that Mr. Poulsen's new system was explained at a Queen's Hall meeting, attended by the Duke of Argyle, the Princess Louise, and many scientists. By this system, perfect communication has been established between Copenhagen and North Shields (530 miles) with the aid of a mast only 100ft. high, and with a power of about one kilowatt—roughly one h.p. At this rate a power of only 10 kilowatts would be required for transatlantic communication. Mr. Poulsen solved the problem of producing undamped electric waves of a million vibrations a second, through discovering the peculiar properties of an arc immersed in carburetted hydrogen. Multiplex wireless telegraphy will be possible to an almost unlimited extent, as, owing to accuracy of tuning, each particular receiver is affected only by the messages intended for it. Lord Armstrong has paid £100,000 for the English and American rights.

VALDEMAR POULSEN.

APPLICATION FOR PATENTS.

The following list of applications for Patents filed in New Zealand during the month ending 15th March has been specially prepared for Progress.

22551—I. P B Kundsen, Copenhagen, Denmark Centrifugal machine

22552—I P B. Kundsen, Copenhagen, Denmark Centrifugal separator.

22553—I. P B, Kundsen, Copenhagen, Denmark · Bearing for rapidly rotating bodies.

22554—R Love, Auckland Games advertising medium.

22555—W. H Haslett and N Marsdon, Auckland Anæsthemic

22556—W C Page and R V Anderson, Wellington Reinforced concrete structures.

22557—C. Jansen, Palmerston North · Draining clothes in process of washing

22558—F H Lampen Wellington Signalling-flags.

22559—J. Murdoch, Wellington · Toilet-cabinet

22560—H W Gilling, Matapu · Milking-machine.

22561—H. Mackay, Martinborough: Bicycle chain guard.

22562—G Hutchinson, Christchurch, · Seed-sower.

22619—J. Sharpe, Glebe, N.S.W.: Bottle or jar for liquids under pressure.

22563—D. W. McLean, Methven: Tire.

22564—E. N. Waters, Melbourne, Vic.: Cable chain-grip.

22565—L. A. Pannell, Christchurch: Adjusting and measuring hobbles for horses.

22566—W. E. Hughes, Wellington: Finishing and cooling curved stereopypes.

22567—W. E. Hughes, Wellington: Finishing, cooling, and drying curved stereotypes.

22568—H. P. Pearson, Manchester, Eng.: Hats of straw, palm leaf &c.

22569—Linotype and machinery Limited, London, Eng.: Printing machine.

22570—United Shoe Machinery Company, Paterson, U.S.A: Pounding-up machine.

22571—United Shoe Machinery Company, Paterson, U.S.A.: Grooving or channelling attachment for sewing-machine.

22572—S. W. Winslow, Beverly, U.S.A.: Buffing and abrading machine.

22573—C. A. Kidd, Christchurch: Bicycle pedal strap.

2574—B. G. C. Stephens and B. G. Mahoney. Dunedin: Inflating tyres of motor-cars.

22575—M. G. Wilson, Rongotea: Collapsible-box.

22576—A. Hankinson, Sydney, N.S.W.:, Wire lattice for reinforcing concrete floors.

22577—A. A. Walters, Melbourne, Vic.: Opening or closing lift or elevator doors.

22578—A. E. Young, Christchurch: and E. G. Kerr, Timaru: Machine for issuing checks or tickets.

22579—The Kendrick and Hill Manufacturing Company, Denver U.S.A.: Lawn-mower.

22580—J. Whitehouse, Waihi: Wire-mattress bed.

22581—A. Storrie, Invercargill: Vacuum milking-can.

22582—G. W. Wilkins, Penhsurst, V c.: solution for rendering fabrics fire-proof.

22583—J. Thompson, Invercargill: Spring tire for vehicle wheels.

22584—J. Burrows, Auckland: Hose-darner.

22585—J. A. Steele, Tamahere: Apron of harvester-binder.

22586—J. and H. M. Copeland, Palmerston North: Telephony.

22587—J. and H. M. Copeland, Palmertson North, Telephony.

22588—E. S. G. Rees, Wolverhampton, England: Rotary pump and turbine.

22589—B. A. O. Prollius, Copenhagen, Denmark Distance pieces for the insertion plates of centrifugal machines.

22590—K. Gillingham, Dunedin · Oven of cooking range.

22591—R. B Williams, Winton: Umbrella.

22592—J H. and P. Walker, Dunedin: Safety cock and tap.

22593—T. R. Christie, Dunedin: Skylight.

22594—C. H. Matthews, Wellington: Means for re-covering billiard tables.

22595—F. H. Lampen, Wellington: Range-finder.

22596—E. T. Coppell, Kaitaia, Auckland: Self-centering lathe chuck.

22597—E. T. Coppell, Kaitaia, Auckland: Automatic mechanism attached to lathes for replacing callipers &c.

22598—H. Rochfort, Auckland: Filtering suction hose.

22599—H. A. Adams, Linton, Vic.: Document files and assembling means.

22600—G D. Lumsden, Christchurch: Steamer and strainer for cooking utensils.

22601—A. Rowlands, Wellington. Motor-tire.

22602—H. E. White, Christchurch,: Concrete mixing machine.

22603—N. Olsen, West Plains: opening and shutting gates.

22604—W. Jamieson, Christchurch: Rotary engine.

22605—G. E. Woodbury, San Francisco, U.S.A.: Ore-concentrator.

22606—International Sand-blast Company, San Francisco, U.S.A.: Sand-blast apparatus.

22607—F. W. Barton, Dunedin: Cellar lift for casks or packages.

22608—R. R Richmond and A. H. Byron, Wellington · Bricks and method of laying same.

22609—A. G. Andin, Glenferrie, Vic.: Milking machine.

22610—J J F M. Smulders, Rot terdam, Holland: Lighter, or vessel from which coal is discharged.

22611—J. J. F. M. Smulders, Rotterdam, Holland: Continuous conveyors used in conveying coal, &c.

22612—E S. Slee, North Carlton, Vic. and P. Tremayne Brunswick, Vic Machine for sweeping and elevating road refuse, &c.

22613—A Crichton, and W. Williams, Dunedin: Adjustable chair.

22614—F Cotton, Hornsby, N S.W.: Treating ores containing iron.

22615—J. Peterson and J. Wearn, Invercargill: cream-cooler.

22616—W. Alexander, Wellington: An accessory of temperature and moisture testers.

22617—D. J. Young, Ohinemuri: Fire-kindler.

22618—D. McKenzie, Auckland: Wire mattress and bedstead.

22620—J. P. Horner, Epsom: Shaft-tug.
22621—R. R. Douglas, Dunedin: Machinery rollers.
22622—H. Wilkenning, Clifton Hill, Vic.: Belt and conveyor fastenings.
22623—F. A. Kjellin, Stockholm, Sweden: Method and furnace for reducing metals.
22624—J. H. Warren, Albert Park, Vic.: T. Blades, Footscray, Vic.: and J. Wren, Kew, Vic.: Railway- signalling.
22625—E. S. Baldwin and H. H. Rayward, Wellington: Rifle-sight.
22626—J. W. Harris, Montreal, Canada: Excavator
22627—W. S. Cobham and H. H. Oxley, Wellington: Tips for the ends of chair &c., legs.
22628—F. R. Cotton, Christchurch: Telephone subscriber's list.
22629—International Cigar Machinery Company, New York, U.S.A.: Cigar machinery.
22630—E. H. Clift, Kensington, Eng.: Internal combustion engine.
22631—W. R. Taylor, Rakaia: Sheep feed-box.
22632—E. Goltstein, Cologne, Ger.: opening bottle stoppers.
22633—E. Goltstein, Cologne, Ger.: Bottle-capsule.
22634—E. Goltstein, Cologne, Ger.: Closing bottles by means of metal capsules.
22635—S. E. Bell, Wangaratta, Vic,: Fuel economizer, soot-arrester, &c.
22636—G. J. Cox, Balwyn, Vic.: Securing cash box of coin—freed apparatus.
22637—C. J. Cox, Vic.: indicating and recording the velocities of fluids.
22638—R Lowe, Brunswick, Vic.: Rotary and revolving action maze.
22639—E. G. McDougall, Wanganui: Machine for dividing and wrapping blocks of butter.
22640—T. Tait, Waiwera S.: Wire fence dropper.
22641—H. McKinlay, Broken River: Sewing machine needle.
22642—L. Burrell and D. H. Burrell, junr., Little Falls, U.S.A.: Shaft mountings for centrifugal machines.
22643—H. H. Kerr, Elsternwick, Vic.: Alternately supplying vacuum and air around teat-cups.
22644—F. J. McDonald, Sydney, N.S.W.: Press for compressing material into bales.
22645—A. E. Usherwood and W. H. Hanlon, Dunedin: Valve gear for engines.
22646—F. C. Thompson, Christchurch: Bracket for fixing blinds to window sashes.
22647—W. A. Thompson, Nelson: Tire-inflator.
22648—T. H. Davidson Dunedin · Flax-scraping machine.
22649—F. W. Payne, Dunedin: Hydraulic-ram.
22650—G. J. Browne and E. Toms, Palmerston North: Machine for making sheet-metal seamed and grooved piping.
22651—J. Callaghan, Dunedin: Milk can and measure.
22652—R. Wilson, Dunedin: Flue attachment for ranges.
2653—B. W. Benn, Meeniyan, Vic · Vacuum motor for cow-milking apparatus.
22654—B. W. Benn, Meeniyan Vic.: Cock and accessory for use with milking-machines.
22655—J. B. Davies and H Bell Melbourne, Vic. Nail-making machine.
22656—W. Gillett and M. D. Lehmann, London, Eng.: Carburetter for internal-combustion engines.
22657—H. Mote, Balmain, N.S.W.: Extension ladder.
22658—J. Wilson, Auckland: Construction of moulds for use in forming concrete walls.
22659—D. Beckett, Reikiorangi: Wire-netting holder.
22660—J. Wilson, Auckland. Construction of armoured concrete fencing-posts.
22661—United Shoe Machinery Company, Paterson, U.S.A.: Construction of wire for the manufacture of metallic fasteners.
22662—G. T. Booth, Christchurch. Attachment to flax-stripper for truing up beaters of drum.
22663—United Shoe Machinery Company, Paterson, U.S.A.: Pulling-over machine.
22664—J. A. Horton, Providence, R.I., U.S A · Wire-drawing drum.
22665—W. Dunz, Granville, Eng · Laying jointless stone wood flooring
22666—A. Fischer, Adelaide S. Aust.: Quick heating water vessel.
22667—A. Fischer, Adelaide S. Aust. Cooking and baking apparatus.
22668—A. Fischer, Adelaide S. Aust.: Tap for water and gas.
22669—A. Fischer, Adelaide S. Aust.: Gas-burner.
22670—J. Baird, Waikino · Using stored or compressed water for driving water-motor.
22671—G. D. Ross, Glasgow Scotland: Motor vehicle wheel.
22672—W. Scott and M. Richard, Glasgow, Scotland; Machine for handing up or rolling dough.
22673—R. Sylvester, Lindsay, Canada: Agricultural machine.
22674—D. O. Stewart, Wanganui: Applying pressure to liquids.
22675—H. Quertier, Dunedin: Suction road-cleaner.
22676—T. I. Yourelle and J. Bellingham, Wellington; Ferro-concrete and fire proof construction.
22677—H. T. Twiss, Wellington: Street fire-alarm box.
22678—T. Page, Wellington: Manufacture of carburetted air for lighting, heating, &c
22679—A. S. Thwaites, Christchurch. Ploughshare
22680—A. G. Monahan, Timaru · Tailboard for tip-carts.
22681—G. Davidson, Hokitika · Sprocket chain.
22682—T. S. Skeates Auckland Tire protector.
22683—H. J Gaby, Kilbirnie: Step-ladder.
22684—J. E. Friend, Annandale, N.S.W.: Rotary steam-engine.
22685—A. J. Lamb, Christchurch Tramway track cleaner.
22686—S. Lake, Berlin, Ger.: Dredging-vessel.
22687—R. Weir Mount Forest, Canada: Clothes wardrobe.
22688—R. Weir, Mount Forest, Canada · Clothes wardrobe.
22689—F. C Brown, Komata · Lining tube mills and other grinding and pulverising machines.
22690—H. Cramer-Roberts, Waihi · Treatment of gold and silver ores.

Full particulars and copies of the drawings and specifications in connection with the above applications, which have been completed and accepted, can be obtained from Baldwin & Rayward, Patent Attorneys, Wellington, Auckland, Christchurch Dunedin, etc.

Burning of a Royal Motor-Car.

An untoward accident has befallen one of the motor-cars which His Majesty had intended to take with him to Biarritz. On Monday evening, Nov. 4th, as the railway porters were hoisting this 60-h p. machine on to the platform, it was seen that the oil reservoir was full. In the effort to empty it, a lantern was placed too near, the oil caught fire, and the automobile was completely destroyed. (*Times March 5th* 1907.)

BIRD'S CHROME TYRE.

A SPLENDID SUBSTITUTE FOR RUBBER

A Unique and Practical Idea.

It is the old, old story—so many futile attempts to solve a problem on orthodox lines, and the solution eventually found in a complete departure from the beaten track So has it been with the eternal tyre trouble. Efforts innumerable have been made to produce a satisfactory substitute for rubber, and all sorts of compositions have been tried. But the rubber tyre, with its liability to puncture, to "blow out" and to wear out with money-eating rapidity, still remains the dominant covering for the motor wheel, albeit it is now aided by a variety of costly accessories At length, however, a healthy and promising rival has arisen, and if the reasonable anticipations of its sponsors are realised, New Zealand will be able to claim the honour of having solved the problem and earned the gratitude of the motorists of the world Undoubtedly in the unique and practical creation of Mr. W. H Bird's inventive genius, The Bird Tyre Company has got hold of what promises to be one of the best good things—a comparatively inexpensive and thoroughly serviceable tyre The Editor of Progress, when in Wanganui recently, availed himself of the opportunity of inspecting the inventor's original full-sized model, and it is but stating a truism to say that he was profoundly impressed by the tremendous potentialities of the invention. It is so simple yet so evidently effective, and a careful and critical examination seems to

BIRD'S CHROME TYRE : CROSS SECTION

fully justify all the claims that are made on its behalf. And what are these claims? Let us state them categorically—

1—It is economical. The first cost will be much below that of the present-day tyre, and the repair bill will be proportionately reduced.

2—It is as light as a good rubber tyre, while possessing greater density and substance

3—It is simple in construction thereby necessitating no very expensive and elaborate machinery.

4—The material of which it is constructed (chrome leather) is obtainable in all countries

5—It will afford practically complete immunity from puncture or "blow out"

6—It will have less liability to skid or side-slip.

7—It will possess greater wearing qualities

8—Protective armouring will not be necessary but if desired it could be satisfactorily applied to the tyre itself, an obvious impossibility with the rubber article

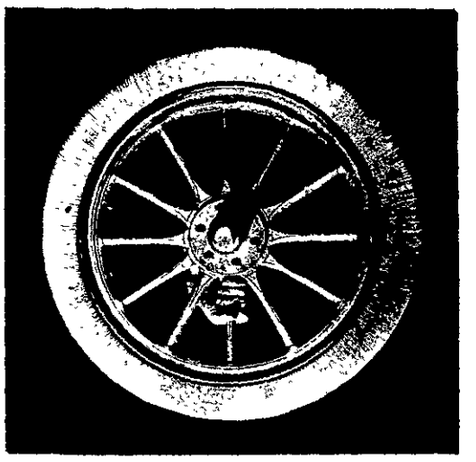
9—Retaining the pneumatic principle, it possesses the resilient qualities of a rubber tyre.

10—It is attachable to the rim of the wheel by any existing method.

Obviously for a tyre possessed of these qualities and virtues there must once it is satisfactorily placed on the market, be an enormous demand. Later on we will refer to the financial possibilities of the invention Just here, however, it is more appropriate that we should give our readers a description of the tyre, so that, by familiarising them with the details of construction, they may be better able to judge for themselves as to the reasonableness of the claims set out above. We need scarcely add, in this connection, that anything approaching a full realisation of the merits of the Bird tyre can only be attained by personal inspection There is that about the tyre which speaks for itself it looks and feels the good thing which we honestly believe it to be As we have already said, the Bird tyre is constructed of chrome leather As all experienced motorists are aware, many attempts have been made to produce a leather tyre, but so far without success. The method usually applied by the experimentalists has been to cut long strips of a suitable size and shape and to mould them to the wheel. This means, of course, that only the very finest portions of each side of leather could be used, the process being to place layer upon layer until the necessary thickness is attained At the very outset a tyre so constructed is open to objection, in that it requires attention immediately the first layer of leather is worn through Furthermore, the continuous rolling tends to make the tyre thinner and thinner, while any stretch left in the leather is developed unequally, thus throwing the tyre out of shape. Mr. Bird has completely departed from the old lines. His tyre is constructed so as to make the edge of the leather engage the ground Small pieces of chrome leather, cut in the shape of the cross section of the tyre, are placed side by side, and the tyre is built up of these pieces until the circle is complete. Compression and vulcanisation complete the process, the leaks having been previously treated with the vulcanising solution, and the whole becomes a united mass It is significant that whereas in all attempts to use leather in the ordinary way only the prime portions of a hide could be utilised, with Mr Bird's method the whole hide may be used up, including the softest portions, and instead of deterioration, the resiliency of the tyre is enhanced, and all waste avoided. The tyre shown in our illustration, though crudely constructed, weighs 17½lbs, is 28 x 4in and is one inch thick on the tread The 28 x 3½ inch tyre which is replaced weighed 15lbs, and is much less in substance. The question may be asked, will not the wear have the time stretching effect as in the case of using leather on its surface? We understand that this would not be the case, as any chance which the running of the wheel might make would have the effect of thickening and not thinning, the leather, thus if anything increasing the torsional compression. Another point which may probably be raised by the uninitiated is as to the probable swelling effect of water on the leather. If the leather used in the Bird tyre was the ordinary brown variety, with which we are all familiar, that might be so, and any attempts at treatment might have the effect of unduly hardening it; but the leather employed by Mr Bird is known in the trade as "chrome" and is enormously strong, besides being so much like rubber in its texture and appearance that many people viewing the tyre have mistaken it for that material Tennis players are familiar with "chrome sole," as it is becoming very popular as a substitute for rubber, than which it is said to wear three times as long while affording equal comfort and spring. However, it might be stated as a fact that the effect of water on chrome leather is not at all similar to that produced on brown leather. True, in its raw state it will absorb a certain amount of water—which has little or no softening effect when compared with ordinary leather—but after having been subjected to the vulcanising and compression processes the pores will be sealed, and its absorbent properties will be practically nil, not more at most than sufficient to give a greater grip on the wet roads and minimise the danger of side slip, that great peril of the motorist. Perhaps the chief factor in tyre troubles is the great internal pressure necessary to keep the ordinary tyre in shape The air is forced into the inner tube to the extent of about eighty pounds to the square inch That being so, any slight injury from without is quickly aggravated from within, and the very efforts of the motorist to keep his tyres in condition by complete inflation only hasten the end. The Bird tyre, possessing greater density does not require the same inner pressure in order to secure the necessary rigidity for a fast tyre, thus putting much less strain both upon itself and the tube With regard to the wearing qualities of chrome leather, an experiment within the reach of any interested person is to obtain a piece of chrome sole leather, a piece of rubber, and a file A very few seconds will suffice to demonstrate that whereas rubber may be easily filed it is by no means easy to make an impression on the leather. Looking at it, then, from every point of view, the Bird tyre appears to "fill the bill," and to be possessed of enormous possibilities. A company in which several of our most influential colonists are interested, has been formed for the purpose of securing patent rights throughout the world and of subsequently disposing of those rights in the different countries. All the shares were taken up by the members of the original syndicate, some of whom, however, have disposed of a small portion of their holdings at a substantial profit. If the enterprise materialises—and we see no reason why it should not do so—it should certainly prove one of the biggest "scoops" ever brought off in Australasia, making the fortunes of the fortunate holders, and result in a splendid advertisement for New Zealand. We need not dwell upon the financial potentialities of an invention like this, nor, indeed, would it be possible to venture even an approximate estimate in face of the amazing growth of the motor car industry Last year the output of cars in the world totalled 193,000, and their total value, at the very low average of £200 each, was £39,000,000. And yet the industry is only in its beginning. Clearly he would be a rash man who would hazard a guess at the value of the rights of a property like the Bird tyre. In conclusion we may say that provisional protection has already been granted to Mr Bird's invention in New Zealand, in the Commonwealth of Australia, and in Great Britain, and the Company expects at any time now to be informed that full patent rights have been granted. We like the tyre; we shall be surprised if it does not prove to be just what is wanted, and we heartily wish Mr. Bird, of Wanganui, and those associated with him, the greatest possible measure of success.

American Saws.

Mr. Rufus Fleming, American Consul at Edinburgh, has been pointing out the superiority of American saws to those of British manufacture He alleges that American saws are not only better than ours, but the fact is practically recognised over the border. Scottish carpenters, joiners, and cabinet makers "have long shown a decided preference for American band-saws." He goes on: "An Edinburgh saw expert informs me that these



BIRD'S CHROME TYRE. IN POSITION.

tools have now gained such a reputation that they have the first grade market practically to themselves. Probably over seventy-five per cent. of the handsaws now sold to skilled mechanics in the district are American. English saw makers have closely copied standard American saws so far as appearance goes, but my informant asserts that they have entirely failed to imitate the American quality His opinion is that the only serious obstacle to the introduction of any new grade American saw here would be the existing complete satisfaction with the goods of certain American manufacturers already well established in the market An Edinburgh saw dealer tells me he gets ten per cent more discount on the best Sheffield saws than on American saws, but that he finds it more profitable to handle the American goods, owing to the strong preference for them."

A correspondent at Stoke-on-Trent, who calls newspaper attention to this matter, expresses a desire to know what reply our English firms can make to this allegation "I am sure," he adds, "we in Staffordshire don't find the Yankee saws beat Tysachs, Drabble and Sanderson's, Groves', and Spear and Jacksons'." There are other protests in various quarters

Letts' Diary.

There is a story told of a certain prosperous, though ignorant, provincial business man, who once wrote to Messrs. Charles Letts and Co, the diary specialists, saying that he had often heard of Pepys' Diary and asked them to send him one for the forthcoming year.

Liquid Air Tests.

At the time of the first commercial production of liquid air, several years ago, a number of untenable claims were made as to its practical applications. One of the most valuable uses to which the liquefaction of air has been put is that of the subsequent separation of the oxygen and nitrogen by fractional distillation and rectification The possession of such a substance as liquid air, however, has proved of much value in the study of the behaviour of various metals at low temperature. It is generally assumed, for instance, that at very low temperatures metals become brittle, and even fragile, and in numerous cases the breaking of steel rails in winter weather has been attributed to this cause. By the use of a bath of liquid air it has been found practicable to test various metals and alloys at temperatures as low as 180 degrees centigrade; and this has led to the discovery that while many steels have their tensile strength increased, their ductility lowered, and their brittleness raised at low temperatures, this is not always the case. Mr. Hadfield has shown that a nickle manganese steel can be made which will be as tough, if not tougher, at 180 degrees centigrade below zero than it is at ordinary atmospheric temperature, and this, too, without material change in the tensile strength. Liquid air has also been used for quenching specimens after tempering, and some instructive information has been obtained about the process of hardening in this way. The much heralded liquid is thus becoming useful in ways not considered by its original exploiters, and will doubtless find increasing application of similar nature —*The Forum.*

Waste.

It will be readily conceded that one of the most important, one of the most characteristic, features of the utilitarian science of to-day is its application to the profitable utilisation of waste products Next to this, and almost its equal in importance, is the scientific destruction of trade and other waste. It is not too much to say that in the scientific destruction of waste material there is a mine of wealth.