PROGRESS

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EDITORIAL COMMENT.

The Patent Regulations.

INSTEAD of altering the law in regard to the working of patents, which seems to be the intention of the government next session, reform might be effected in the regulations under the Act which urgently require amendment. These regulations are made by the Governor-in-Council, and the same power can unmake and remake at its own will and pleasure. There is a point of great importance to which the attention of this body may be drawn, we hope, with great advantage. The Registrar has no authority to receive declarations during the proceedings in his Court. These are admitted in the Supreme Court, where the interests are at least as great, as those involved in applications to the Registrar of patents. *Prima facie*, there does not seem to be any reason why the procedure which is right in the case of the greater interests should be wrong in the lesser. As a matter of fact there is a weighty reason why the practices of the two should be assimilated. It is that the applicants for, and the objectors to, the granting of patent rights, who live in other countries, or who live in New Zealand and are unable to attend in person, are not permitted to give evidence by written declaration. Such persons are consequently debarred from giving evidence at all. This is a serious hardship and in many cases a source of loss and injustice. In England the practice is to admit declarations in all patent cases, and the bulk of the evidence in the English Patent Courts is tendered that way. In the name of common sense and justice why can the practice not be the same here? Our law is based on the English law and our practice ought, by analogy, to be based upon the English practice. If it be contended that our law is silent on the subject we can only assume that the provision for accepting declarations was omitted from the Act of 1889 by inadvertence.

There is another anomaly, very serious, not less unjust and even more absurd. There are local Patent Offices in different parts of the colony. In these branches both provisional and complete applications may be filed. This practice is convenient for the inventor and there is no reason for its alteration. But when the application for completion following upon an application for a provisional protection in a local Patent Office is presented at the same office, the applicant is informed that the local office has no authority to receive the documents which must be sent to the central Office in Wellington.

In practice the hardship is easily imagined. The provisional protection lasts for nine months. There being no reason to imagine anything so absurd as a rule which prevents the receipt of the final papers at the office to which they would in the natural course of things belong, applicants naturally send their final documents there. To the consternation of the applicant the applications are returned to him, and if the period of nine months has elapsed, he can not obtain his final patent rights, and the result may be serious loss. It is true that an extension of time may be granted. But why require the trouble of applying for an extension when everything is ready and presented for filing? Moreover, extensions cost money and there is no power to compel their grant. This anomaly has been complained of for many years by the patent agents of the colony without redress. It is really time that the patent Office of New Zealand realised that the object of the Patent Laws is to encourage, not to discourage, invention.

A third anomaly is the status of Patent Agents. It is hardly necessary to say that enormous sums of money are invested in patents and very large businesses built up on them. It will scarcely be believed that the Patent Agents who are entrusted with the duty of framing the technical descriptions upon which the patents are granted, are required to pass no examination except as to their knowledge of the law of patents. They are not asked to show any knowledge of mechanics, of electricity, of chemistry, or of any of the countless technical subjects concerning which they may be called on at any moment to take out patents. Now in all of these matters they will be expected by their clients to show considerable skill in the preparation of specifications and drawings and the hundred other things surrounding the technicality of every patent. In England there has always been provision for the passing of severe tests by all aspirants to the rank of Patent Agent. All candidates have to qualify in a wide range of subjects, technical and scientific, and they have in addition to pass an examination in at least one foreign language, including of course the technical terms common thereto. These tests moreover are growing more and more difficult as time goes on, and inventions progress. Here any lawyer without further examination, or any one who passes examination in the patent laws, may become a Patent Agent. Now the mere grant of patent rights is not a guarantee of the validity of a patent. Take the case of such highly technical constructions as type machines, gold saving apparatus, oil engines, motor cars. Considerable technical skill and fine discrimination are required to set forth the particular characteristics and essential features of any of these intricate and highly technical apparatus and the particular point or points in which it differs from other patents. Without such skill the specification may be faulty in a hundred ways. When faulty a patent has the inestimable advantage of being open to the gallop of the proverbial coach and six through its various specifications. Moreover let it not be forgetten that a flaw in the description voids the patent, which therefore proves valueless when contested in a Court of Law. Recent cases have demonstrated this sad truth to several inventors much to their chagrin and more to their loss. A large proportion of the Patents granted in New Zealand are, we do not hesitate to say, not worth the paper on which they are written, for the simple reason that some part of the specification is faulty through draughtmanship by incompetent persons. The English practice recognises that the inventor must not only be encouraged to invent, but that he must also be protected in what he has invented against the employment of incompetent assistants without technical skill. Here, the law not recognising (as we have shown) the need for encouraging the inventor to invent, the regulations naturally refuse to recognise the necessity for protecting him when he has invented. It is high time for radical alteration.

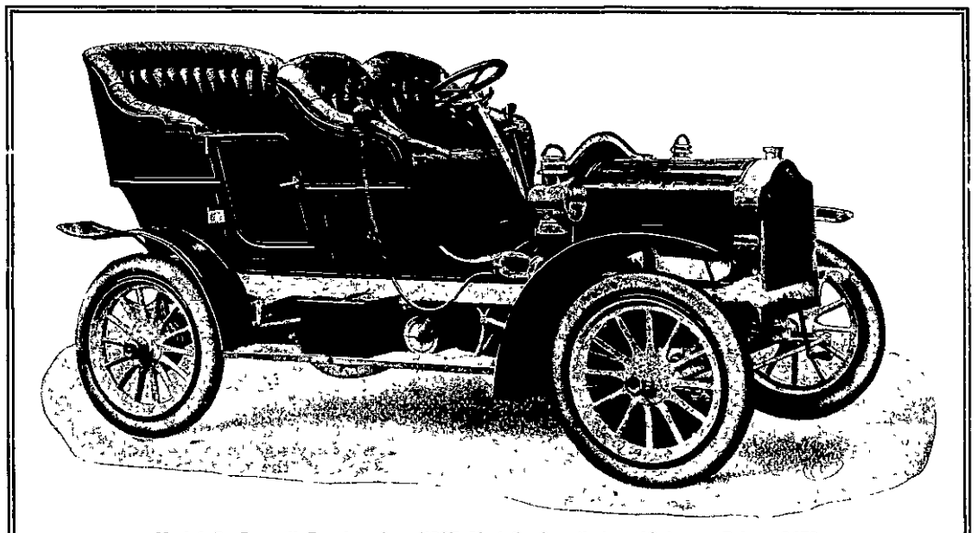
The sealing of patents requires a word. In Great Britain it is almost the universal practice for the executive heads of the Patent Office to sign the Deed of Letters Patent. In New Zealand the old practice of the Governor's signature is still obligatory. The advance of the colony has now reached a point where the practice of Great Britain might well be followed and the deed signed by the Registar, thus facilitating the business of the office.

The Uses of Exhibitions.

"A modern universal exposition is a collection of the wisdom and achievements of the world for the inspection of the world—for the study of its experts by which they may make comparisons and deductions, and develop plans for future improvements and progress. Such a universal exposition might well be called an encyclopædia of society, as it contains in highly specialised array society's words and works. It constitutes a classified, complete, indexed compendium (available for ready reference) of the achievements and ideas of society, in all phases of its activity, extending to the most material as well as the most refined. It offers illustrations covering the full field of social performance, from the production of the shoes on our feet and the pavement beneath them, to a presentation of the most delicate creations of the brains and hands of men, what are classified as the fine arts of civilisation."

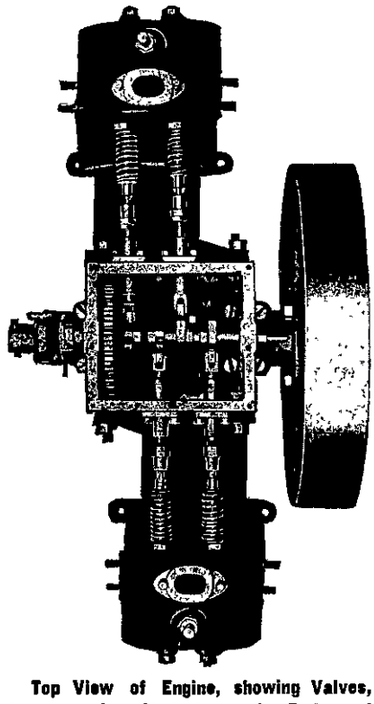
One is reminded of these words, which were written by the director of exhibits at the Louisiana Exposition in an introduction to the bulky volumes in which the showings and the doings and the aspirations for which that exposition was remarkable are chronicled and catalogued. They raise the hope that the chronicling and cataloguing of the exposition at Christchurch (which has already reached its millionth visitor) may be worthy of the objects of every exposition so well described by the man who enjoys the reputation of being the greatest organiser of exhibitions in the world. It cannot, of course, be expected that the compendium of the arts and sciences of the world, with all their various processes and all the complexity of detail of the various tools used in their production, could be as complete at Christchurch as it was at St. Louis. Nevertheless Christchurch is as great an opportunity for us as was St. Louis for the American people. It is our industrial census, by which we can gauge our progress and pull ourselves together for the next forward step. The government did well to organise this census. But if the official descriptive record is not in proportion, the value of that organisation will be considerably diminished. The ten volumes of the St. Louis record are an admirable guide. They are full of descriptions charmingly written, accurate in principle and detail, and they were published early after the Fair.

..Famous..
RUSSELL CARS



Model D, Russell Touring Car (1907 Model), 2 cylinder, 16 h.p. Price, £450.

"The RUSSELL" on a Motor Car stamps it with the Hall Mark of Distinction. . . . . The **RUSSELL** is Supreme in Mechanical Construction, Quality of Material, Symmetry, and Silent Running. It is Unequalled as a Hill Climber, and no Car is more Simple to Handle.



Top View of Engine, showing Valves, Cams, and Cam Shaft, Connecting Rods, and Commutator. All are most accessible.

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Automobilism in Four Centuries.

1619—1907

The World's Motors.

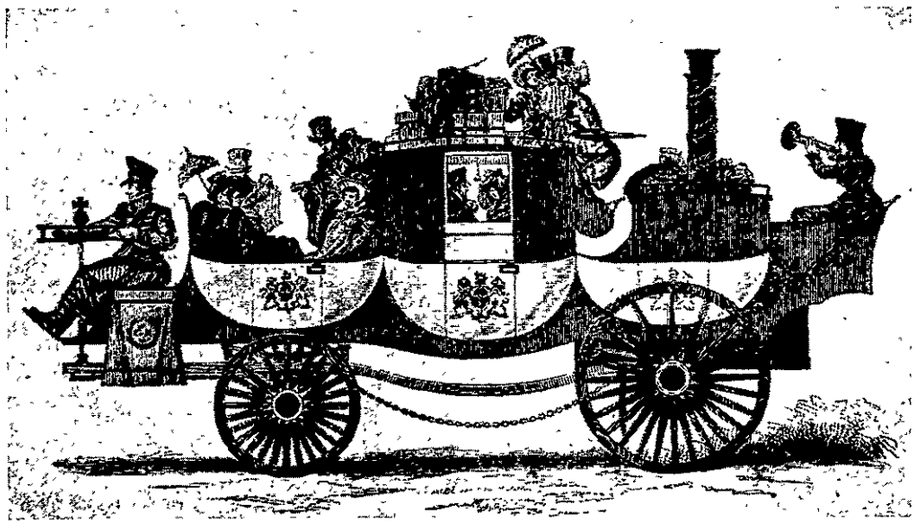
THEIR ENTRY INTO NEW ZEALAND.

Into this country the motor car came in a stealthy sort of way—crept in by ones and twos. And each, as it came out into the light carrying a blinking owner, failed to impress the spectators with the dignity of its appearance or the importance of its arrival. When we turned to the contemporary prints of Britain we found only enough references to the motor car to support a belief that the thing had been invented for the benefit of Opera Bouffe and the inveterate jokers who had become anæmic for want of subjects on which to sharpen their wit. Such lists of disasters, such tales of journeys interrupted, honeymoons extinguished in inextinguishable laughter, such prodigious bills of costs, such manifold failures, each with a touch of the ludicrous, these were the staple of the reading devoted to the motor car—a thing apparently mean to look at, poor to perform, unreliable, and above all essentially ludicrous—that was the opinion one seemed to be compelled to form from their first readings (not of course in the papers published by experts) about the motor car of commerce. Men were ready to laugh as much as they did when the Salvation Army first put in an appearance.

That mood changed quickly. The ones and the twos of the importation became threes and fours, and soon it was understood that some of the four centres, particularly Christchurch and Auckland, had managed to accumulate a most respectable connection. Garages began to appear here and there, and the motor car was to be seen wheeling along the country roads. This was the stage of admiration. Every one wanted a motor car. The few who had ridden in them said there was no motion like it, and their talk was of speeds of sixty miles, as if it were the most common experience of the delightful novelty that had come so recently to stay. The third stage was the stage of discovery and envy. It was discovered that universality is not the destiny of the motor car, for the cars were dear and required, besides, a good deal of repairing which cost money.

From that to the stage of distrust, hatred and ill will was but a single bound. We then began to read in the British papers things that convinced us the motor had got out of the stage of burlesque and left Opera Bouffe far behind. It had become a machine for the destruction of human life, the terrorising of country roads, and the perpetual frightening of that noble animal the horse, whose place on the planet it was threatening and preparing to take. Britain had combined for the control of this abomination, why not the colony too? So the voices of the public went up into the political air and there met with the usual reception. The result was legislation for efficiently reducing to order this disorderly creature which had made our roads—we tried to persuade ourselves, and it proved vainly—unfrequented and dangerous.

Progress however goes ever on. Therefore New Zealand soon reached the present stage, which is one of considerable admiration for the motor, of large appreciation of its services for both business and pleasure, and of deep respect for its future. The law still controls the motor, and quite right, too. But the law is reasonable inasmuch as it confines the speed to that which is reasonable under the conditions existing at any moment of the motor's career. If there is a road straight before it extending for miles without a curve and no person or animal in sight, then is sixty miles not unreasonable in the eyes of the law. If on the other hand the motor is in a street where the very pedestrians are gasping for room, then will two miles render the motorist liable to legal process. Local bodies are recognising their duty with regard to the motorist. It is believed among them that he is actually entitled to attention and some sort of provision for his comfort, so far as it lies in the way of the public body to provide the same. Even among horse-men and horse-women—even those who take their pilgrimages in pony chaises—there are individuals who are ready to shake hands with the driver of a motor car. Horses themselves are beginning to understand the creature, and it is found not at all difficult to make them reconciled to the sight of it. The garage is everywhere and the toot of the horn; every newspaper publishes, by way of regularly recognised duty, all information obtainable about the new force, lays itself out for presenting the details of every event, fixture, road trial, and journey record. A much improved type of car is seen in the streets taking its ordinary place in the ordinary traffic, and the gliding pleasant motion of them is much admired. We read all about them also, many of us being familiar with such charming books as "The Lightning Conductor" and its pleasant sequel "The Princess Passes." The citizen who turned of old to steamboat and railway for his holiday often now takes out his motor and goes off on some pleasant trip with his better half, to return refreshed and invigorated by his travels, and a great industry is established. Accidents, alas, are not unknown, but their causes will be better understood directly, and their reduction to the irreducible minimum must inevitably follow. Such is the history of the motor with us, with whom it has now come to stay as a guest, on the whole welcome.



THE JAMES ANDERSON STEAM 'BUS, 1829.

THE DAWN OF THE MOTOR CAR.

In the year of grace 1619 there flashed into the public view in the streets of London a horseless carriage propelling itself by invisible means. The fact is on record, and therefore the chronicle of the first appearance of the motor car is authentic. But beyond the bare record there is nothing in any of the bulky volumes of our histories. It is not known how the new-comer was received: whether the theological King (James—First of the name) noted the same in his book on Demonology, by reason of the invisible mystery of its propulsion; whether the horse owners of the shires killed it with fables; whether it carried any one besides the enterprising motorist; how many wheels it had, and what were its powers, build,

GURNEY'S STEAM CARRIAGE ON THE WAY TO BATH, 1819.

wheel base, and appearance—all these things are in the sealed book to which no man ever will have access. Enough that England led the way in motoring. It is a barren honour, for to France belongs the credit of the development which has become the leading mechanical feature of the twentieth century. The best the patriotic Englishman can say of the matter is that four centuries ago we were leading, whereas now we are not very far behind.

France came to the front a hundred and fifty years later, when, in the year 1770, M. Cugnot astonished Paris by running a three-wheeled vehicle by steam, carrying two people—probably owner and chauffeur. He maintained the giddy rate of two miles an hour. Whether this was the reason why the enterprise was not heard of more, or whether the French Revolution, coming soon after, prevented any other kind of revolution, history has not recorded.

In the year after Montgolfier's first balloon a Cornishman endeavoured seriously to deprive the French of the lead. Mr. Murdoch built a model for use on the Cornish roads, and as the model never got any "forrader" we may presume that the state of the Cornish roads proved a fatal bar. At any rate the attempt appears to have been taken seriously, for this model was sought out years afterwards by the famous Mr. Tangye when he elected to become motorist, and preserved with care in his collection. An agitation is now on foot for placing the same in some museum of antiquities alongside of defunct pioneers of the railway and tramway services. Mr. Trevethick followed later with a machine which he launched on those same Cornwall roads at a speed of ten miles. Mr. Tangye had secured a model of this pioneer also before his death. The horseless began from that time to make progress in the land of its first adoption, and France was not heard of in the running for some time. In 1823 Gurney—Sir Goldsworthy Gurney—brought out the wonderful carriage of which we have the illustration on the last page. It ran to Bath and back sundry trips, and it attained

HANCOCK'S 'BUS, LONDON, 1834.

to a speed of 15 miles an hour There is a tradition that the Wellers of the period denounced the creature as not only an interference with their privileges, but as dangerous to the lives and limbs of the sacred public; which, if it was at all like its illustration, we have no doubt it was. It ran, however, a long time between Bath and Cheltenham. Later on Messrs. Macerom and Squire ran a steam 'bus between London and Paddington. It was a carriage of compact type, it carried a multitubular boiler with a fan draught, and was altogether a rather imposing affair. In 1829 the James Anderson steam coach appeared on the Brighton road to the further astonishment of the disgusted Wellers of the period. The illustration gives it a most respectable appearance, setting off its orthodoxy as a mail coach of the ruling pattern. As for the stoker, or chauffeur, we should say that nothing less than a Royal Commission could find any clue of his whereabouts on the craft. This throws a doubt on the correctness of the likeness. As to the artistic success of the picture there can be but one opinion.

All these gorgeous visions were doomed to be swept away by the railway era. England had made up its mind to lead the world with the iron horse, and everything horseless not allied with his equine majesty of iron had to go. The story of how it was shoved out of the way in a free country is one of the most instructive chapters in history. Perhaps the nature of some of the patents applied for may account in part for the public rage against the whole body of the horseless One of these inventors, for example, took out a patent for a pair of iron poles to propel his machine somewhat in the style of a man walking It must have looked like a pile driver "on the spree": no wonder the good folk were alarmed Be that as it may, a long series of persecutions by by-law and statute set in, culminating in 1836 in a law restricting the dimensions of the boilers of these motors out of all possible usefulness The great engineer who had cowed opposition to the iron horse with his celebrated retort about "so much the worse for the coo," put on his best frown before a Committee of the House of Lords and gave forth the oracular verdict "that steam carriages would never do at all on roads." To say that steam was worth anything anywhere off the iron road made for that power by the greatest of engineers was thought worse than burglary. The Committee lost no time in recommending the world to have nothing to do with the steam motor, which was not only a danger to itself, but an awful incentive to rash and speculative persons to ruin themselves and their too confiding friends. The motor of the street thus fell before the rush of the railway companies. The concentrative Briton looks only at one thing at a time. And considering the wonderful success he made of the railways on which he then concentrated his efforts, there is not much reason for finding too much fault with him.

Nevertheless the sacred flame which was later on to find such sparkling vent, through the ignitions of a more appreciative and successful era, was by no means allowed to die out. On the contrary, it was made to illuminate the whole Victorian period with a fitful and surreptitious light. Of those who kept that spark alive the most notable was Rickett of Stafford, who turned out in good order and condition a road steamer of 1½ tons weight, and soon after supplied one of 5 tons to the order of the Marquis of Stafford. In 1861 Garrett and Mitchell of Leeds (enterprising city) built one of nearly 7 tons for Sir Titus Salt of Saltair, better known as a weaver of alpaca then as a successful motor proprietor. Still he was bitten with the motor fury, and he spent his money like a man and a millionaire. But the combined terrors of the new system and of the laws and by-laws of the United Kingdom, to say nothing of the police traps of the period, were too much for the man of alpaca, and the machine passed by purchase into the hands of that gay young spark Mr. Frederick Hodges, well known in the later fifties as the wealthy proprietor of a famous London distillery, and one of the brightest and fastest of the practical jokers of that practical joking age of which Sothern and Toole were the leading lights. This young gentleman took his new purchase out for many a tour through Kent and the southern counties, and made the pace hot for police and peasant and local governing body with equal impartiality. But he did not foster any business capacity of the motor race.

Tangye made a success in 1862 with a vehicle which he drove at a speed of 20 miles an hour, but the fates were not propitious and it went the way of the rest, to the scrap heap or the museum, probably the latter in his case.

The pneumatic tyre was not unknown in those days, having been invented by W Thomson in 1845, but it wanted the modern developments with which our age is more familiar. Of these the pneumatic came in 1885, after 40 year of solid.

The latter inventor was successful as a designer of horseless 'buses, of which he supplied a large number to the order of the Indian Government. They were constructed by Ransome and Sims, they were of 14 h.p., they worked regularly up to 14 miles an hour, their tyres were protected by linked steel shoes, and they regularly carried up to 65 passengers. It is always true that an inventor has more honour in other countries than in his own.

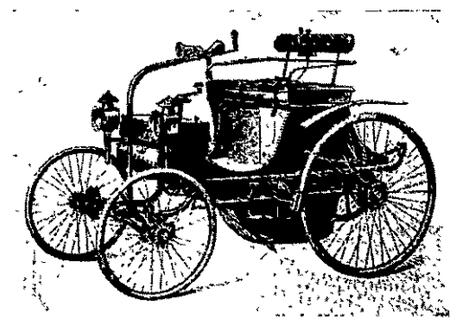
During these years the traction engine had come to stay, but that is another story, except inasmuch as it doubled the persecutions of the motor proprietors. In the same period the law kept pace with numbers of discouraging enactments The motor inventors also moved along, but the honours were with the men on the other side of the Channel.

DEVELOPMENT.

Regarding this portion of the story it is now generally accepted that the modern revival of the motor-car movement dates from 1885. In that year two horseless carriages made their appearance from the designs of Daimler of Deutz (near Cologne) and Benz of Mannheim. There was also a motor by Mr. E. Butler shown in the Exhibition of 1885. All these were of the tricycle order, belt-driven, and all carried limited supplies of fuel, up to some twenty miles only. The Butler type does not appear to have got much further. Benz's developed first into the well-known dog-cart form of which 4000 were sold in England after their introduction by Mr. H Hewetson into that country Daimler's developed at once into the four-wheeler, which proved the forerunner of the numerous types of the present day We give an illustration of the same as the presentment of the first of the modern series, the root from which the motor world has developed to its present tremendous and growing ramifications These developments followed each other with startling rapidity, the French makers leading in all lines, encouraged by a public which took to the sport with the national verve. The names of Peugeot, Serpollet, Roger, De Dion, Bouton, Panhard, Mayarde, Levassor and others jostling one another in the race for fame and profit with startling frequency It was the greatest rush of invention the world had ever seen in any one direction.

The newspapers were friendly, the instinct of journalism keeping as usual ahead of public opinion by just a nose. In 1893 the *Petit Journal*, the famous paper with the small name and the enormous circulation, announced its now famous Paris-Rouen race, which took place in July, 1894, and in which forty-seven vehicles started The first to reach Rouen was the De Dion Bouton steam tractor which covered the 97½ miles at an average speed of 12 miles per hour. Five minutes after the steamer came a Peugeot carriage fitted with a 3½-h.p. Daimler-Panhard engine and solid rubber tyres, then a second Peugeot, and later a Panhard car which had wooden wheels and iron tyres. The first prize was divided between the Panhard and the Peugeot; the De Dion steamer secured the second, and a Serpollet steam car the third prize. The great event of the following year, 1895, was the race from Paris to Bordeaux and back, a distance of 750 miles Sixteen petrol and seven steam vehicles started in the race, and eight petrol and one steam cars arrived back in Paris, the first being M. Levassor on a 4-h.p. Panhard, his time being 48 hours 12 min. However the first prize was given to a Peugeot car, which arrived shortly afterwards, as the Peugeot was carrying four passengers, whereas M. Levassor's car carried only two. This event was notable as being the first occasion of the appearance of pneumatic tyres in connection with long-distance motor-travelling. The Paris-Marseilles-Paris race was the feature of the year 1896 in France. The contest was run off in September in five stages, the distance being 1076 miles. Of the thirty-two vehicles which started twenty-four were propelled by petrol, three by steam, and five were motor-tricycles. M. Bollee, on his voiturette, astounded the world by completing the first stage at an average speed of twenty miles an hour,

Although it was not until November, 1896, that the motor-car became a legal form of conveyance



THE FIRST DAIMLER.

in Great Britain, reports of the great progress which had been made in self-propelled vehicles on the Continent had, of course, reached this country, and, in fact, specimens of the cars had also been brought over, the first one being a Benz, which Mr H. Hewetson received from Germany in November, 1894. The first public display was at the Agricultural Show at Turnbridge Wells in October, 1895 It was organised by Sir David Salomons, Bart., who had long been interested in the subject, having built an electrically propelled tricycle in 1874–75. The machines exhibited included this gentleman's Peugeot 3½-h.p. *vis-à-vis*, which weighed 13 cwt., and could attain a maximum speed of about fifteen miles per hour on the level; the Hon. Evelyn Ellis's Panhard-Levassor car of the Paris-Bordeaux type, a De Dion-Bouton motor-tricycle, and a De Dion-Bouton steam tractor. The year 1896 was extremely fruitful as regards automobile exhibitions, all of which played a prominent part in "releasing the motor-car from the tyranny of the red flag." In May of that year an exhibition of motor-cars was held at the Imperial Institute, London, and at a special reception to members of the House of Lords and the House of Commons Mr. Evelyn Ellis had the honour of driving the Prince of Wales (now his Majesty the King) on his Panhard car in the galleries and gardens of the Institute. The show was organised by the Motor-Car Club, of which Mr. Harry J Lawson was the chairman, and among the exhibits was a Bollee voiturette, two Benz cars, the Lutzman car belonging to Mr. H Koosens, of Southsea, a Roger car (a French copy of the Benz) several Hildebrandt-Wolfmulle motor-bicycles which, according to one who rode them, had practically only two speeds, "one was *nil* and the other twenty miles an hour"—two 4-h.p. German Daimlers, and two Peugeot cars with Daimler motors, a motor tandem bicycle built on the Kane-Pennington system, two De Dion motor-tricycles, an electrical vehicle built in accordance with the Bersey patents by the Universal Electrical Carriage Com-

pany, and an electrical dogcart by Messrs. Offord and Son. During the same month an exhibition of motor vehicles was opened at the Crystal Palace at which Sir David Salomons, Mr. T. R. B. Elliott, Mr. John H. Knight, and others demonstrated their cars by running them in the Palace grounds. The first display of automobiles organised by Mr. C. Cordingley was held in conjunction with the Engineering and Laundry Exhibition at the Agricultural Hall, Islington, in August, 1896. Naturally, it was but a small one, but it attracted considerable attention. It was located in the gallery, in which a miniature lake had been constructed in order to permit demonstrations of a motor-boat to be made by the now defunct firm of Messrs. New & Mayne. The automobile exhibits comprised the Hildebrandt-Wolfmuller motorbicylce, the Bersey electric carriage, already referred to, and an electrical vehicle constructed in accordance with the designs of Messrs. Garrard (now of the Clement Talbot Company), and Blumfield. The latter machine, which was built by Messrs. Taylor, Cooper & Bednell, of Coventry, was notable if only for the 4-in. pneumatic tyres with which it was fitted, an unusually large size in those days. It was fitted with a 1½-h.p. motor and chain drive, the necessary energy being furnished by a battery of twenty-four cells. The Bersey vehicle, which was the forerunner of the electric cabs which made their appearance in the London streets a year or so later, was designed to seat four persons; it had a 2½–3-h.p. motor, and carried thirty-two I.E.S. accumulators. About this time Colonel H. C. L. Holden brought out a motor-propelled bicycle which contained many interesting features, among which were a four-cylinder engine, synchronised ignition, and mechanical lubrication.

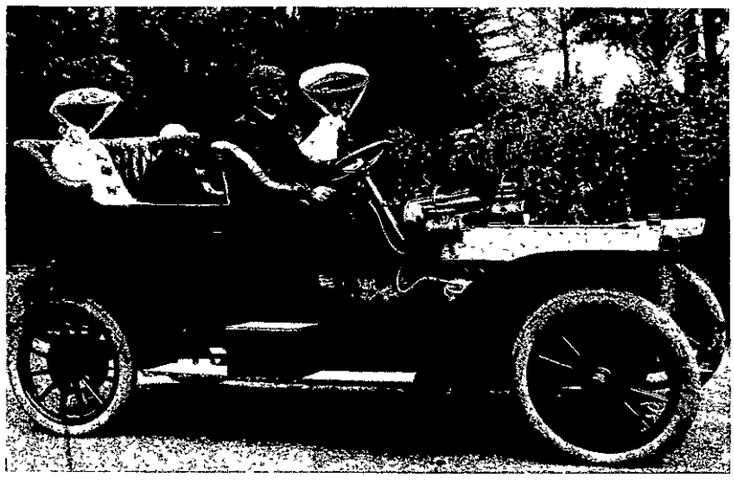
tions. Broken and stuck valves, leaky water joints in cylinder, overheating and pump troubles, burner defects, and weaknesses in the electrical ignition system, these were the cause of ninety per cent. of the early troubles, and they have been largely banished by care in constructional detail and alterations in proportion rather than in radical design. Moreover, the small margin of power then at disposal of these, which now-a-days would mean only a slight diminution in speed, then spelt utter stoppage. In the matter of price, it is pointed out, little progress has been made, the cheapest practically useful car of to-day differing little in price from the similar car of 1896.

Motor cycles are conspicuous by their absence in London city.

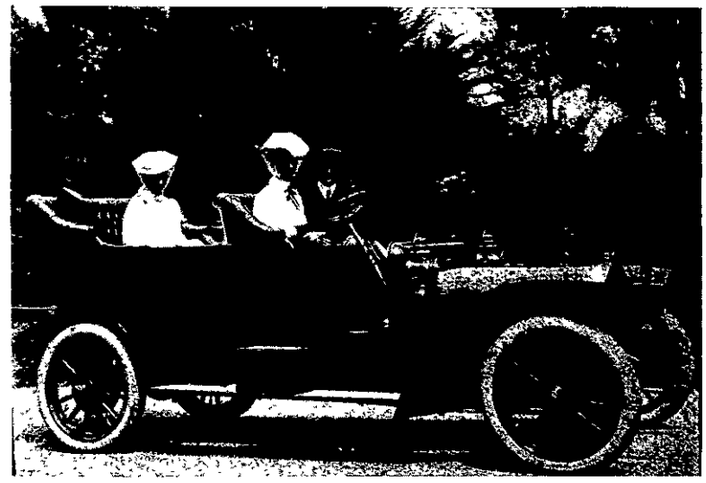
shooting, His Majesty has a specially constructed car with revolving seats and accommodation for guns. The Prince of Wales owns a "picnic" car with folding adjustable tables for luncheon or tea.

The Kaiser's finest car cost £4000. It is furnished like a miniature drawing-room, with carpeted floor, and roof covered with ivory-coloured leather. It contains a handsome writing-table and four high-backed chairs, and is beautifully lighted by electricity.

Queen Margherita, the Queen Mother of Italy, possesses some very handsome motors. The interiors are fitted with tables for six persons, armchairs, and folding-seats, and are lighted electrically. In her favourite car she has a silver image of the patron saint of motorists, St .Christopher. The image is surmounted by the royal arms, and has a gold border with the inscription, composed by the queen herself, "St. Christopher, preserve us from the perils of the way, and protect us in the incidents of the journey."



A WELL-KNOWN WAIRARAPA OWNER: MR. R. Z. RENALL OF MASTERTON AT THE WHEEL OF HIS 18–20 H.P. 4-CYLINDER BROWN CAR.



A REPRESENTATIVE CAR OF MASTERTON: MRS. E. G. T. MATTHEWS' 24 H.P. 4-CYLINDER BROWN CAR.

Marvels of Luxury and Mechanical Ingenuity.

The motor show at Olympia, London, is exceedingly attractive as a display of up-to-date cars and appliances; but would such a show not be more interesting to the general public were it to contain under one roof the swiftest, largest, handsomest, costliest, most curious, most useful, and most luxurious motors in the world!

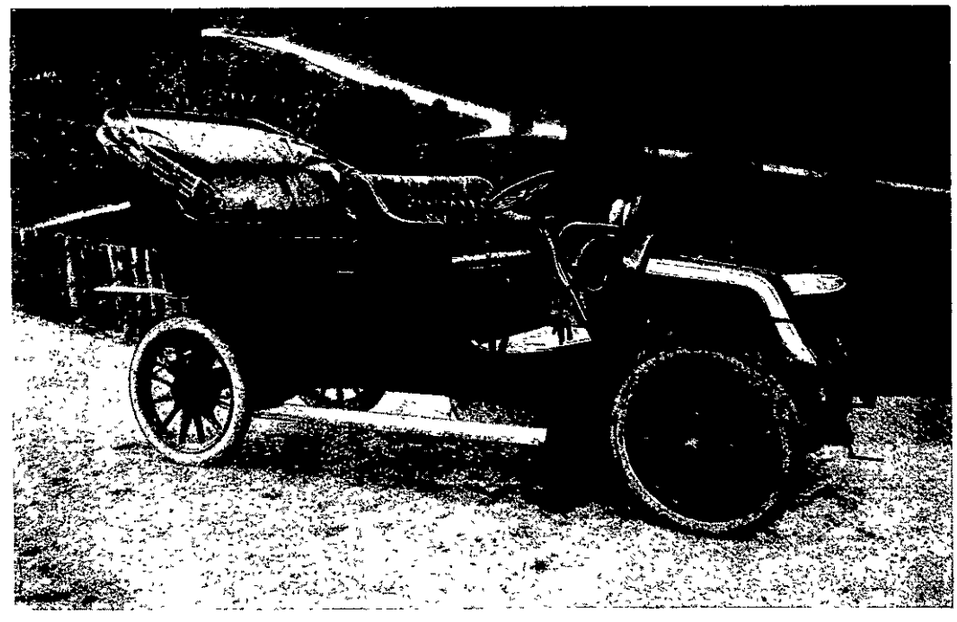
The most luxurious pleasure cars are owned by monarchs and millionaires. The cars of our own Royal Family are the reverse of ostentatious, but they are the "last word" in finish, efficiency,, and workmanship. King Edward's motors have swing chairs and the latest electric accessories, and they each carry a compact "first aid" outfit. For

CHOCOLATE KING'S CAR.

The French "Chocolate King," M. Menier, owns a wonderful motor-car, which is a small hotel on wheels. It is divided into two parts—"bed-sitting-room," with secret folding-beds, and a dressing-room and kitchen, with every possible accessory for toilet and cooking, and every imaginable requisite for pleasure touring. Mr. Pierpont Morgan's partner, Mr. Perkins, drives to business in the most luxurious car in America. The upholstery is of the finest morocco leather. There are seven seats round a table large enough for dinner or a game of cards. There is a couch at the front, and at the back a pantry with an ice-chest, hat-racks, cupboards, and a host of other accessories.

The Motor Progress of the World.

In England the interesting thing is to review the history of the last ten years. The reason is that more than ten years ago all motors of all kinds were "agin the law." They were regarded by the law abiding public as dangerous nuisances, and classed in tariffs of all sorts as noxious animals. On the Continent the motor car was spreading in all directions, in presence of a sympathetic public and favourable laws. Invention got ahead and vast works sprang up, notable fixtures were established, and records of all kinds accumulated. In 1896 there came emancipation for England, and the motorists assembled together and celebrated the day with a run to Brighton. The other day the anniversary was celebrated of that great event in great style. The most interesting point of course is the advance of construction that has taken place during the decade. Now first and foremost is manifest the enormous increase of power in relation to weight, due in the first place to improved design, next to higher compressions and piston speeds, with the more liberal valve proportions necessary therefor, and finally to improvements in materials. The net result of these various factors has been the reduction of weight from about fifty kilos per horse-power to a figure approaching five in the case of the larger car engines, and even less in the case of certain special designs. More important even has been the increase of reliability, and this is due rather to the attention paid to numerous minor details than to any notable innova-

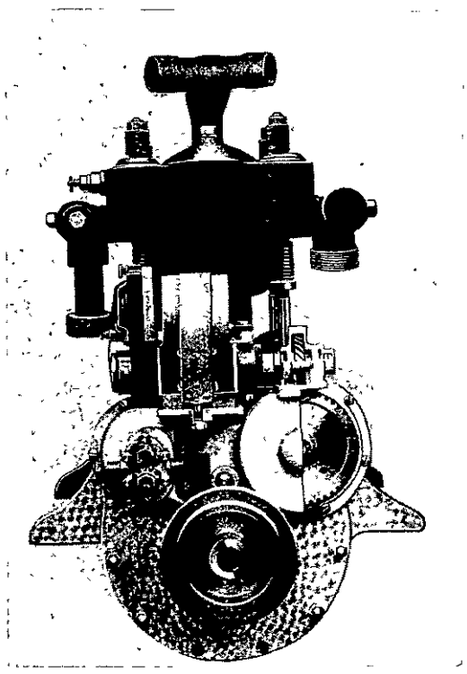


A DISTINGUISHED FRENCH REPRESENTATIVE: 12–14 H.P. 4-CYLINDER RENAULT. THIS CAR IS TYPICALLY FRENCH BOTH IN SHAPE OF BONNET AND BODY WORK.

The world's largest motor-car is owned by a Cleveland millionaire, Mr. Louis D. Schoenberg. It is 25 ft. long, and fitted up inside so that the occupants can live on board as though it were a yacht. Another of America's multi-millionaires, Mr. Fiske, journeys to town each day in a motor office, in which he can transact buiness en route, and it has a dressing-room attached, in which he can change into evening dress in time for dinner when he reaches his suburban home in the evening.

TWO GORGEOUS VEHICLES.

The King of the Belgians spent £6000 on a motor-flat containing a sleeping-room, a dressing-room



FRONT ELEVATION OF THE 16-20 H.P. CHENARD-WALCKER ENGINE.

that cost £800 in fittings alone, and a room for a valet. The late Marquis of Anglesey's gorgeous car, the Quo Vadis, cost £2500, had a Louis XV. ceiling, and silver plate and silver fitting wherever they could be introduced.

Utilitarian motor vehicles are becoming more numerous and varied every day. Commercial travellers' cars, with accommodation for samples, etc., are now supplied for £150 to £200. A motor restaurant exists in London, and a motor ambulance was a feature of the Lord Mayor's Show the other day. Agricultural motors are increasingly used for threshing, hoisting, pumping, shearing, grinding, and so forth.

Motor fire-engines are as yet in the trial stages. The London brigade's latest acquisition, "Motor Fire King No. 2," is proving very satisfactory. It travels thirty miles an hour on the level.

Armoured motor-cars are being largely introduced into the world's armies. The Russian government has just acquired seven cars, which are veritable fortresses on wheels. Each has bullet-proof sheathing and a machine-gun turret which works in any direction, firing 600 shots a minute. In our own army we have a bullet-proof steel first-aid motor, capable of carrying its occupants in absolute safety through a hail of fire from 10,000 rifles.

FOR THE DESERT.

Exceedingly interesting are the motors for polar and desert work. The former is expected to supersede dogs in Arctic exploration. It consists of a fiercely revolving, four-bladed fan, driven by a gasoline engine, and is attachable either to a motor-car or a sleigh. The wheels of desert-motors have very broad, flat tyres, with a flange in the centre, which throws up the sand on either side and makes a bed for the flat part of the wheel to run on.

A queer-looking contrivance is the Canadian dummy-horse car. The dummy-horse is fixed to the car out of deference to the nerves of real horses. The horn is attached to the dummy's mouth, and at night the eyes are lighted up, a pair of brilliant green and red orbs glaring at passing vehicles

The motor-car pawnshop made its inevitable appearance in New York recently, flaunting the sign of the three balls and carrying a cash supply of £10,000.

Motor-skates and flying-boats should not be overlooked in an enumeration of motor "freaks." M Constantini, a Parisian, has travelled 30 miles an hour in motor-skates. Each skate is fitted with a motor of 1½ h.p., air-cooled. The petrol tank, holding three-quarters of a litre of fuel, is supported by a girdle round the waist. The skater also carries the coil and accumulator and the levers for controlling the speed of the engines. Holding the control lever in the right, and having made the necessary arrangements to switch on the current and open the petrol supply, the skater pushes off on one foot in the customary way

The motor-boot, by the same inventor, is worked on identical principles. The boots are really diminutive motor-cars fitted to Wellington boots. Each boot has four wheels, 8 in in diameter, with solid tyres. M. Constantini has travelled hundreds of miles in them.

The gist of what is in everybody's mouth about the tendency to lightness of construction, in defiance of common sense, has been summed up easily, thus by an expert:—

One would naturally think makers of air cooled engines for a high compresson would have castings of a fair weight for the sake of safety, but my experience is that they don't. Probably this is accounted for by the constant craze for lightness. A light engine is made, it does not give enough power, or at least the h.p. of a reasonably heavy one, and up goes the compression. Result: A banging, knocking engine, that is a misery to drive and a source of constant trouble to keep gastight.

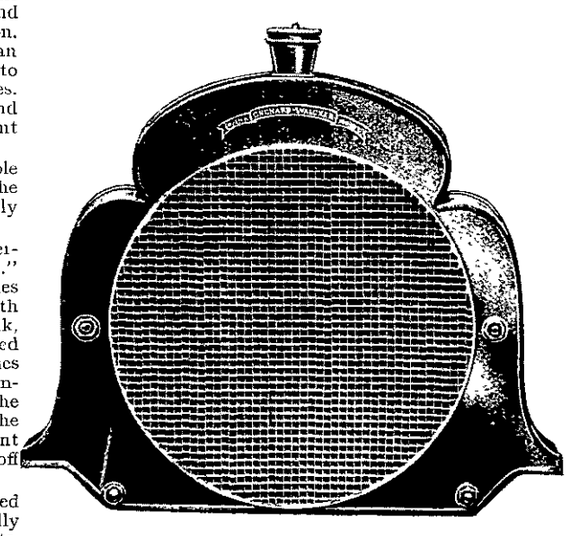
One sixteenth of an inch thick is not enough for a cylinder casting. If the piston stuck at any time from faulty lubrication the cylinder would break off at the foot, if it did not break before. Three-sixteenths of an inch is not too thick for even a motor cycle engine.

Ten Years of Motor Racing.*

By Georges Prade.

The sport of automobile racing began in France and the entire world ten years ago, and these ten years are those that created not only the racing car which we saw whizzing by on the Circuit de la Sarthe at ninety miles an hour, but also the touring carriage which brought the visitor to the tribunals of Mars, and which, however humble and modest it be, is nevertheless a monster of speed as compared with the racing car of days gone by.

Let us, then, date the foundation of automobile racing in France from the Paris–Bordeaux race of 1895 (although a few races of no great importance

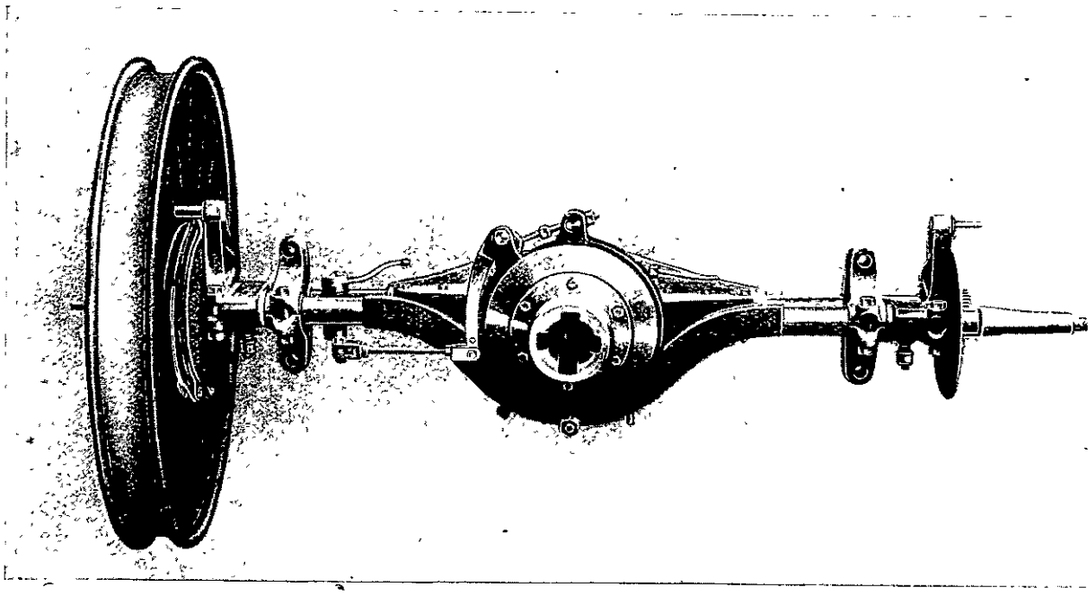


THE DISTINCTIVE RADIATOR DESIGN IN THE CHENARD-WALCKER CARS.

had taken place previously), and allow us to present the first winner, the famous No. 5, which was driven by Levassor himself, the founder of the great French establishment which was found in line again this year. It is a far cry that crude carriage with its 4-h.p. motor to the monster of to-day. High and short, and so heavy that with so moderate a power it would not even have been able to take part in races in which the weight is limited to 2200 lb., it took 48 h. 12 min. to make the round trip, a total of 720 miles.

It was also a Panhard that triumphed in 1896 in the Paris–Marseilles and return race, organised by the Automobile Club of France, which had then been formed. The test was a 1054-mile one, and the winner was Mayade, who covered the distance in 67 h. 42 min. 58 sec. This time the run was by stages, and the race lasted ten days. The carriage would appear to-day as ridiculous as that of the Paris–Bordeaux race, with its cow-tail steering lever, which was to cost the life of Levassor in this same race, and, three years later, that of Mayade himself.

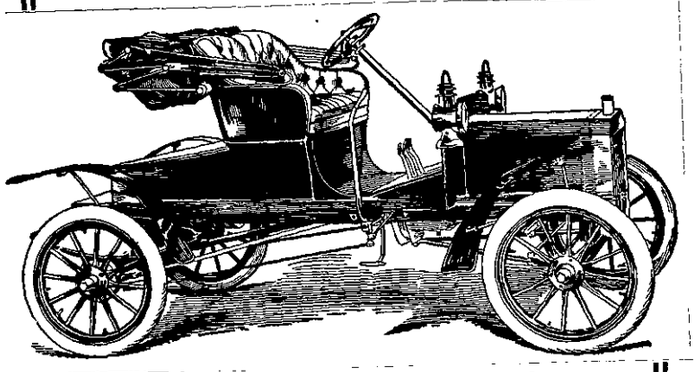
Nevertheless, we note an improvement in the first motor with four non-balanced cylinders, in which the explosion passed successively from the first to the second, from the second to the third, and from the third to the fourth, thus making of the motor and carriage a genuine instrument of torment by reason of its vibrations. In the test for motor-cycles, now abandoned, the winner was Viet, upon a De Dion machine. Among the participants in the Paris–Marseilles race with Viet, now engineer at the Renault Brothers' works, was to be found in a carriage with seats for four, and which was to make the first trials of pneumatic tyres, Chevalier Ren. de Knyff, now president of the Racing Committeee of the Automobile Club of France. The Marquis De Dion had already taken part in the Paris–Bordeaux race, and in 1897 we saw Baron Zuylen in line upon a motor-cycle in the first Marseilles–Nice race. The year 1897 was more con-



THE CHENARD-WALCKER DUPLEX BACK AXLE, SHOWING THE BRAKES AND DRIVING MECHANISM.

* Translated from *Les Sports*.

FORD FOUR-CYLINDER RUNABOUT.
1907.



MODEL "N" SPECIFICATIONS.

TYPE OF CAR—Runabout.
MOTOR—4 cylinder, vertical, 4 cycle.
HORSE POWER—15 *BORE*, 3¾″. *STROKE*, 3⅜″.
CYLINDERS—Cast in pairs. Water jackets and valve chambers cast integral.
DISPOSITION—Longitudinally, under hood at front.
VALVES—Inlet and exhaust offset; all on left side. Interchangeable. Operated by single cam shaft.
CAM SHAFT—One piece nickel steel forging. Eight cams integral. All bearing surfaces hardened and ground.
CRANK SHAFT—Set at 180 degrees. Drop forging from chrome nickel steel specially treated by Wyman & Gordon process; no welds. Bearing surfaces ground.
CRANK CASE—Nickel aluminium; side plates removable for inspection or adjustment of bearings.
COOLING—Water; cellular radiator; centrifugal pump.
IGNITION—Jump spark—batteries.
FAN—Cast in fly wheel.
CARBURETOR—Ford design—float feed, automatic.
LUBRICATION—Force feed oiler using pressure from exhaust. Also splash system in engine base.
CLUTCH—Multiple disc.
TRANSMISSION—Ford planetary system; all spur gears.
FINAL DRIVE—By carbon shaft with single universal joint to bevel drive gears in live rear axle. Ford three point system (patented in all countries) with all moving parts enclosed in dust-proof casing, funning in oil.
REAR AXLE—Ford design. Hyatt roller bearings of large dimension Bevel gear differential.
FRONT AXLE—One piece steel drop forging in I-beam section, specially treated.
FRAME—Pressed steel.
STEERING—By Ford reduction gear system; irreversible, gears at top of column, away from dust and grit.
BRAKES—2 sets. (a) Service band brake on transmission. (b) Internal expanding, brakes in rear hub drums.
OPERATION AND CONTROL—High and low speeds by hand lever at right of driver; reverse by foot lever; service and emergency brakes by foot lever, ratchet lock.
SPARK AND THROTTLE CONTROL—Give all speeds from 3 to 40 miles per hour on high gear
WHEELS—Artillery wood type.
TIRES—Pneumatic; standard equipment 28″ x 3″.
SPRINGS—Front: Semi-elliptic, cross spring. Rear. Full elliptic perched on rear axle outside frame line.
DUST PAN—Protects all machinery from mud and grit.
WEIGHT WITH TANKS FULL—3 inch tires and top 1080 pounds.
WHEEL BASE—84″. Tread 56″.
BEARINGS—Phosphor bronze and babbit in motor. Hyatt roller in rear axle. Large balls in front hubs.
GASOLINE CAPACITY—8 gallons.
WATER CAPACITY—4 gallons.
PRICE—£250.
TOP—With side curtains and storm front. £270.

SOLE AGENTS FOR N.Z.:

THE AUTOMOBILE CO. of N.Z., Ltd.

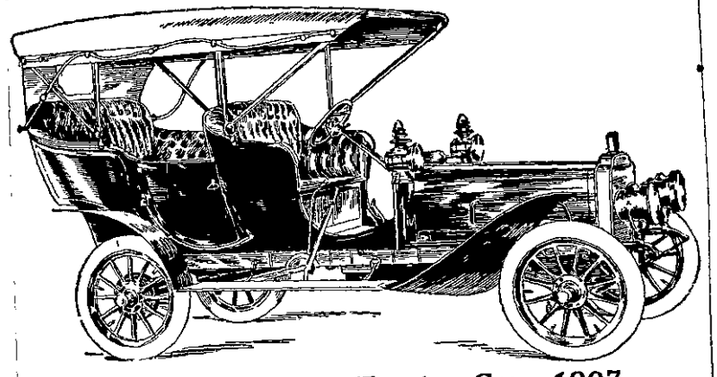
Office: WOODWARD STREET. Garage: 15 MOLESWORTH STREET.

WELLINGTON.

FORD
1907. Six-Cylinder Touring Car.

MODEL "K" SPECIFICATIONS.

MOTOR—6-cylinder vertical.
HORSE POWER—40.
COOLING—Cellular radiator.
PUMP—Centrifugal.
CAMS—Forged integral with shaft.
LUBRICATION—Positive feed mechanical oiler to all motor parts.
IGNITION—Ford dual system; (a) high tension magneto; (b) batteries. Two sets of plugs.
TRANSMISSION—The "velvet Ford" planetary—spur gears.
FINAL DRIVE—Ford triangular system (patented in all countries) all parts enclosed.
FRONT AXLE—One piece drop forging from Chrome nickel steel. I-beam section.
STEERING—By Ford reduction gear system—irreversible.
FRAME—Cold pressed from Chrome nickel steel Straight sides, channel section.
CONTROLS—Easier than any other large car in the world.
BODY—Straight side tonneau; seats 5 liberally, 7 by adding folding or revolving seats.
COLOR—Optional.
TIRES—34″ x 4″ front and rear.
PRICE—£875. With cape top and gas lamps, £950.



Ford Six-Cylinder Touring Car, 1907.

SOLE AGENTS FOR N.Z.:

THE AUTOMOBILE CO. of N.Z., Ltd.

Office: WOODWARD STREET. Garage: 15 MOLESWORTH STREET.

WELLINGTON.

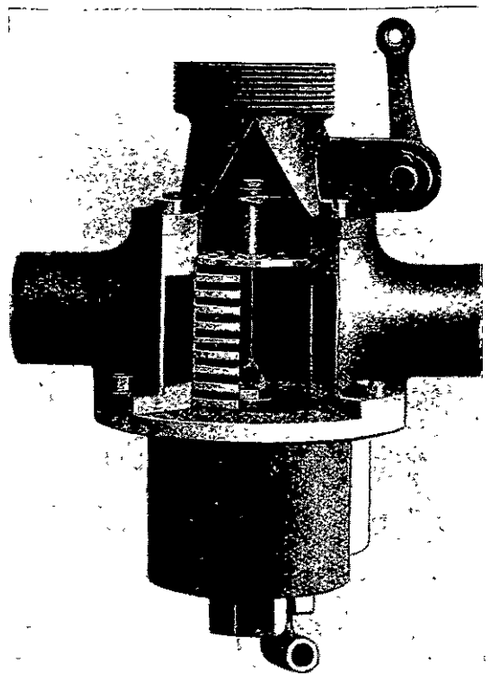
fused. The Automobile Club of France did not itself organise any great races; but the Automobile Club of Nice got up that of Marseilles-Nice, which was won by Count Chasseloup Loubat on a De Dion-Bouton steam brake, followed by M. Michelin, the well-known manufacturer of pneumatic tyres, who tested his own products, with the result that he became the first to engage in an industry which was then unthought of, and the success of which was to be phenomenal.

Beaten at the beginning of the season, the explosion motor had its revenge in the Paris–Dieppe and Paris–Trouville races with the Leon Bollée voiturettes that where led to victory by Jamin, one of the organisers of the 1906 Circuit of Sarthe, and with the famous 6-h.p. Panhard carriages, which have become classic under the name of Paris-Dieppe, and were led to victory by M. Huillier, at present one of the managers of the Mors establishment and who raced under the pseudonym of Giles Hourgieres.

It was with this same type of carriage, the last to be steered with a lever, that Ren de Knyff in 1898 was to gain his first victory in the Paris-Bordeaux race, in which he covered the distance in 15 hours, a performance which, at the time, astonished the whole world. But the year 1898 was to witness the advent of the first car of which the outlines and details slightly recall the motor vehicles of the present day—that famous 8-h.p. Panhard which won the Paris-Amsterdam race and glory for Carron, who covered the 1011 miles divided into six stages in 33 h. 4 min. 34 sec. The second was M. Girardot, the third Gaudry, the pseudonym of M. Etienne Giraud; the fourth M. Ren de Knyff, and the fifth M. Loysel. The 8-h.p. Panhard of the Paris-Amsterdam race had four balanced cylinders, a steering column with inclined wheel, and a radiator in front. The form of the car was elongated and low, and the average of the winner, which was thirty miles an hour, marked the definite conquest of what we to-day call speed, for even at the present time an average of thirty miles on an unprepared road constitutes an unquestionable speed.

But something better yet was going to be done. The year 1899 was to mark the creation, by the Panhard establishment, of the famous 12-h p cars, the type of which long remained classic, and which, driven by Harron, won the Paris–Bordeaux race in 11 h. 43 min., and then the celebrated 16-h.p. Panhard with which Ren de Knyff was to win the Tour de France (the longest test known to automobile sport—1398 miles) in 44 h. 43 min. Towards the end of 1899 the 16-h.p. Mors had already triumphed in the Paris–Ostende, Paris–Trouville and Bordeaux–Biarritz races. However, the decisive contest between the two great French houses. did not take place till July, 1900, upon the 822-mile stretch of the Paris–Toulon race, where the 24-h.p. Mors driven by Levegh attained an average speed of 43 miles an hour, and covered the distance in 26 h. 43 min. 55 sec. The winner of the voiturettes was the glorious Marcel Renault, who was later on to lose his life in the Paris–Madrid race, after winning the Paris–Vienna event.

The great year of success for the Mors establishment, however, was 1901, in which Henry Fournier, its champion, won in succession the Paris–Bordeaux race at an average of 55 miles in 6 hours, and the Paris–Berlin—which will perhaps remain the most colossal success of automobile tests—in which he covered 732 miles in 16 h. 6 min. Here again the voiturette winner was Renault, represented by the second brother, Louis, who was both an engineer and racer.



THE CHENARD WALCKER CARBURETTER IN PART SECTION.

The year 1902 marked the first important regulation of automobile racing. It was the weight limit. It was decided that racing cars should not weigh over 2200 pounds. The general type had been scarcely modified. At the most, a new form of the old Daimler had made its appearance at the Mors and Mercedes, with ignition by magneto, and, later, a steel frame. The year 1902 was that of the great battle. This was waged upon the 873-mile stretch of the Paris–Vienna circuit, the winner in which was Marcel Renault, in a light 1430-lb carriage, while after a furious contest between Panhard and Mercedes in the big 2200-lb class, victory settled upon the banner of the French house with its 70-h.p., the champion of which was Henry Farman, who came in ahead of Zborowski, who drove a 40-h p. Mercedes The general victory was accorded to Marcel Renault. It was in this race that was seen the advent of the majority of the marks that we find in the lists of to-day the Darracq, which disputed the victory with the Renault up to the last moment; the Brasier, which was then making its debut; the Gobron-Brilli, run by alcohol; and the Clement.

It was at the end of the season of 1899 that Mr. James Gordon Bennett founded the celebrated race, the principle of which was that it should be disputed between the great national clubs, each represented by three cars manufactured in all their parts in the country represented by the club. It was therefore a national competition *par excellence*, which required a national production in each country

The first year the cup was contested for upon the Paris–Lyon Circuit, and there was but one rider to each of the three 20-h.p. Panhard cars that contributed the French contingent. The winner was Charron, who came in ahead of Girardor. In 1901 the cup was obscured in the Paris–Bordeaux race won by Fournier; and the winning of the cup by Girardot in a 24-h.p. Panhard car passed unnoticed. Up to then no foreign club existed, or, at least, as in 1901, had come to the front. Again in 1902 the race was run in conjunction with another (Paris–Vienna), when, some racing accidents having arrested the three French champions, Edge, the sole foreign contestant, in a Napier car, captured the cup and carried it to England.

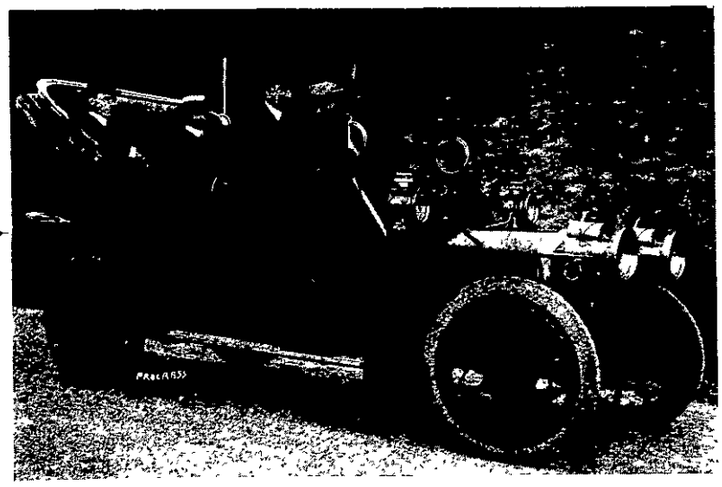
From that time it was the Gordon Bennett Cup that became the great race. The prohibition of races in France after the Paris–Madrid, of which the first stage only was run, and won by Gabriel on a Mors, soon emphasised this evolution. The creation by Baron Pierre de Crawhez of the Circuit of Ardennes, the great Belgian race, inaugurated the principle of the circuit, and of the race without neutralisation, but did not suffice to diminish interest in the Gordon Bennett Cup. Such interest became colossal when, in 1903, the cup was won in Ireland by Jenatzy on a Mercedes car, and was thus captured for a second time by another than France and carried to Germany.

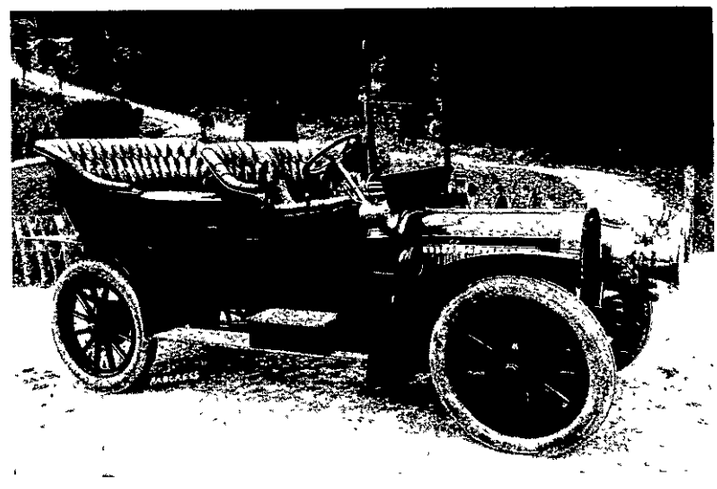
The type of the victorious racing car was to have a profound effect upon the prevailing style of vehicles. The chassis of pressed steel, ball bearings, the regulation of the gases, the ignition by magneto and the radiator cooled by fan were introduced into fashion by the successes due to the races of 1902 and 1903.

The cup therefore became the object of the tests of 1904. The French industry prepared itself thoroughly for it, and the Automobile Club of France organised elimination trials in order that it might designate its three champions. It was the Brasier establishment, new in name, but whose engineer, M. Richard Brasier, had assisted in the construction of the victorious cars of 1900 and 1901, which attached its name to the recapture of the cup in 1904 at the Taunus race, and to the apparently definite possession of it at Auvergne in 1905. It was a Brasier car driven by Thery that won the four races in succession, beating the German industry in the Taunus and the Italian in the Auvergne race after a hot contest. For it must here be remarked that in 1904, at the Taunus race, a new rival, Italy, had sprung up with the Fiat cars, which, in 1905, came very near taking the cup from France. At the end of the year 1905 the Italian industry gained its first international victory at home at Brescia with the Italas, while the Darracq cars won in succession in the Circuit of Ardennes and in the Vanderbilt cup race in the United States.

The 16-20 H.P. Chenard-Walcker Car.

Ever since their introduction to the British public each successive design of Chenard-Walcker car has presented one or more features which have given birth to a tag or motto comprehensively descriptive of that particular type. This characteristic is not lacking from the model now under review. The striking phrase which will synchronise the Chenard-Walcker in most minds in the future will be "one pedal only," for this car is one in which all auxiliary levers are entirely

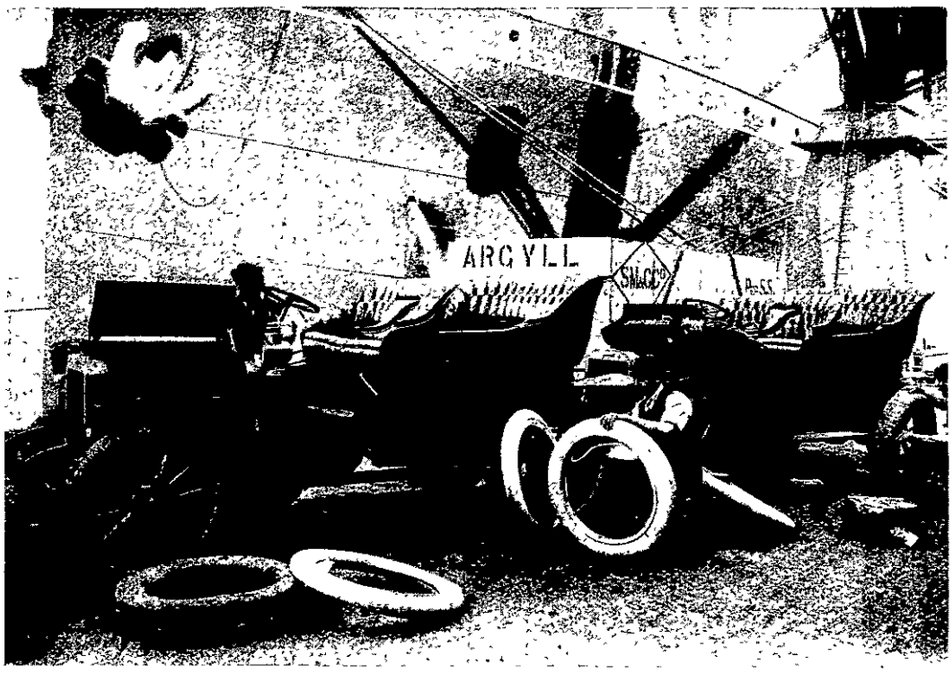




ROLLS-ROYCE 16–20 H.P. 4-CYLINDER CAR WHICH WON THE RECENT TOURIST TROPHY RACE IN THE ISLE OF MAN.

16–20 H.P. 4-CYLINDER ARGYLL WHICH RAN SECOND IN THE TOURIST TROPHY RACE IN THE ISLE OF MAN.

THESE CARS HAD THEIR WIRE WHEELS REMOVED BEFORE EXPORT TO NEW ZEALAND.



HOW AN ARGYLL IS LANDED: THE ONLY WORK NECESSARY IS THE PLACING ON OF TYRES AND THE PREPARATION FOR RUNNING OF ENGINE.

dispensed with, all graduations of speed being obtainable by the means so succinctly suggested. In reviewing the present car it is interesting to note that the structural features peculiar to the Chenard-Walcker practice, and which have earned for those cars so excellent a reputation, are consistently adhered to, namely, double back axle, combination clutch and brake, thermo-syphon radiator, and automatic carburetter. The frame is of pressed cambered channel steel, suitably trussed and stiffened with cross members of similar section. The wheel gauge is 4 ft. 5 in. and the wheel base 9 ft. 4 in. The wheels are 810 by 90 mm. steering, and 815 by 105 mm. driving. The engine is of the four-cylinder type with cylinders cast in pairs and valve chambers on each side, each pair of valves being get-at-able by the removal of a single nut. The bore and stroke are 88 by 130 mm. Half-time gears are specially enclosed, and the high-tension magneto is gear-driven off the exhaust camshaft by worm gearing, which brings it in an accessible position in front of the engine. The cylinders and valve chambers are amply water jacketed, and the water connections are of more than generous diameter. The basic principle of the Chenard-Walcker carburetter is that the mixture is automatically controlled by the variable lift of a combination valve, consisting of a circumferentially slotted piston, the base of which covers the area of the annular air passage; whilst the centrally placed tapered needle attached to the perforated piston head regulates the volume of petrol in exact proportion to the volume of air passing to the cylinders. In the present model this piston is now formed of bronze, steel being found liable to rust in damp weather. The special improvement in the present carburetter, however, consists of the introduction of a valve in the induction pipe above the piston, whereas the lift of the piston was previously determined by a small forked arm, which in its turn depended upon the return of two spiral springs. The valve above referred to is opened by a spoon-shaped arm (the only control), the lift of the piston beneath it being effected by the suction in the cylinders and determined by the position of the spoon-shaped arm operating the valve above. It is claimed that the introduction of this valve and its combination with the piston effects an economy of 33⅓ per cent. in the fuel bill, and at the same time simplifies the driving. The distinctive design which has marked the radiators of the previous Chenard-Walcker cars is retained, as is the combined friction clutch and brake, operated by one pedal. Ball bearings are fitted to the gear box throughout, and ball bearings have been introduced to the now well-known double back axle. This system particularly lends itself to the fitting of ball bearings, being relieved of the double strain of load and drive. The ignition of this car is the well-known Simms-Bosch high-tension system. Exceptional brake power is provided in the shape of three absolutely independent metal to metal brakes, any one of which, it is claimed, is capable of holding the car on any gradient backwards and forwards First, there is the clutch brake, actuated by the pedal, and already referred to; secondly, the differential band brake, likewise operated by a pedal; and, thirdly, the compensated hand brake, taking effect on brake drums on the rear wheels. Lubrication is obtained by means of a mechanical pump with an oil tell-tale on the dashboard. The auxiliary oil tank, in connection with which is an oil pump, provided with a four-way tap on the dashboard, feeds oil to the gear box, the differential, and performs the extra duty of recharging the motor oil tank, the operation of which should be performed every 200 miles. This four-way cock in connection with a hand pump is capable of another and very useful duty, namely, by its means the used oil can be pumped from the crank chamber into the gear box or differential, thus effecting a marked economy in the oil bill The mahogany box dash is particularly neat. This contains the lubricating tank and is provided with a convenient petrol gauge The steering wheel and dashboard are innocent of either throttle, spark, or auxiliary air levers. In the driving of this car the accelerator pedal alone suffices for all graduations of speed It is impossible to examine this car with any degree of attention without realising that its special features are substantially of construction and the elimination of all those unnecessary complications which are so loved by the crank designer

From a recent number of *The Car* we learn that the 16–20 h.p. Chenard-Walcker covered over ⅛ mile running at 4½ m.p.h. on the top speed.

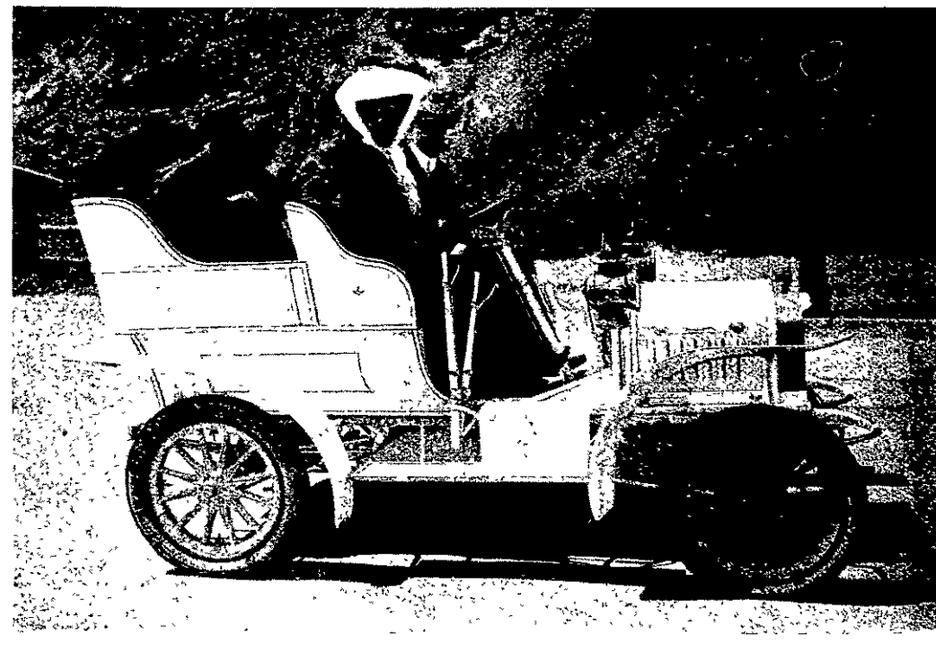
By slightly applying the side brakes so as to offer a little resistance to the pull of the motor, the speed was reduced to 4.1 m.p.h., still on top speed, and without any manipulation whatever. This was a truly marvellous performance and tends to show what can be obtained with a properly balanced 4-cylinder engine and a really efficient carburetter.

The Charging of Accumulators.

Our correspondent "Chauffeur" having put a question asking for information about the charging of accumulators, we have much pleasure in placing the following at his disposal and that of others who may want this useful information.

The successful running of the motor will depend to a large extent upon the condition of the accumulator; an imperfectly charged one will not produce a good spark. Most accumulators supplied for motor-cycles may be relied to run 800 miles before they require charging again. The best test to apply to an accumulator to see if it retains a charge is to place either a small four-volt incandescent lamp across the terminals, or connect the battery up to a voltmeter If the accumulator is charged, the lamp will glow brightly and remain so as long as it is connected; if the accumulator is nearly exhausted, the lamp will only appear a dull red. A fully charged battery will show 4.2 volts, or just over two volts for each cell. Most riders have not got the necessary appliances for charging, and the usual method is to send the cells to an electrician and get it done; the cost is very small. If the electric light is fitted in the house or shop—and providing it is continuous current—the accumulator can be readily charged. But it is only necessary to take the cover off one of the switches controlling a group of two or three lights, put the handle *in the off position* and find out which is the positive terminal. To do this, connect two lengths of insulated wire (bell-wire will serve), one to each connection of the switch. Clean the other ends of the wire bright and hold them apart in a glass of slightly acid water. The wire connected with *the negative pole* of the switch will give off bubbles of gas It is only necessary to join this wire to the black terminal, and the other wire to the red terminal of the accumulator, and leave on for about eight hours. The lamps will remain alight and with no appreciable loss of brilliancy. It is important to note that the handle of the switch *remains off* during the charging. When fully charged the accumulator will give off gas freely, and the liquid becomes a grey colour. The voltage will also rise to nearly 4.5.

Charging from a lamp holder.—Instead of tapping the current at the switch it is often more convenient to connect the accumulator up to a lamp holder and charge it while the light is on. The method is simple. It is only necessary to purchase from an electrical fittings depot a simple holder, a fitting known as an "adapter," and a couple of yards of flexible conductor The adapter and lamp holder require to be wired The adapter is fitted into the



10–12 H.P. 2-CYLINDER ALLDAYS CAR.

main lamp holder, and the lamp is inserted in the new holder. It only remains to find out which are the positive and negative ends of the wire, and connect up to the accumulator as before described. The lamp used would be either an 8, 16, 32, or 50 c.p , according to the size of the accumulator and the voltage of the lighting circuit.

Charging from a dynamo —A good deal of misunderstanding sometimes arises as to the proper way to connect up an accumulator to the wires from a dynamo machine. The correct way is to connect the lamps across the wires, the accumulator being placed in the circuit between one of the brushes and one side of the wiring. According to the number of lamps in circuit will depend the amount of current in amperes that will pass through the cells. The current that each lamp will pass depends on its candle power and voltage.

Bichromate battery —A perfectly satisfactory method of charging ignition accumulators at home is to rig up a two-fluid bichromate battery. One type is known as the "Fuller" battery. It consists of four glass or earthenware jars, and in each of these is placed a circular porous pot. Then placed in each outer jar are two carbon battery plates, and in the porous pot a thick zinc rod or plate, that has been previously amalgamated with some mercury. The outer jar is filled with a strong solution of 4 oz. chromic acid, water 16 oz., and 10 oz. sulphuric acid added The porous pot is filled with dilute sulphuric acid, one part to eight of water. The plates must be connected carbon to zinc, with insulated wire and joined up to the accumulators. An ammeter should if possible be placed in the circuit to see that no excess of charging current is passing; if so, it will be necessary to place about 20 in. of No 20s German-silver wire in the circuit, and adjust it to the right length to give the correct charging current The battery will charge up a twelve-ampere-hour accumulator three times without the solutions being renewed, but it is important to see that the zincs are removed from the acid when not in use. The capacity of the outer jar should not be less than three pints The supplies can be obtained from any dealer in electrical fittings, or the battery complete can be purchased from one of the large motor accessories depots.

Straker Steam Wagon.

Gradually motor traction is taking the place of the horse for heavy traffic, even in the country districts. The Rangitikei County Council were the first to make use of steam motors for the cartage of metal, next, the Oroua Carrying Company Ltd purchased a five-ton "Colonial" type to be used principally for the cartage of produce to the railway at Feilding The following bearing on this wagon, is taken from the *Manawatu Daily Times* "The wagon was loaded with four tons of wire The run was along Kimbolton Road to Cheltenham, then via Hayne's Line to Beaconfield and to Cunningham's Post Office, negotiating the Devil's Elbow with the utmost ease It was then taken through Davis' cutting and home via the Cheltenham Cross Road negotiating the very steep hills (1 in 7) easily on the low-speed gear With the four tons load it came home from Cheltenham a distance of 9 miles in 55 minutes The journey only occupied six hours It may also be mentioned that the consumption of coke was small The settlers in Apiti will no doubt be delighted at the success of the company's enterprise, for now a speedy and cheap means of transit has at last been provided which will bring them in closer touch with the centres

After exhaustive enquiry Mr John White, contractor, of Hawera, decided to discard horse-traction for the cheaper, reliable and more modern system for the carriage of road metal and produce and so as to meet the varying conditions, purchased a five-ton tipping wagon which is giving every satisfaction to its progressive owner Wellington has also received the addition of one wagon, which is being used by its owners, Messrs McEwen & Carter, for the carriage of goods between Wellington and Petone

We gave it as our opinion in an early publication of PROGRESS, that motor traction would play a leading part in drawing the outlying country districts closer to the towns and railways, and it seems evident that Messrs Sydney Straker & Squire Ltd. (who are now represented in New Zealand by Messrs. Norman Heath & Co) have been able to turn out a machine that proves satisfactory to the owner, and which will be welcomed by the back-block settlers

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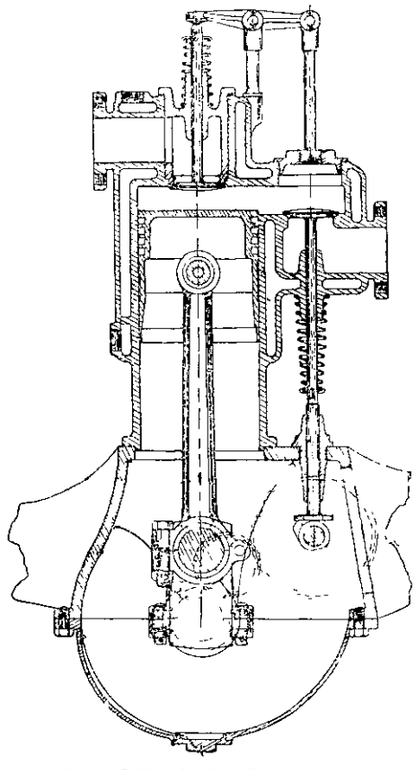
The motor cycle is destined to solve the problem of universal locomotion Ladies of all ages are now procuring this means of transit in the Old Country, and it will not be long before the initiative is taken by some intrepid New Zealand lady whereupon the fashion will grow appreciably

The Lancashire Steam Motor Company are announcing a new shipment of their celebrated steam wagons for municipal general and colonial service They are contractors for the War Office and many of the largest municipal authorities The excellence of their make has obtained everywhere the praise of experience



CROSS SECTION OF MITCHELL MOTOR.
(See Motor Notes)

The Mitchell 1907 Car.

In John W. Bate the Mitchell Motor Car Company have an engineer whose foresight and knowledge of shop economics have done more for the car industry than perhaps any other man as witness the fine models that firm is renowned for Mr Bate turns out three models viz —

(1) 14–18 h p 2-seat run-about 4 cyl 3½″ x 4″.
(2) 18–20 h p 5-seat light touring car 4 cyl 4″ x 4½″
(3) 24–30 h p 5 seat large touring car, 4 cyl 4¼″ x 5″

All three types are amply powered as the cylinder volume shows and are really rated well below the actual horse-power for on working out the above, it comes out Mr Bate says, that the 14–18 is actually 22 h p the 18–20 is actually 29 h p, and the 24–30 is actually 44 h p, a truly remarkable instance of under-rating the available power, and one which can be demonstrated any time, Mr. Bate believes, by brake test

All these cars are provided with standard sliding gear transmission of an unusually substantial nature, and also a very special design of clutch, which although on the cone principle, is as smooth, if not smoother, in engagement than the multiple disc, the principle being that the leather face is mounted on a flat spring ring over the clutch cone, which while being compressed gradually, puts the car up into speed and then holds fast, and obviating danger of shock from a clumsy pedal engagement to the machinery or tyres The frames of the cars are of heavy gauge pressed steel cold riveted, all cross-members being reinforced with gusset plates The valve action of the motors is both direct lift and lever, Mr Bate using a directly lifted intake valve at one side of the combustion chamber, and a lever-depressed exhaust valve in the middle of the cylinder head This central placing of the exhaust valve clears the cylinder extremely well (a point which many designers neglect), and it is the valve placing that governs the speed of an oil engine, and the Mitchell cars have engines which can be run at extremely high speeds efficiently if necessary, and with great economy.

These cars show a decided tendency to substitute high grade bronze for both steel castings and drop forgings The tough and enduring qualities of bronze—though costing more—being considered better practice

The front spring hangers are also of bronze Parson's manganese bronze only being used

The spark is controlled by a hand lever under the steering wheel while there are both hand and pedal for the throttle

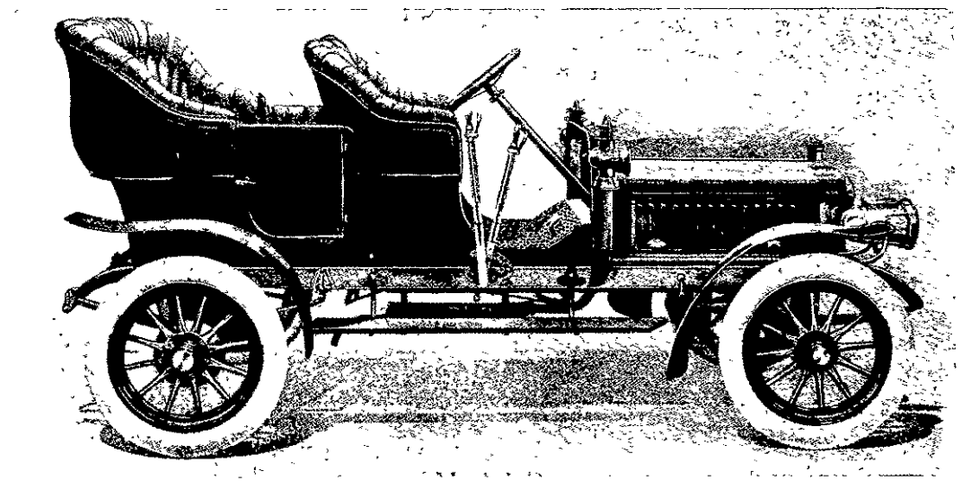
The description of the Mitchell muffler has been refused till now This important part of the car is worked exactly the reverse of the others, except one, by discharging the hot exhaust unto the *largest* muffler chambers, and discharging it from the smallest of the three chambers formed by three concentric shells 4 in outside diameter and 20 in long Messrs Holmes & Allen inform us that this procedure is based on Bate's theory that since the hot gases have the largest volume they require not only the largest space, but also the coolest—the cooling immediately reduces the volume and results in quite a silent exhaust with a back pressure not even enough to blow the exhaust type of horn

Taken all round, from upholstery and finish to the internal economies, we have to give this new visitor to our shores a good welcome and can say that for easy riding, accompanied by that confident feeling that the car always has ample power in reserve, we know of no make better provided

Messrs Holmes & Allen, of Brandon street, the sole New Zealand representatives, have to be complimented on introducing so up-to date and practical a machine.

16-20 Rolls-Royce Car.

This car, which belongs to Mr W. A. Keiller, of Lower Rangitikei, is fitted with exactly the same engine as the one used on the car that successfully competed in the recent Tourist Trophy race, and gained first place No expense has been spared in the way of fitting out this car with all the latest equipment. A Victoria hood is fitted which has the electric light inside Synchronised ignition is used, the seats are covered with detachable waterproof covers to protect the upholstery, there is a Cromwell folding glass screen protecting the two front seats from wind and dust; and a folding-glass screen is fitted to the back of the front seat to protect those behind The car has four speeds, and is very fast indeed. The speeds are, 15, 14, 36, and 50, with direct drive on the third gear The change-speed is the Gate type and is very easy to change The wheel base of the car is 9 ft 6 in and the extreme length of each car is 13 ft. The engine is four-cylinder with bore and stroke, 100 x 127 In its trial run the car was able to negotiate from practically a standing start on the steep gradients on which it was tried on the third gear The body work of this car was built to special specifications made by the Scott Motor and Cycle Co, Ltd, and executed by Messrs. Barker and Co of London The car is one of the most handsome machines ever landed in New Zealand. The equipment includes a speedometer and a milometer, with eight-day clock



A HANDSOME AMERICAN CAR 24–30 H P 4-CYLINDER MODEL "D" MITCHELL CAR.

16-20 Argyll Car.

This car was specially imported for Mr. P. R. Sargood, of Dunedin and it is exactly the same in all particulars as the one which ran so well in the Tourist Trophy race with the exception of the wheels The engine is a very beautiful piece of work, showing a very fine finish, every part being extremely accessible, and the whole working as quietly as possible It has four cylinders, bore and stroke being 95 x 130. The cylinders are all cast separately, with the valves on opposite sides. Double ignition is used with high-tension coil and high-tension magneto ignition. The car is equipped with 35 x 5 Palmer cord tyres It has the usual handsome Argyll Rois de Belge side-entrance body, finished in deep carmine The machine has lots of road clearance and is very speedy It also has the latest Argyll design in back axle with ball bearings at four different points This machine seems to require little or no effort to make it run on the road

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The Singer Motor Manufacturing Co, of Coventry, England are shortly to be represented by an agency in Wellington for the Australasian colonies. Their motor cars are well known throughout the world for their reliability.

Motor Notes.

By "Accumulator."

Orders booked by British motor-bus engineers will average an aggregate output of 25 machines per week for the next six months—say £100,000 per month.

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A unique sight is now offered Londoners. They are witnessing the smart and smoky petrol vehicle ranged alongside the unostentatious Jehu. The irony of fate!

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The motor-bus traffic in London is very much curtailed within the centre of the city (taking in the Strand, Ludgate Circus, Oxford Circus, Piccadilly Circus, etc.) on account of the incompetence of drivers.

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Messrs. Trengrove & Petherick have opened a new motor garage in Wellington—Harris street Their establishment is commodious and up-to-date, and, supplying as it does a long-felt want, is a reliable sign of the increasing development of automobolism in the metropolis.

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The tyre trouble still reigns supreme. Studded treads are going out of fashion on touring cars; the greenhide tread, or even the bare rubber tyre, being preferred. Studded treads will soon be found in use on city private cars only. These treads guard against the calamitous results of skidding in a crowded thoroughfare.

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There is a movement in Britain for urging the great importance of encouraging the use of some other fuel than petrol, one of British manufacture for preference, as a matter of great national importance. Certainly there could be no better means of creating competition in fuel suitable for internal combustion engines on motor cars than the method of offering large money prizes.

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The bodily exertion on the part of a London policeman, which he has displayed for ages, in the uplifting of the right hand to stop traffic, has now given place to the simple process of turning his back upon a flood of vehicular traffic when he requires to stop it. He and his colleague on the opposite corner so work in harmony in this respect as to lead one New Zealand motorist, who recently witnessed it, to consider that London traffic is now "mechanically operated."

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The child's seat on the bicycle seems to have come to stay, and no wonder, for they are delightful to the children and therefore naturally so to all who are with the children. Moreover, they are remarkable for the simplicity of their attachment. I understand that Mr. Gardiner of Kilmore street, Christchurch, who has a stand in the Exhibition of that city, is very well satisfied with the demand that has set in, despite the fact that he is not at all pleased with the position assigned him by the authorities.

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All reliable cars turned out by reputable firms cannot possibly come down in price on account of the ever-occurring application of new patents in their construction. Raising of gears and other improvements in the mechanical part of cars at all times require considerable forethought and outlay of capital. One improvement already applied to an English car is that of pneumatic control of gears and brakes, there being absolutely no levers. All that is required in order to ensure perfect control is the pressure of a finger on a pneumatic bulb.

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Selling agents in London are feeling the effect of competition at the hands of members of local directorates. These members, being chiefly composed of noble lords, succeed in influencing an enormous amount of business, and it is quite a common thing for a prospective buyer to meet "my lord" in the course of a drive, and to be led into buying a car. The noble representative of the business pockets the commission in quite a gentlemanly and unostentatious manner, to the detriment of the selling agent, while the buyer believes he has at least procured a car free of the middleman's charges.

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The need for keeping an eye (when buying) on the rough roads of the colony has been brought home to the neighbourhood of a certain centre not more than a hundred miles from Palmerston North, by the experience of a resident lately returned from the old country, who brought with him a magnificent car on which he is said to have spent the sum of £2000, warranted to do every thing in the world possible to any car. This proud character it proceeded to live up to by breaking down at an early stage, after the rattling of the roads had fatally disagreed with the beautiful creature's digestion.

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The F N 4-cylinder motor bicycle which hails from the ancient town of Herstal, Belgium, is beginning to engage the attention of the patrons of that branch of the motorism of the day. Its chief advantages are that it is built on a system of interchangeable parts, is gear driven, is free from vibration, has 59 per cent more cooling surface than prevailing systems, and is fitted with the Simms-Bosch magneto ignition and the patent F.N. fork. In addition, the frame is of extra strong steel tubing, the crank shaft is drop forged of high grade steel, the lubrication is all that can be desired and the carburetter entirely automatic

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Who was the inventor of the motor car? This question, so often discussed by the motorist, is answered by the Jewish Chronicle, in a recent issue. The Chronicle says —"The inventor of the motor car was Siegfried Markus, of Vienna Markus's benzine motor was on show there at the great International Exhibition of 1873, and the description of the vehicle is to be found in the large catalogue of the Exhibition, which was published by the Imperial and Royal Printing Office. The car in which Markus and some other Viennese, who are yet living, made the first trips in Vienna is still to be found there in the depot of a well known carriage and motor manufacturer."

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The "Prevention of Corruption Act, 1906," which came into operation in England on the 1st of January, substantially affects the motor trade, more especially from the chauffeur's point of view who is in the habit of demanding or receiving a commission for the introduction of business on behalf of his employer. From the 1st of January any chauffeur who accepts any gift or consideration, or attempts to obtain any without the knowledge of his master, will be criminally liable The penalty is up to two years hard labour and a heavy fine. An echo of this measure seems to have reached and affected a good many people in this colony.

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The 1907 Mitchell motor new design valve action is interesting, as will be seen from the cross section of our illustration. The valve placing is the notable thing. The exhaust is in the middle of the cylinder head, and hence is rapid, and connection assures a partial vacuum in the cylinder when the cold charge enters below the last remnant of the escaping burned charge, and this valve placing and operation makes a fast running motor. The coring is easy and simple, and the motor has a very great extreme of high speed, as much as 2000 R P.M, and possibly more, which means that it takes in a large charge volume, and is strong at low speeds, showing decided advantages to the mixed valve placing, which calls for the hybrid valve action The chassis frames are of pressed steel, and all the best features of the Mitchell system are present, as per experience.

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To speak of driving a motor car or a motor boat is the easiest thing of the world But to get the practice which alone can guarantee safety and true pleasure,—there's the rub. It is something to know that the art has, like others once considered more important, at last become the object of a school of the correspondence order The Correspondence School of Automobile Engineering, incorporated in New York, is now prepared to furnish all who may want them, correspondence courses in automobile and motor boat operation and engineering. This supplies a want felt by owners, machinists, drivers, repairers, and the rest who have to make the motor car perform its useful functions in out-of-the-way back blocks and lonely places. I have to acknowledge receipt of a copy of the pamphlet of the rules, terms, and all necessary particulars from Mr Rodger, of Cashel street, Christchurch.

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About steam cars a recent controversy is interesting and instructive, and it has placed the merits of steam in somewhat bold relief. For example, as to hilly country, there are, it may be gathered, steam cars which negotiate the stiffest hills without any rushing at the bottom; and they have this advantage that if, in going down a hill, anything goes wrong with the brakes the engine can easily be reversed and the car pulled up Starting is a problem, sometimes, in the car of Commerce, but in the case of steam, once steam is up, all you have to do is to open the throttle, and away glides the car, with instantaneous and certain start. In the matter of economy (to which millionaires attend as much as the messenger boys, their employees who ride motor bicycles) the steam car burns paraffin at a cost of 5d. to 6d. per gallon and will run as far as a petrol car carrying the same quantity of petrol, the present price of which is 1/3 a gallon. Moreover the steam car runs a hundred miles on a single fill of water, eighty if there is much hill work. Fourthly to lubricate adequately means that the steam engine will last practically for ever. That, at least, is the statement of one enthusiastic expert, who declares that after several years of use of a steam car, he has never paid a penny in repairs of the engine, and never had to take off the covering

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Mr. Somerville, county surveyor for County Cavan, writes to Messrs. Alldays & Onions about a 10-h.p car recently purchased from them, that he is particularly pleased with its hill climbing capacities. It can with ease surmount on the top gear hills that a 15 h p 4-cylinder car of celebrated make was only able to take on the second speed, and it is only on rare occasions that he has had to use any but the top speed, and as a very striking example of this, he says, he drove, with two up, the entire distance to Banbeborough and back, a distance of 40 miles, without once altering from the top speed the whole time, and that on one of the hilliest roads in that, perhaps the most, hilly county in Ireland. The firm, which turns out these cars in all sizes up to 20 h.p of both ordinary and standard gauge, has a type specially constructed for the colonies, with special radiator and fan for efficient cooling, and built extra strong to withstand the rough roads.

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The motor manufacturing industry in England is extremely promising A New Zealander, who has just returned to Wellington, says the Home demand is so great that colonial orders must, perforce, take a very second place. Notwithstanding my informant's ideas, I am fully aware that the lack of capabilities to complete foreign orders in England is due more to the inadequacy of arrangements for handling the demand than to the inordinate inroads on any one firm's power of production. To further qualify this we have only to look to at least half a dozen large motor manufacturing concerns which, two or three years ago, doubled and nearly trebled the size of their then existing factories in order to meet the impending rush. These firms were at the time ridiculed on many sides, but their forethought has helped them to enter into a very profitable and expanding trade with Britain's oversea colonies.

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In corroboration of the above another expert has some pertinent information to offer. "I can remember" says he, "a little air-cooled bicycle engine I rode about 1901. The combustion head was as heavy as most motor-car cylinders are cast now, it was detachable with flanges 5-16 in. thick; it never got hot enough to fire prematurely or to fire at all with switch off The De Dion tricycle engines were not cast with light cylinders or combustion heads, yet they never or seldom overheated with gears of eight to one when properly driven. Again I rode a motor cycle in 1904-5 with a particularly light engine, and it was most difficult to keep it cool. The cylinder was a beautiful example of moulding and casting, bored out to 3-32 in. with very thin ribs, but it absolutely refused to keep cool. This year I have been riding a very heavy one. The radiators are 'chunks' of metal. Does it get hot? No! And one cannot make it overheat unless by very careless driving."

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The announcement recently made in England about the inclusion of a monstrous tax on horse power (£1) in the draft of the new motor Bill has excited the greatest indignation in motor circles. When the mail left the expert journals were full of correspondence on the subject and the enquiries as to what ought, might, could, would and should be done to prevent this tremendous iniquity were exceedingly numerous. All were agreed that the first vital necessity was to get the proposed provision modified before the Bill got before Parliament. Protest was made principally because the Bill is a government one and ought, therefore, not to pick out any particular section of the community for drastic, if not prohibitory, taxation; and, secondly, that the tax of £1 per horse power would considerably restrict the sale of motors, and therefore affect a very large number of hands employed in the motor industry.

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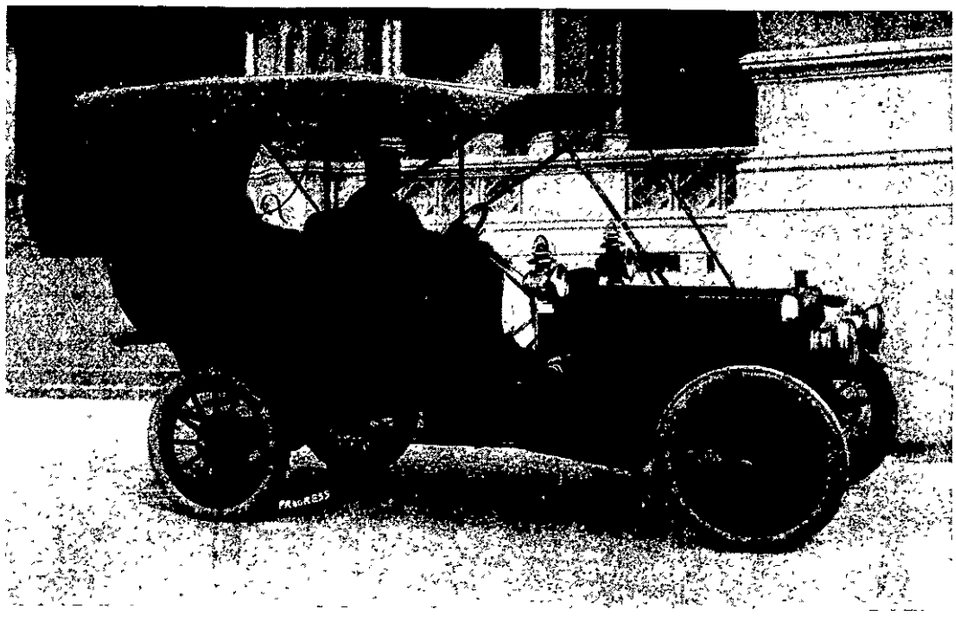
Tourist trophy races are now recognised in England as the most important and the most interesting which take place in connection with automobilism, combining, as they do in a way peculiar to themselves, sport and mechanical development There is, therefore, much discussion about the conditions on which these events are to be arranged. The bulk of opinion



THE FIRST 6-CYLINDER CAR TO ARRIVE IN THE COLONY: 40 H.P. 6 CYLINDER. FORD MODEL "K."

seems to favour, above all things ,the making of a proper and easily understood definition of what an "ordinary touring car" is. Further, the majority seem to incline to the opinion that an "ordinary touring car" is one in which there is comfortable accommodation for the number of passengers it is supposed to carry, and adequate space for a moderate amount of luggage. On the following details of specification, also, there appears to be a widespread agreement :—

1 The number and weight of passengers to be carried.
2. The dimensions and minimum weight of body.
3. The distance from dash to front edge of back tyre.
4. Clearance.
5. Breadth of frame and track.
6. Minimum weight of chassis
7. Maximum average speed desired.
8. Allowance of petrol.

But there is no disposition to adopt heroic measures. One of the suggestions that meets with a great deal of favour is that the opinion ought to be ascertained before the race or trial of :—(*a*) All the entrants for the year's race. (*b*) All the principal British manufacturers who did not take part in the year's race. (*c*) The principal foreign clubs, as the race is an international one. (*d*)The editors of the principal technical papers in the country.

* * * * * *

In re dust nuisances and their remedy, the dustless roads! motorists all the world over, likewise cyclists who follow their pleasant calling over the highways and byways of the earth, are always met by the objections of the local authority. The remedy suggested is to convert the local authority by bringing preponderating ratepaying force to bear upon it. It is a matter of organisation and Associations, which grow with the growth of motorists, who, presumably, are all ratepayers—probably all payers of the highest of the rates. In this connection a correspondent writes to a contemporary as follows :—

> You have at various times reported the meetings of a number of parish and district councils all over the country, at which sundry members thereof have indulged in vituperative tirades against motorists because their vehicles raised the dust which happened to be, but ought not to be, upon the roads. These set pieces have often been received with considerable applause. It is, however, becoming more generally realised by those authorities—although somewhat slowly, perhaps—that it is their own methods that are at fault, and we have found that when the non-motoring section of their constituents rub that fact into them and demand improved roads, they set about the work with an alacrity which is naturally absent so long as they think they have only the motorists on one side, and the critical ratepayers objecting to the conversion of their roads into motor tracks at their own expense, on the other. It is useless for a motorist to attempt to persuade the average ratepayer that he is looking at the matter from the wrong point of view ; he only gets more abuse for his pains. This is where the Dustless Roads Association comes in. We can, and do, convert that anti-motorist into an anti-duster, wholesale.

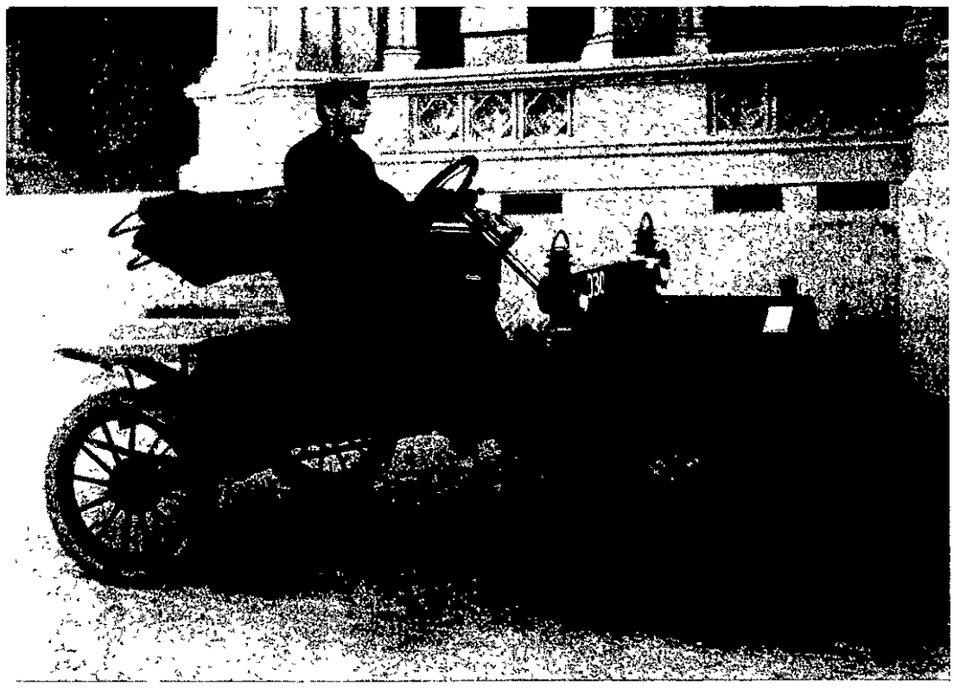
About the great problem of non-skidding, and the precautions to be taken for securing that very desirable consummation, Dr. Samways, well known as a motorist of enterprise and sagacity, writes a contemporary on this subject detailing some experiences as interesting as they are valuable. Thus :—

> "I have a pair of Samsons' Non-Skids on Continental tyres which were put on in Paris five months ago, and they have given no trouble whatsoever; except that the rivets are getting thin they are as good as new. On my other car—a 12-16-h.p. Swift—I have had experience of other non-skids. Two made last year were good and wore well. This year the type has been improved upon, and the result is somewhat disappointing. The long rivets on one tore quickly out and the tyre beneath the other burst. The tyres, moreover, are spoiled by the process of scraping to which they are subjected before the non-skids are stuck on. One of my tyres not only has places from which the rubber has been completely scraped, but the canvas beneath has been cut and weakened and the burst referred to resulted from that cause. At the present moment both the non-skids on my car have been put on by myself in order to avoid the damage done to the tyres beneath by scraping, vulcanising, &c., when sent to the works. Using Sen's Vulcanisateur according to the instructions, the home applied non-skids are eminently satisfactory, even though for economy's sake I substitute ordinary rubber solution and only use Sens' reviver. By this means I know that my tyres are sound and drive with confidence. Moreover, I can use up home-strengthened old tyres which the works refuse to restud. I have not yet found a house which will supply me new unapplied non-skids. The makers always allege, incorrectly, that they cannot be put on by an amateur. My advice is re-stud, or have re-studded your old non-skids, but, for the sake of the tyre beneath, put them on yourself, as well as new ones, if you can get them."

The Ford Car.

The 1907 Model "K" Ford is, in many respects, though not radical ones, an improvement on its predecessor and namesake of 1906. The six-cylinder arrangement has been retained on account of its perfect balance and freedom from vibration, as proved by long experience. The motor has higher compression and the radiator 25 per cent more capacity in consequence. In all the details there is improvement, a greater accuracy having been secured by grinding down to half a thousandth of an inch of truth. The gear pump of the former type has been replaced by a centrifugal pump, and the lubrication improved by giving all the tubes separate action, and by maintenance of the level in the base. The carburetter is improved in starting qualities and flexibility, so that it accurately and automatically compensates for every degree of motor speed. A new arrangement in the air intake secures economy of fuel and a more uniform mixture. The planetary system of transmission has been retained by reason of its proved service qualities, but a much needed improvement has been secured by the introduction, between the motor and transmission shafts, of a flexible joint of a nature to permit a sufficient degree of universal movement of the shafts at the intersection, to fully compensate for all possible distortions and strains due to hard driving over bad roads. The wheel base has been widened six inches, more leg room and a direct front style of sitting secured in the body—the only radical change in the design—patent leather wings and a metal shield running its whole length make the car absolutely dust and mud proof, so that "Miss Phebe Snow" might ride in it indefinitely without soiling her immaculate gown or dainty gloves: furthermore all the hubs have been made stronger. The consequence of these improvements is an increase of weight of 100 lb, the 1907 "K" weighing 2600 lb against the 2500 of its predecessor. The increased power—up to 40 h.p.—makes the new "K" capable of 60 miles an hour with full load of five adults, and the combined flexibility of the six cylinder motor and magneto enables the driver to throttle down to a crawl without the necessity of changing gears or releasing the clutch.

The 1907 Model "N" Ford Roundabout. From the original car shown in January, 1906, there is

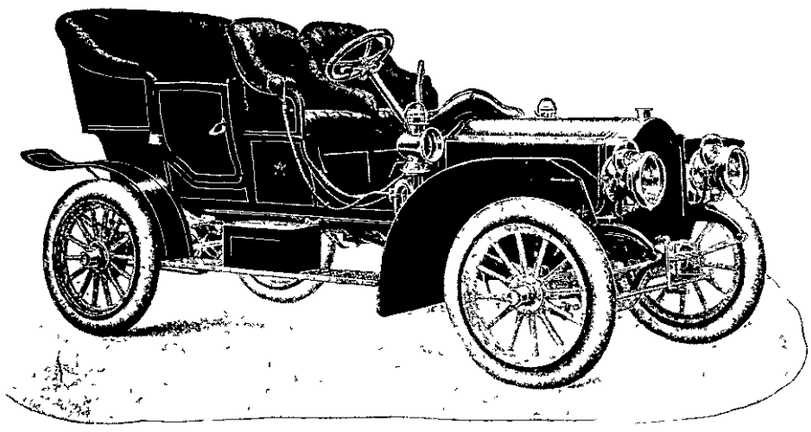


A MARVELLOUS HILL CLIMBER: FORD MODEL "N." 15 H.P. 4-CYLINDER RUNABOUT.

no change. Some 5000 of them are on the road, and their behaviour on the roughest roads with full loads warrants the makers in continuing the type unaltered in any respect, in its characteristic of lightness and strength As a hill climber the model "N," it is said "has practically no equal in the colony, the proportion of power to weight being abnormally high"

The Russell Car.

The 1907 Model "E" Russell contains no alteration of principle, simply owing its excellence to the improvement and refining in all the details from radiator to rear axle, and it will be regarded as a standard type for years to come. As may be seen from our illustration, which we print through the courtesy of the agents, Messrs Magnus, Sanderson & Co, it is more pleasing than its predecessor, the Model "C"; its spring suspension (semi-elliptic springs) will give it better riding qualities, it will have more power, and quieter operation. There

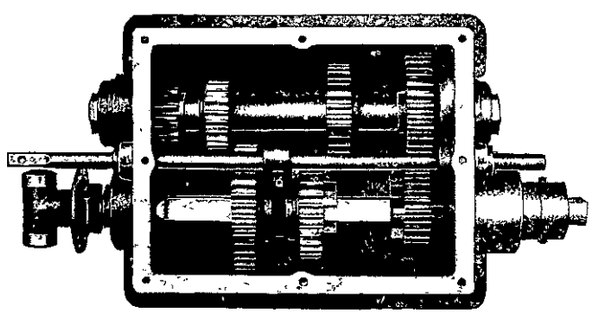


MODEL "E" RUSSELL TOURING CAR, 24 H.P. 4-CYLINDER ENGINE

are four vertical cylinders; the valves are all on one side of the motor; the bearings can be tightened without dismantling the motor, all gears are enclosed and run in oil; lubrication is by splash, and the centrifugal water pump is of liberal capacity. The clutch is adjusted by a single nut. The transmission is of selected type, giving three speeds and reverse, all controlled by a single lever with a positive locking device keeping the gears separate. The rear axle is of the floating type, the driving pinions and all the gears are of nickel steel, the driving shaft is-supported-on ball bearings, both above and below the pinion, and the differential is so arranged as to be removable without disassembling the rear axle. There are besides numerous improvements in control, dust protection, roominess, ingress, and convenience of driving.

12-14 4-Cylinder Renault.

We believe this is the first Renault car landed in New Zealand. Many people who have seen this model are particularly struck with the unique design. The engine is exceedingly compact and is certainly in appearance a very beautiful piece of engineering work. The car is silent, and moves on the road like an electric car This machine has already proved to be interesting to all motorists. The car has been landed to the order of the Scott Motor & Cycle Co, and is illustrated on p. 163.



RUSSELL TRANSMISSION CASE WITH TOP REMOVED, SHOWING THE SHAFTS, THE GEARS AND GEAR SHIFTER ROD.

Landing an Argyll.

Argyll cars are despatched from the factory in such a splendid condition that agents have very little to do in the way of tuning up these cars It may be a surprise to most people using motors to know that the Scott Co drive every Argyll motor car landed in New Zealand from the wharf to its destination Nothing needs to be done to any of the machines other than connecting the parts and filling the car with oil and petrol We show on p 168 an illustration of a 14/16 Argyll being landed on the wharf in Wellington Forty-five minutes after the boxes were landed on the wharf each machine was out of the case filled up and ready to drive to the Company's warehouse

Tops and Covers and Canopies.

In the beginning the motor was made for the rain to fall on the just and the unjust alike, for the winds to blow untempered on the shorn lamb-like chauffeur, for the frosts and heats to work their wicked wills on the unprotected tourist These neglected beings first began by devising costumes, and for awhile they swaggered in them attracting the attention of the ubiquitous photographer, and the comic artist Enveloped in the motor dress everybody looked like everybody else This proved unpleasing to the ladies This is perhaps the reason why the motor makers took to devising protection shields, and covers, and canopies No one can imagine why the obvious necessity was so long ignored any more than any one can deny that when the remedies came they found a grateful world Nevertheless, when they did come they had to submit to developments before they could be allowed to stay

The main difficulty was to find a bow socket strong enough for the work. Hoods were often collapsing on the road, therefore, and it was a rare thing to see them fold up in the manner which delights the eye trained to neatness In this respect Colonel Sprague of the famous factory made himself a public benefactor at an early stage of the march of progress, by overcoming the main difficulty He did so by the use of a strong drop steel forging welded to a large heavy double or laminated steel tube It is the bend which under this system is made of the forged steel This obviates the bending and fracturing of the steel socket, for when you bend a steel bow you crystalise the steel and that is why the common carriage bow is always liable to break on the slightest strain Moreover, in the new laminated double steel bows the wood extends to the bottom of the bow thus giving two thicknesses of steel in combination with a regular solid ash bow Result, the tops always fold neatly back as they ought to, and keep place The same firm Sprague Umbrella Company of Ohio, makes a specialty of tops of which they have many varieties Of these perhaps the best is the top covered with rubber duck and lined. Sometimes they use 3-ply whipcord in gray or khaki colours or imitation leather, with of course adjustable hood

There is a vast variety of fronts, of which the pick is the metal plate glass folding front, or wind shield it is run very close, however, by the patent adjustable front. In the matter of covers, leather looks splendid, and for that reason many prefer it But in frosty weather leather may not be folded under penalty of cracking, a consummation every owner always desires to escape, if he can possibly manage it Imitation leather is even worse

The Coming of the Light Motor.

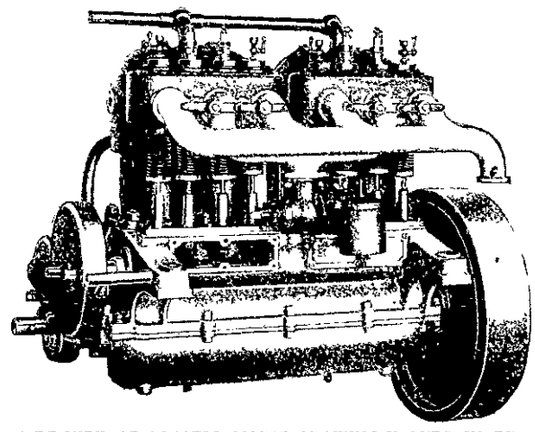
How different is the present-day heavy motor cycle from our early dreams When the novelty of cycling began to wane we possessed far-off dreams of a motor attachment which would negotiate the hills or battle against the wind, which was always a head one. The motor cycle came, but was it what we looked for? The weight, vibration, noise, lack of real efficiency, and general clumsiness resembled more an infant locomotive than a bicycle

Youth could forgive all these drawbacks and inconveniences in his chase after speed and excitement, but the generation who dreamed of their ideal attachment waited, so far unsatisfied But the infant locomotives did not satisfy their riders, and being inefficient on the hills more power was called for and more power was given, but the increased power was practically neutralised by the increased weight The old generation still waited perhaps a trifle more hopelessly Then from the land "where the watches come from," Switzerland, where mechanics are born, came the Motosacoche (the motor in a handbag), an attachment for ordinary Roadster Bicycles, its total weight is 32 lb with 1¾ h.p., simple light, efficient

The old generation looked interested the motor cycle world looked uneasily Could it climb hills? It surely is not possible that this toy can dare to compete with the real motor cycle!

The manufacturers, Messrs Dufaux & Co. entered their invention in the great Continental reliability trials, and against 102 competitors from all countries were awarded first and second prizes on all counts Success attended them not in one trial only but in dozens

Could it climb hills? The Dufaux Bros. undertook to climb that majestic mountain, the Grand Salève and in the presence of the citizens of Geneva rose 4000 ft up the unloaded mountain side This was in June 1904, and this record climb still remains unchallenged The motor world now realised that the principle of the heavy motor cycle was wanting, and the features of the last Stanley Show were the low-powered light weight motor cycles exhibited, led by the marvellous Motosacoche



SIDE VIEW OF RUSSELL MOTOR SHOWING VALVES, INLET AND EXHAUST PIPING AND CAM SHAFT A MODEL OF COMPACTNESS AND SIMPLICITY

RUSSELL FRONT AXLE.

The old generation now cry "Eureka!" and the orders placed in the hands of the manufacturers of the Motosacoche amount to many thousands.

In fourteen days at the Milan Show 2800 cash orders for Motosacoche attachments were received by the manufacturers.

New Zealand is not behind the times, and the Cycle & Motor Supplies Ltd., successors to Herbert H. Smith, who are N Z representatives for the Motosacoche, report that the demand for the hill-climbing Motosacoche is nothing short of amazing.

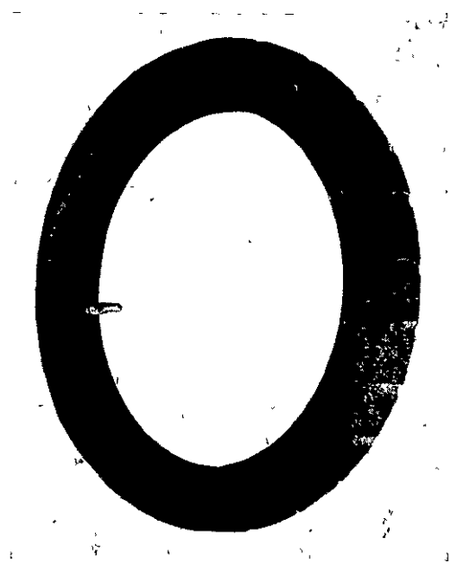
The Dunlop Rubber Co. of Australasia, Ltd.

Amongst the many enterprising and progressive business concerns of this colony the Dunlop Rubber Co. of Australasia Ltd stands in the foremost rank, a fact which no one would feel inclined to dispute after a visit to the company's large and commodious warehouse which is located in the very heart of Christchurch, where can be found evidence of the most substantial nature as to this company's abilities to cope with the thousand and one demands that are being daily made upon its ingenuity and resources.

In the person of a representative of this journal we recently paid a visit to the company's business premises, of which an illustration appears elsewhere in this issue. The appearance, it will be noted, is in keeping with the reputation and prosperity of the company, and the place is furnished with every appointment necessary for the successful management of a thriving business Upon

THE NORTHCOTE MOTOR COAT.

entering we were at once impressed with the "activity" and "go" essentially characteristic of a live concern. Going through the smartly appointed hall we were struck by one of the firm's handsome mats of grey corrugated rubber, with a blue scroll laid down the centre and around the border. To tread upon this was to recall the elasticity and buoyancy of youth, and greatly increase our admiration for the fabric so well displayed by the coloured tiles of the floor. A few palms here and there and several panels showing special features of the company's work set this hall off to great advantage Close by is the sanctuary of the general manager. We interrupt Mr. James in the midst of his work, which he puts aside with his usual courtesy We talk of the history and progress of the company in New Zealand, and we hear him review its reassuring prospects. In the course of his remarks Mr James gives the *raison d'etre* of his company which is to forward the automobile movement by adopting the most modern and improved methods of making tyres suitable for the roads of Australasia This has led to the expenditure of many thousands of pounds. Much of the money has been spent in experimenting with, we learn, eminently satisfactory results, as proved, the manager says, by



NEW DUNLOP NON-SKID TYRE

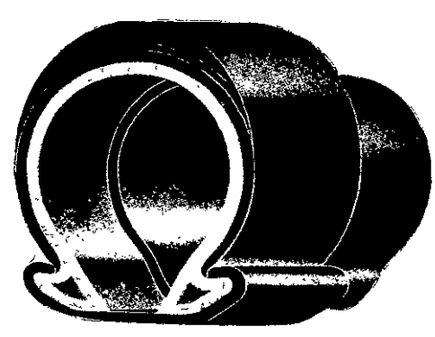
the enormous demand for the firm's tyres. Mr James is naturally proud of the combination of ingenuity, energy and capital that has adapted itself to Australasian conditions

It is some eleven years since this company, then known as "The Dunlop Pneumatic Tyre Co" first appeared in this colony with a catalogue of not more than half a dozen lines and a staff of four persons To-day there is not a line, said the manager, for which rubber can be utilised which they do not manufacture. In the Christchurch establishment upwards of fifty persons are employed, while the number of individuals on the company's pay sheets throughout Australasia is not far short of a thousand with an annual wage aggregate of £100,000

These preliminaries over, we are courteously taken over the premises First, the clicking of many typewriters is suggestive of the volume of correspondence required by this large business, secondly, the department of "Country Orders" and "Guarantees," the substantial ledgers and general activity follow up the suggestion, further ahead is the Delivery Department, completing the same, with the numerous lines of the company's manufactures and its various facilities for expeditious despatch of its many orders This latter was at the time of our visit a veritable hive of industry. The counters were crowded with clients, the assistants bustling to and fro in the hurry and stress of the local trade, which here meets and swells the general volume of the company's business. In the Packing and Forwarding branch at the rear of the store thousands of covers, tubes, mats and other goods are stacked, all of which make substantial evidence of the stability of the rubber industry in these colonies.

Through a convenient entrance we reach the Garage and pass through numbers of cars undergoing treatment, (tyre replacements, etc etc.) reaching in due course the General Factory and the bedrock of the company's business. Here are all the appliances and machinery necessary for the execution of all classes of repair work in connection with car covers, tyres, rims, and the rest of the requirements of a great and growing trade. A special feature is the large modern vulcanising and electric plant All these machines going at full pressure sustain substantially the impression of the company's large trade, as do also the thousands of car and cycle rims stored on the next floor

In due course we reach the Show Rooms, where



SECTION OF DUNLOP MOTOR TYRE.

is a fine exhibition of the whole of the various articles manufactured by the company. Prominent among them of course are all sorts and conditions of motor tyres Among these we notice particularly the Heavy Dunlop Roadsters, some of which are covered with the Samson tread, and are therefore puncture proof, according to the statement of the manager and non-skidding. We notice also the Dunlop latest style of non-skidding bar tyre an illustration of which appears herewith. There are compound motor foot pumps with gauge for the inflation of tyres to their proper pressure, the thing of such material importance to the life of the tyre, motoring rainproof coats, two illustrations of which will be found on this page, rugs, spring bumpers, strengthening pads, putties, tubes, valves, security studs, outfits; together with samples of re-treaded car covers water and dust proof, bags for enclosing spare covers and tubes, tyre levers, solid motor-bus tyres (both single and twin) weighing something like 150 lb and capable of carrying loads up to 5 tons.

Altogether the floor space of the new premises covers considerably over 25,000 sq. ft Roaming over that we saw quite enough to justify the reputation of the Dunlop Company for vigour and enterprise We conclude with grateful acknowledgement of the courtesy of the manager and his assistants throughout a most interesting and instructive visit to the important industry in which they are doing such useful service.

To copper the surface of iron or steel wire, have the wire perfectly clean, then wash with the following solution, when it will present at once a coppered surface rain water, three pounds; sulphate of copper, one pound.

THE BEDFORD MOTOR COAT.

Rules for Calculating Speed.

The diameter of the driver given, to find its number of revolutions

Rule —Multiply the diameter of the driver by its number of revolutions and divide the product by the diameter of the driven. The quotient will be the number of revolutions of the driven.

The diameter and revolutions of the driver being given to find the diameter of the driven, that shall make any number of revolutions

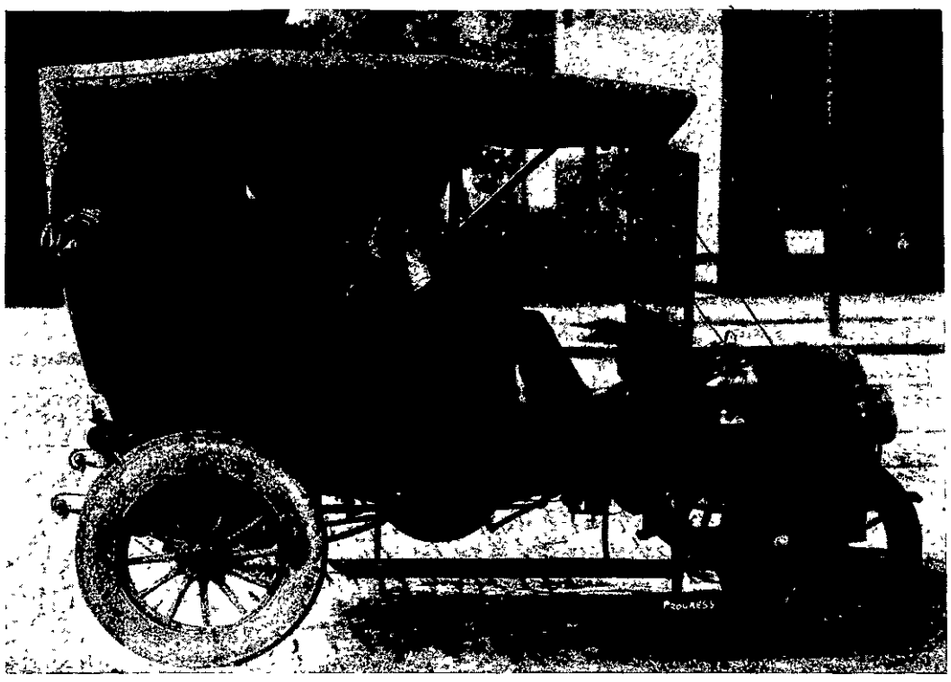
Rule —Multiply the diameter of the driver by its number of revolutions and divide the product by the number of required revolutions of the driven. The quotient will be its diameter

To ascertain the size of pulleys for given speeds.

Rule —Multiply all the diameters of the drivers together and all the diameters of the driven together, divide the drivers by the driven. Multiply the answer by the known revolutions of main shaft.

The best way to get even with your enemy is to surpass him.

The man who gets on is the one who keeps one eye on his work, and one open for the main chance.



THE MCLEAN TYRE PROTECTOR: NOTE THE ALUMINIUM PROTECTIVE CASING ON THE BACK WHEEL.

The McLean Protective Casing.

A MOMENTOUS INVENTION.

GREAT NEWS FOR MOTORISTS.

A patent is now out which promises to supply a want much felt by all sorts and conditions of motorists since motoring began. It is the invention of Mr. McLean, of Braeside, Ti Tree Point. It relates to wheels provided with pneumatic tyres and has for its object the providing of such wheels with an improved form of protective casing. Provision is made for the tyre to clamp the protective casing and the rim in their respective positions, and for preventing the protective ring from slipping on the ground. At the same time the resiliency of the tyre is preserved and the rim and casing are provided with an inexpensive and effective means for preventing the collection of dirt and foreign matter between the rim and protective casing. This casing may be made of any resistant material, such as thin steel, or aluminium. It is provided at its centre with an incurved recess adapted to receive the tread, which will be ordinarily composed of rubber and retained in place by the shape of the recess, and also by means of imbedded wires extending circumferentially round the ring. Besides these wires there are flexible connecting strips of leather, rubber, or other suitable material, secured to the ring and rim by cement, rivets, or other similar connecting means. These strips prevent dirt and foreign matter from working in between the protecting ring and the tyre, and by virtue of their flexibility permit the radial movement of the ring in the rim. The rubber tread is essential, for otherwise the resistant material of the casing would not grip the ground with sufficient security. There is another advantage, namely, the incurving portion performs a function other than providing a recess for the tread, as such incurving portion gives the protecting ring a bearing upon the tyre at only one point, leaving its sides free from the tyre, thus increasing the resilient properties of the wheel. One can see at once that the protecting ring can, because of its limited bearing upon the tyre, move much more readily in a radial direction than if such ring touched the tyre throughout a circumference, as is usual in devices of this type. Already, we understand, a large body of expert opinion, both in Europe and in America, has been expressed unanimously in favour of the new idea. The diameter of the ring is just enough greater than the diameter of the rim to provide for clamping of the parts in their relative positions by the inflation of the tyre There is therefore no rubbing of the ring upon the outside of the tyre, as is ordinarily the case when the ring is considerably larger than the rim.

In practice it is found invariably that the tyre is free from friction; tyres which get hot under the ordinary conditions of the road remaining perfectly cool After the longest runs there is never any dirt inside; and there is a blast of air around the wheel which effectually blows all dirt out, prevent ing it from even lodging in the theoretically weak place, namely the space between ring and tyre. These are great advantages which motorists will be quick to recognise. Our illustration shows the application of the McLean Protective Casing to the back wheel of a 10-12 h.p. car.

The Six-Cylinder Car.

TO THE EDITOR.

11th January, 1907.

Dear Sir,—The commencement of the year 1907 coincides with the fact that 103 manufacturers in different parts of the world have up to date commenced to copy the Napier principle of six-cylinders, and I think it may interest you to receive a complete list up to date of all the firms who are, or have been, making six-cylinders. I admit that some of them, who started a year ago, have dropped out again, owing no doubt to the difficulties they have found in the manufacture. It is curious to note that some large firms, who have been successful in making four-cylinder cars, have tried to make six-cylinder cars, and have failed completely up to the present, so far as a successful motor vehicle has been concerned.

The list of makers to-date is as follows:

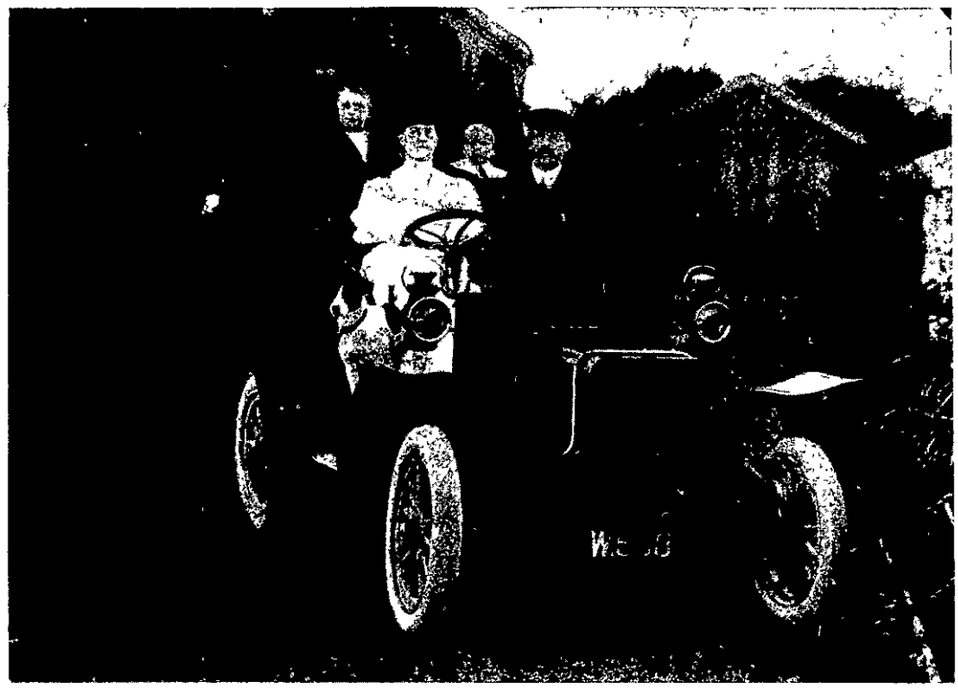
Ariel	Lege
Aquila	Mercedes
Belsize	Minerva
Berkshire	Maudslay
Brooke	Mieusset
Bayard	Martini
Bradburn	Mors
Benz	Napier
Brown	Napier (Italy)
Britannia	Napier (America)
Berliet	National (England)
Beaufort	National (America)
Bolide	Newmobile
Brasier	Olympia
Boyer	Owen
Clement	Orleans
Compound	Oldsmobile
Cottereau	Panhard
Cochrane	Pierce
Calthorpe	Premier
Climax	Protos
Civelli de Bosche	Rolls-Royce
C.V.R.	Regent
Doman	Rossel
Daimler	Rocket-Schneider
Darracq	Standard
De la Buire	Simms
De Dion	Stevens-Duryea
De Dietrich	Singer
Elswick	Stevens
Frayer-Miller	Spyker
Franklin	Sunbeam
Ford	Straker Squire
Fiat	Speedwell
Gladiator	Star
Gobron-Brillie	Siddeley
Gnome	Scout
Germain	Stoddard-Dayton
Humber	S.P.A.
Hotchkiss	Thornycroft
High Tension Co.	Thomas
Hurd & Haggin	Thames
Hurst & Middleton	Twentieth-Century
Horbick	Vinot.
Heron	Vertex
Hexe	Vulcan
Itala	Vici
Iris	Wilson-Pilcher
Kansas City	White & Poppe
Lamb	Welch
Leon Bollee	West
Lanchester	Yukon

Total 104.

If there are any names of makers which I have omitted, I shall be very pleased to hear what they are, so that I may add them to the list.

Yours truly,
S. F. EDGE,
14 New Burlington St., London.

MR. G. T. CHAPMAN'S 16-20 H.P. 4-CYLINDER CHENARD-WALCKER



MR. AND MRS. W. A. FENDALL (WAIRARAPA) ON THEIR 8 H.P. ALLDAYS CAR.

The Fairbanks Engine.

There is so much talk about this engine that it is necessary to look into the thing fair and square, in order to do justice to what apparently is a good machine of its kind, well worthy the attention of those who require power either on water or on land. The first consideration, of course, is of safety, for if the most perfect thing in all other respects be unsound in the matter of safety, it could not be considered for a single moment. This question the manufacturers face very fully, and they claim that they are in a position to speak with confidence. They point out that the engines have been designed to stand all the strain that can possibly be put on them in every way, and all parts have a great margin of safety. None but strictly first-class material, they add, is ever permitted to enter into their construction, and their conclusion is that they will never go to pieces because the engine, before leaving the factory, is subjected to a severe working strain, and any part showing the slightest weakness under severe test is immediately replaced.

The next questions are as to the reliability and dependability of the engine. They are perfectly balanced, and therefore no amount of vibration can damage them; there is no danger of overheating, and the reliability is ensured by the careful selection of all the parts after the closest scrutiny.

The water circulation for cooling the engine is a most important feature in connection with lubrication, and has had the most careful attention from the inventors, as well as in the factory, as has every other thing connected with the manufacture. The manufacturers use a strong plunger pump on the single cylinder and a rotary pump on the multi-cylinders. The cooling water enters the cylinder around the exhaust port at the point of greatest heat, and keeps the cylinder cool to a point that permits perfect lubrication; it passes upward through the head, down past the intake ports then through the exhaust elbow and finally through the water jacketed intake pipe. It is a water circulation of proved reliance.

For the control of these engines nothing superior has been turned out yet in any of the workshops. The system is nearly absolute There are to begin with, three independent methods of control which, while working separately, can be worked together in any combination that may be desired in reference to desired results. Then the throttling carburetter regulates the admission of any desired volume even to the point of stopping the introduction of fuel altogether.

Add economy in fuel and a low percentage of repairs, and the subject is profitably exhausted.

Our illustrations show offset cylinder head inside cylinder; shape of top of piston; location of valves; counterbalanced crank; water circulating passages, cylinder casting parting on centre line of crank shaft; water jacketed intake pipe; compression chamber · all of which features will well repay study and detailed investigation.

Rubber Packing.

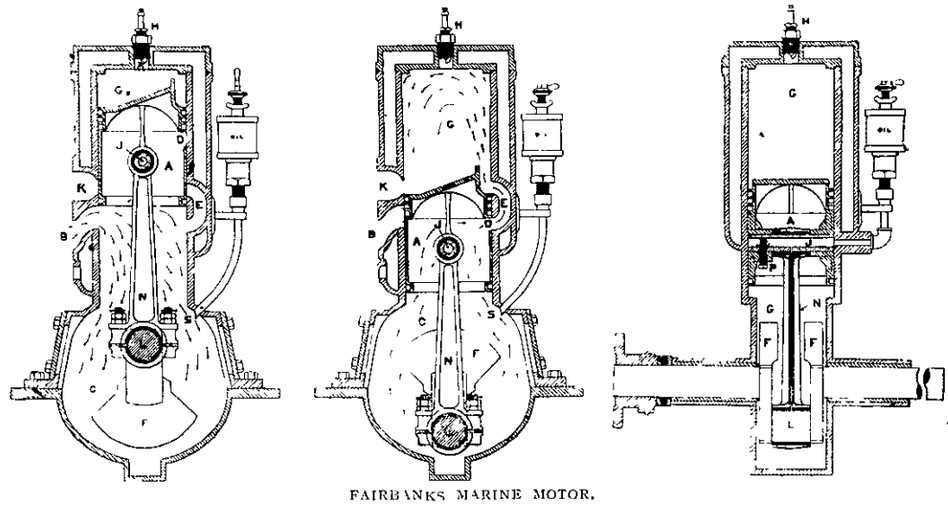
Where rubber packing is used, it will last many times longer and not blow out if a piece of common wire screen (same as used in window screens) is put on each side of the rubber. It embeds itself in the rubber and holds it together, so that when hot and soft, it cannot blow out.

To Soften Steel.

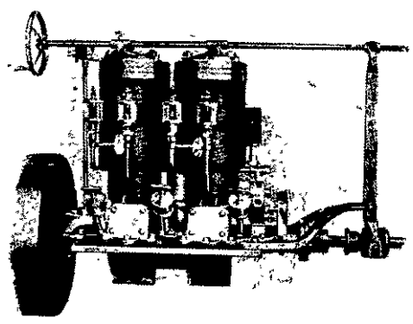
Cover it over with tallow, heat to a cherry-red in a charcoal fire, and let it cool of itself

Strong sal soda water or soapy water is much better than clean water to use where water cuts are being taken, either on lathe or planer.

Put a piece of rosin the size of a walnut into your Babbit; stir thoroughly, then skim. It makes poor Babbit run better, and improves it. Babbit heated just hot enough to light a pine stick, will run in places with the rosin in, where without it, it would not. It is also claimed that rosin will prevent blowing when pouring in damp boxes.



FAIRBANKS MARINE MOTOR.



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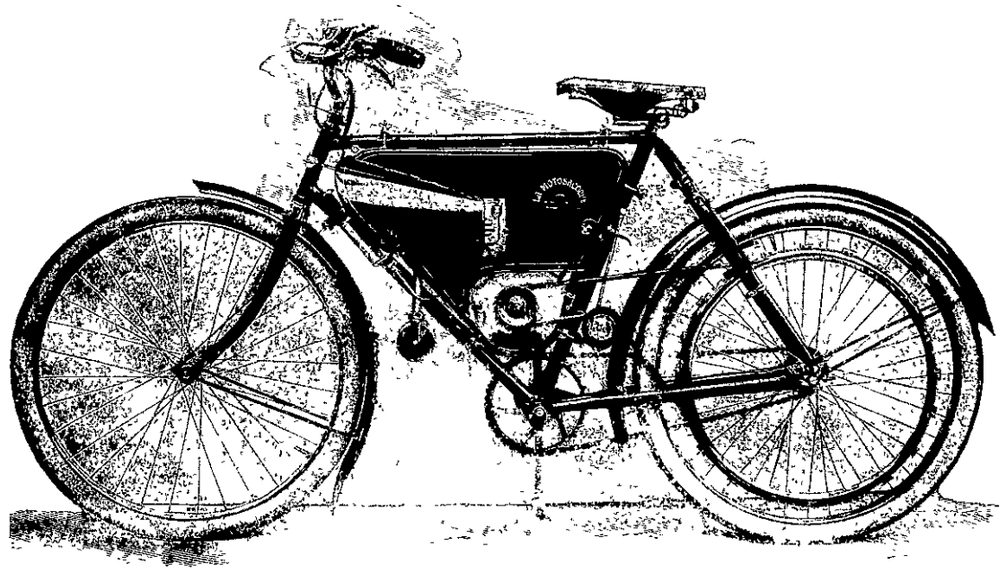


THE MOTOSACOCHE ATTACHED TO AN ORDINARY BICYCLE. (SEE "THE COMING OF THE LIGHT MOTOR," P. 174.)

MOTORING ROAD BETWEEN LAKES ROTOITI AND ROTOEHU, HOT LAKES DISTRICT.

Motoring in New Zealand.

New Zealand offers manifold attractions to the motorist, and is probably a more varied field for this class of travelling than any other country of its size on the globe The traveller in the back blocks often has imperfectly formed roads to contend with and numerous rivers, particularly the snow fed rivers of the South Island, some of which are unbridged, but, taking it as a whole, the colony is surprisingly well roaded for such a young country, and the delightful scenery far more than compensates for any difficulty of travel. The motorist can take his car from practically one end of the colony to the other, and on the way he views scenes of such wonder and grandeur as no other part of the earth can show him in such a limited compass An American traveller, Mr. Ghidden, who not long ago brought his touring car to New Zealand and motored through both islands, was loud in his expressions of delight at the marvellous variety of the natural scenery which he was enabled to visit He travelled in all some 4,000 miles over New Zealand roads, and except for the unbridged streams which he encountered here and there, was thoroughly pleased with the condition of the main vehicle routes of the colony.

The accompanying pictures are examples of places in the principal tourist districts which can be readily reached by motor car, but these localities are only a very small fraction of the many interesting spots available to the touring motorist

In the North Island there are some splendid runs along the main arterial roads right through the island Chief of all is the route from Auckland through the beautiful and historic Waikato valley, through Cambridge, and then on to Rotorua and over the pumice roads of Geyserland to Lake Taupo, with its sea-like expanse of blue waters and its grand background of volcanic peaks—Tongariro Ngauruhoe and Ruapehu From Taupo there is a mountain road via Tarawera and Runanga to Hawkes Bay and the pretty town of Napier, and again from Napier either northwards to the green Wairoa and the lovely mountain lake Waikaremoana, one of the most exquisitely beautiful sheets of water in the world—or southwards through the rich Wairarapa valley to Wellington city There is also the western route from the plains of Taranaki to Wanganui and Wellington, and motor cars have been taken from Auckland to New Plymouth by way of the King Country and Mokau and the coast of North Taranaki but this road is sometimes rather difficult for the motorist

In the South Island there are thousands of miles of splendid motoring roads, particularly in the Canterbury province For grand scenery—woodland, mountain and lake—there is no finer route than that from the pretty town of Nelson down through the Buller Gorge to Westport, Reefton, and Hokitika; thence across to the Canterbury side by way of the Otira Gorge through the heart of the Southern Alps.

These gorge roads often try all the motorist's nerve and promptitude of action in emergency, but they are kept in excellent order and are easy to travel.

North of Christchurch there is Hanmer with its hot springs, and South Canterbury motorists can travel right up to Mt. Cook "Hermitage" (Government Hotel) near the foot of giant Aorangi, and close to the terminal faces of several enormous glaciers.

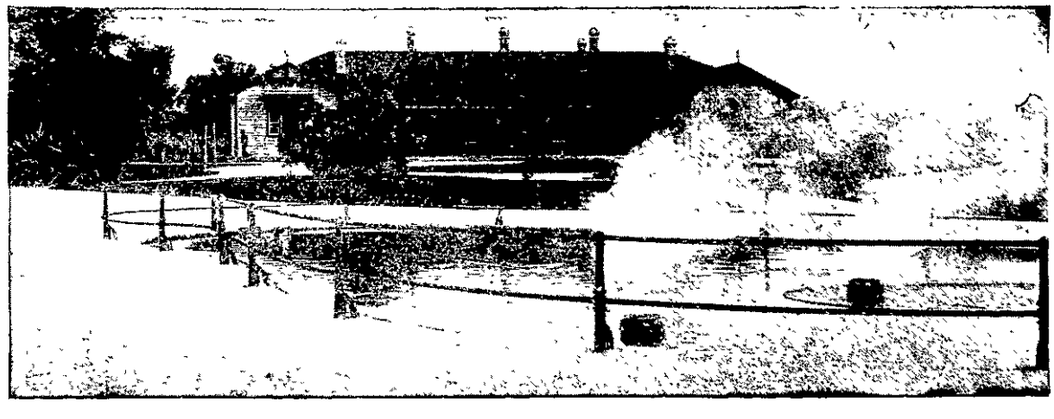
Southward again are the great blue glacier-formed lakes, Wakitipu, Wanaka, Hawea, Manapouri and Te Anau All of these can be reached by motor car, and the fortunate motorist can in this way penetrate right to the heart of some of the most wonderful scenery that this globe of ours can show.

The Friction of Metal on Metal Without Lubrication.

May be taken at one-sixth of the weight up to 40 lb per sq. in; at one-fifth of the weight up to 100 lb per sq. in, Brass on cast iron one-fourth of the weight up to 800 lb per sq in., wrought on cast iron one-third of the weight up to 500 lb per sq. in. well oiled with tallow at one-tenth of the weight; well oiled with olive oil at one-third of the weight. 800 lb per inch forces out the oil. Friction of journals under ordinary circumstances one-thirtieth of weight. Friction of journals well oiled sometimes only one-sixtieth of weight.

A propos of the reference we made in our last to a process of making briquettes of saw-dust and shavings for firewood, we have to add that Messrs. M Glover & Co., patentees and sawmill engineers, Leeds, have devoted much time and skill to the perfection of machinery for sawing, splitting, and bundling waste wood, and also for automatically moulding and compressing sawdust, shavings, and other inflammable ingredients into neat, small briquettes, so as to make convenient fire-lighters at little expenditure. Many firms engaged in industries in which wood is extensively employed now find a profitable method of utilising surplus power and waste wood, in producing a saleable commodity in the shape of bundles of firewood.

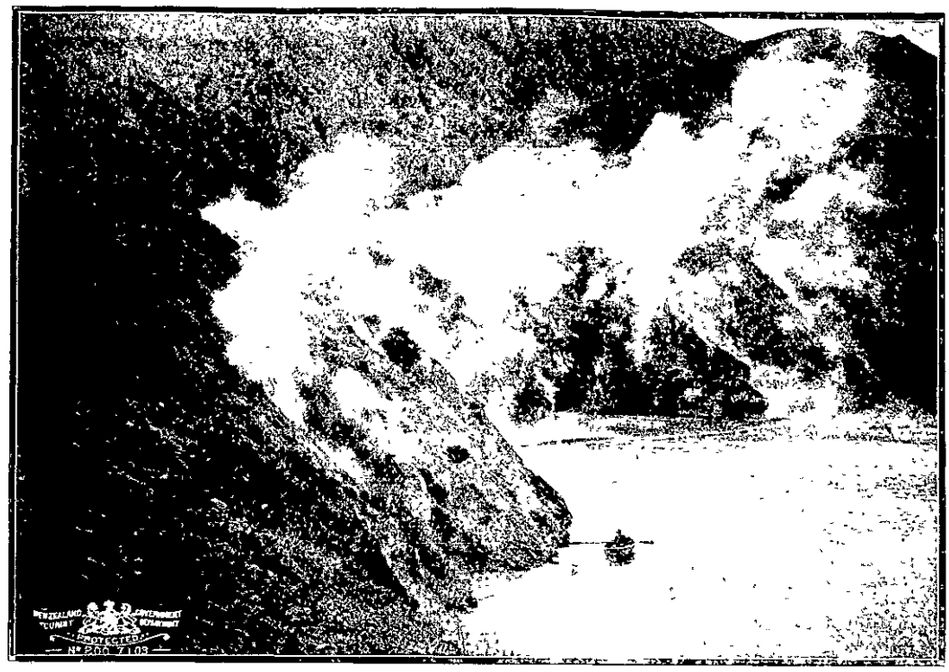
This seems to prove again the old truth that new methods for the prevention of waste have often proved more remunerative than new methods of production. In dealing with materials, no less than in dealing with finances, it is of the utmost importance to stop the leakage. There are few by-products to-day that are wasted, but in many industries it is certain that remnants are not always used up to the greatest advantage. Where the remnants are metal, and can be re-fused, and then remade into some other useful form, the waste is minimised. In the case of wood remainders, however, the object is to use them so as to leave little ultimate loss.



IN THE GOVERNMENT GARDENS, ROTORUA.

Concrete Railway Sleepers.

The uses of reinforced concrete are now so many and various that it is with little surprise that we learn of its success in experimental use for railway sleepers Concrete piles made on the Hennebique system have received our attention lately, and now we learn that concrete is to oust the wooden railway sleeper For upwards of three years the Lake Shore and Michigan Southern Railway has been experimenting on its lines with reinforced concrete sleepers as a substitute for the ordinary wooden type Full particulars of these experiments appear in a recent issue of the *Railway and Engineering Review*, and from the accounts there given it appears that these sleepers consist essentially of an inverted piece of scrap 65lb rail, with the original base of the rail serving as the top face of the sleeper, the concrete body of the sleeper, 6½in deep and 9in wide at the bottom being moulded about the downwardly turned head of the old rail. This reinforcement was unnecessarily strong as was understood at the beginning, being purposely made so as to ascertain whether concrete can, with the assistance of enough steel reinforcement to withstand alone the bending strains to which the sleeper is subject maintain a solid body for the sleeper Sleepers of this design laid on the main lines in 1902 and 1903 are still in service At some of the points none of the sleepers have failed during these three or four years, but at other points a considerable percentage has failed At certain points these have been subjected to the severest tests possible, being laid where there is a heavy freight traffic and heavy passenger trains passing at speeds frequently as high as eighty miles an hour Altogether about 6,000 of these sleepers are in use on this railway alone, and the engineering department has arrived at two conclusions—namely permanent way laid with these sleepers is too rigid for high speed trains when the ground is frozen and it is probably impracticable to construct a sleeper body of concrete which will carry heavy and fast trains without a considerable percentage of breakages after a term of years It is, however considered the ideal sleeper for side tracks and yard tracks or for any track which does not carry fast traffic Side tracks laid with these sleepers and well surfaced will need practically no attention for long periods; indeed Mr. S Brockwell, chief engineer of the Lake Shore and Michigan Southern Railway, has no hesitation in recommending the sleeper as one of long life for any track carrying slow traffic.



THE STEAMING CLIFFS OF LAKE ROTOMAHANA

Anti-Friction Alloy for Journal Boxes.

Zinc, 17 parts, copper, 1 part Antimony, 1½ parts This possesses unsurpassable anti-friction qualities and does not require the protection of outer castings of a harder metal

Case Hardened Cast Iron.

Heat to a red heat, roll in a composition consisting of equal parts of prussiate of potash, sal ammoniac, and saltpetre, pulverised and thoroughly mixed Plunge while yet hot into a bath containing 2 oz of prussiate of potash and 4 oz of sal ammoniac to each gallon of cold water

Answer to Correspondent.

Ben Brown Dennistoun —An alternating current can be changed into a continuous current after it has passed through the brushes of a dynamo This cannot be done by an ordinary induction coil, it requires a converter An alternating current cannot be used for an electro magnet in connection with an alarm bell.

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.

Tenders for the extensive additions to Messrs. Sargood, Son & Ewen's Wellington warehouse close this day.

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Drawings and specifications for the Crematorium to be erected at Karori are being prepared by John S. Swan.

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A brick and stone residence in Manchester street, Christchurch, is being erected for Mr. Zebulun Leigh. Architect, W. V. Wilson.

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Four two-story brick shops and dwellings are in course of erection in Colombo street, Christchurch, for Mr A. Lawry. Architect, W. V. Wilson.

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Two-story brick workshops and offices, Armagh street, Christchurch, are in course of erection for Messrs. Macarthy & Clark Architect, W. V Wilson.

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The contract for semi-detached houses in Roy street, Wellington South, has been let for £1019 Architect, J. S. Rowden; contractor, P. C. Watt

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Tenders for the erection of four houses to be erected in Dock street, Wellington, from designs by John S. Swan. architect, closed at noon on Monday, the 25th ult.

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Substantial additions to Mr. Dunlop's warehouse fronting the river, Gisborne, are in course of erection. Architect, C Tilleard Natusch; contractor, Mr. Clayton.

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Tenders for the erection of a large private hotel to be erected at the corner of Victoria street and Cambridge terrace, Wellington, closed at noon on Monday, the 25th ult. Architect, John S. Swan.

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Mr. J. M'Gill, architect, has accepted the tender of Messrs. Martin, Hurrell & Snaddon for erecting a brick building of three floors and a basement in Manners street West, Wellington. The contract price is just under £6000.

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The contract has been let for Mr. Scott's new residence at Hastings at £1250. With the exception of a recreation room on the first floor the house is a ground-floor one, with a flat garden roof accessible from the recreation room and surrounded with embattled parapets. Architect R. Tilleard Natusch; contractor, S. Tong.

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Mr. C. Aleck Natusch, who is in charge of Mr. C. Tilleard Natusch' Gisborne Office, has in hand substantial additions to Mr. Walter Barker's fine residence. The new works consist of two wings one of which contains a handsome billiard-room and the other a ball-room and over this several additional bed-rooms. A conservatory is also included in the contract. Contractors, Skeet Bros.

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Three two-story residences are in course of erection in Tonk's Grove, off Cuba street, Wellington, for Mrs. K. Tonks at a total cost of about £2800. One is of twelve rooms, including drawing-dining, breakfast, and sewing-rooms and is provided with conservatory and all modern conveniences; while the other two are smaller, being of seven rooms each. Architect, J. M. Dawson; contractor, F F. Cameron

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It is the custom to believe that youth is in command of everything in the United States, where it is said, chiefly on the authority of Mr. Foster Fraser and other lightning calculators, that a man is absolutely old at forty The selection of an octogenarian architect for one of America's largest contracts is a somewhat flat contradiction to the prevailing theory

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During the nineteenth century there were four architects who after a fine career achieved "Westminster Abbey." In the first years of the twentieth one has been accorded that distinction. Sir Charles Barry, Mr. G.. E. Street, Sir Gilbert Scott, and Mr. J L. Pearson, the four above noted, have been followed by the late Mr. Mickelthwaite, F.S A., who was buried in the Abbey early in October last This gentleman was not in the first rank of architects, absolutely, so far as creative work is concerned, but there is a special reason why his labours should be commemorated in the Abbey He had been architect to the Abbey since 1898 and had watched and protected the famous fabric with admirable taste and zeal He was widely known as an authority on ecclesiastical architecture, and was the author of a book on "Modern Parish Churches" and of many papers on archæological and antiquarian subjects.

* * * * * *

A new building is shortly to be erected in Panama street, Wellington, for Mr. W. H. Sefton Moorhouse The architect has the preparation of plans in hand, which he is instructed to arrange to suit the requirements of those desiring to become tenants This building is to be erected in ferro-concrete work, and as ferro-concrete structures give the greatest possible security against fire and earthquake, these offices should be rapidly filled. Architect, C. Tilleard Natusch.

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A contract has been let for the erection of a five-story brick and concrete building in Christchurch. The building will have a frontage of about 60 ft. to High street, and is to be finished within eight months from date. There will be three shops on the ground floor with doors at the back of each, and the other floors will contain 36 offices, together with sanitary conveniences An electric passenger lift will serve all floors. Contract price, £7000. Architect, John S Swan Wellington; contractor, J Smith, Christchurch.

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A Boys' Preparatory School is to be erected at Orari for Mr. J. R Orford. The building is planned to accommodate from thirty to forty boys, and contains on the ground floor two large school rooms, boys' dining-room, kitchen, etc private dining-room and drawing room, study, office and music room, and lavatories for boys; first floor contains two large dormitories and two smaller ones, nursery, sick-room, matron's sitting-room and bed-room, work-room, two large bed-rooms, and large boys' bath-room and private bath-room · attic floor contains servants' rooms and box room. The school portion of the building is heated by hot air · while the whole structure is lit by electric light The outbuildings contain washhouse, laundry, fuel, dairy, and engine-room, stable, coach-house, etc The building is three stories, including attics and covers, and has 45,000 sq. ft of ground space Architect, J. S. Turnbull, Timaru

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Some time ago the architects of the British isles were much exercised by the decision of the London County Council to throw open the competition for the design of their projected great hall—which is to be a wonder of modern architecture—to foreign competition. Since then they have been given a set-off, unexpected as it is magnificent, from the United States Mr. Bodley, R.A., has been selected to design the new cathedral for Washington. Mr. Bodley is the leading ecclesiastical architect in the British islands. The selection by so exclusive a people as the Americans proclaims that in the opinion of very competent authority Mr. Bodley is the first ecclesiastical architect in the world. Mr. Bodley has built more churches than any living man and he is associated with Mr. Gilbert Scott in the carrying out of that gentleman's designs for the new Liverpool cathedral, but he has never before had such an opportunity as is now afforded to him No doubt the popular appreciation of these numerous works of his will now be higher than ever

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One of the best examples of the Hammer-Beam Roof in the world is the roof of Westminster Hall. The building which dates from the days of Richard the Second, has been used for generations as the dining-hall of the King's Scholars of Westminster School It is full of interest, with its beautiful fourteenth-century windows its quaint minstrels' gallery, and its massive oaken tables, carved according to tradition out of one of the wrecked hulks of the Invincible Armada The improvements lately made in this remarkable chamber are chiefly at its northern end. Here a number of interesting coats of arms, which in the process of years, had become almost obliterated have been renewed, while others have been added The coats of arms which have undergone restoration are those more peculiarly associated with the Abbey, such as reputed arms of Edward the Confessor, the arms of Christ Church Oxford, and Trinity College, Cambridge, also the arms of the Order of the Bath, which has the Dean of Westminster for its chief ecclesiastic. Among the arms now added are those of the Lord High Almoner to the Sovereign of England, an office now held by the present Dean.

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One is reminded, by the selection of Mr. Bodley in his eightieth year to design the new cathedral at Washington, of the fact that few architects have ever lived to see the completion of their designs, that is to say in the matter of great church buildings. Many of the great cathedrals of England were some centuries in the building, as is proved by the various styles of so many of them. The Cathedral of Cologne and the Duomo of Milan were each begun several centuries before they came to completion, if indeed they can be said to have yet reached the final stage. In Australia the late Mr Wardell—brother of the well-known magistrate and ex-runholder of the Wairarapa—was the only one who saw the completion of a first-class Gothic cathedral of his own design—St. Patrick's at Melbourne—a completion which did not include the towers and spire, which have still to be built. He did not, of course see the whole of this design for St Mary's at Sydney carried out, for the nave of the fine edifice is still to be completed But as things happen in the order of nature it is not improbable that Mr. Bodley is destined to be the architect of a great cathedral and see nothing of the work which owed him life

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The other side of the question, so far as the British isles are concerned is to be found in the statement recently made by the president of the Sheffield Society of Architects, that young men who have embarked in architecture are not sufficiently "pushful." This is taken by at least one authority to mean that too many of the juniors do the work while their seniors draw the pay and obtain the credit. Says one authority in the profession · "It is quite true that there are many

young men, and, indeed, many no longer young, who have never taken the position and received the emoluments which their talents and industries should command. They spend their lives as architectural assistants, doing the more arduous work connected with an architect's business, including often a great deal of first-rate original designing, for which they receive but a very inadequate salary. The architectural "ghost" who makes designs for which his principal gets the credit, and the pay is a melancholy figure." Of course this is a terrible state of affairs. It is impossible, however, to imagine vast crowds of men so utterless spiritless as to put up with injustice of this kind, though here and there may be a genius who suffers from neglect and imposition. In New Zealand genius neglected is not so prevalent as it is thought to be in Britain. On the other hand many people are in favour of the competition system because it calls out the best talent, and if youth or "ghosts" have the talent, the system will give them the career.

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The National Harbour Works at Dover are described in most of our exchanges as being stupendous. They need to be, for the number of times the works have been the plaything of the sea are a familiar story And the sea thereabouts when in a rage is something to remember, in fact never is forgotten by anyone who has made closer acquaintance with it. This time the nation seems determined that the old fishing village's fame from its earliest days as the starting place for the Continent, shall be emphasised by one of the best artificial harbours in the known world Some idea of the magnitude of the work may be gathered from the length of the piers and breakwater, which is between two and three miles Commencing at the engine sheds with quite an array of locomotives, you pass on to the stoneyard where Goliath cranes are lifting 45-ton blocks of concrete with the greatest ease. From thence on to the eastern arm, the full length of which has a fine elevated promenade protected on the weather side with a solid granite coping. From the eastern arm you cross over a temporary bridge on to the breakwater, which is about 40 ft. wide and from 60 ft. to 70 ft. deep. Here the divers are working in bells and dresses day and night, rapidly placing in position the huge blocks of concrete, all of which have been made at the ancient port of Sandwich. The blocks that are exposed to the water are cased with 12 in of granite built into them when moulded. The harbour will be one of the largest in the world and will cost from £12,000,000 to £13,000,000.

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Talking of architects and those capable assistants who, according to some authorities quoted above, do the work for which inferior men get the credit and the pecuniary reward, what shall we say of the great architects who left their work for the admiration of generations of grateful men, but no hint of their names or their no doubt, most interesting personalities. Take the case of this very Westminster Abbey, which shelters the dust of so many architects of note, none of whom ever did anything to come up to the famous Abbey The architect of that great pile, is not mentioned in any history; he has been forgotten. We are reminded of the fact by the following fine verses in the *Westminster Gazette* —

Dead men, whose heavy ashes here we hide,
Not yours, I think, the ghosts to stir this shade
But comes he never that this Abbey made,
Whose name we know not, neither how he died?

Princes and kings that gave their gold in pride
Lie still enough, nor stir themselves at all,
But he that flung these arches up so tall
Should sometimes wish to see how they abide.

Now, while his pillars all stand sentinel,
While for one hour the city thunders sleep,
In some still shadow surely he must wait,

To fade at dawn contented, for that still
Darkness and silence in their vigil keep
This his immortal shrine inviolate

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The new store which Messrs. Williams & Kettle have found it necessary to erect at Port Ahuriri, to meet the requirements of their large and steadily increasing business, is now completed It is situated at the corner of Bridge street and Ossian street, with a lofty and imposing facade to Bridge street Though not at present required, provision has been made for a second story which can be added at a comparatively trifling cost in the future The store has a depth of 155 ft with a frontage of 135 ft, and is capable of holding for sale purposes nearly 3000 bales of wool It is built on the usual lines, with the exception of the roof, which is known as the saw-tooth roof, and which was introduced into this district some six years ago by Mr C. Tilleard Natusch, whose Napier representative, Mr Rene Natusch, prepared the plans and supervised the erection of the building The wall of the store next Messrs. Williams and Creagh created considerable curiosity and criticism while in course of erection, as it was erected of reinforced concrete according to plans and specification specially prepared by Mr. Rene Natusch This is understood to be the first time that reinforced concrete has been used to a large extent in a building in Napier. The contract price was £4200, and the work was carried out by Messrs. Bull Bros. in a good and workmanlike manner to the entire satisfaction of the firm and the architect. The dumping plant, which is of the most improved type, was put in by Messrs. Jas J Niven & Co

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The work of the New Zealand Brick, Tile, and Pottery Company, New Lynn, Auckland, are being laid out with the intention of making them the most up-to-date plant of its kind in the southern hemisphere Many New Zealanders will be surprised to hear of the extent of these works when completed. They stand upon 73 acres of land, and clay has been tested as far down as 150 ft. One machine is capable of turning out 100,000 bricks per day on the plastic system, of any colour that may be required; but though the machine has this large capacity, it is doubtful if the bricks can be removed in their plastic state as fast as the machine is capable of making them. The plastic system generally is not supposed to give such a perfectly formed brick as the various press machines, but this particular machine turns out bricks wonderfully true, square, and smooth. After leaving the machine they are dried by artificial heat in one day, and are then burnt and ready for market in about two weeks The kiln is of the continuous kind, with a capacity of from 30 to 40 thousand daily; the draught is specially controlled and arranged in such a way as to be away from the workmen, making it much more pleasant to operate Sanitary ware will be specialised, and very soon glazed bricks and tiles will be made. The larger kinds of pottery, as demi-johns, bread pans, sinks, etc., will be also made here. Fire-clay goods will constitute a fair percentage of the output, as a specially good clay is available. The abattoirs at Otahuhu are taking the first of the company's output As artificial drying forms a feature in the process of manufacture, a large Hornsby steam boiler of 390 h p, working pressure 160 lb per sq in., is installed and supplies heat for artificial drying and steam for the engine, which is one of Tangyes' 165 h p The managing director is Mr. Hugo Friedlander of Ashburton Mr. A. Crum kindly showed our representative around, and we hope when these works are in regular running order to supply our readers with some views of them.

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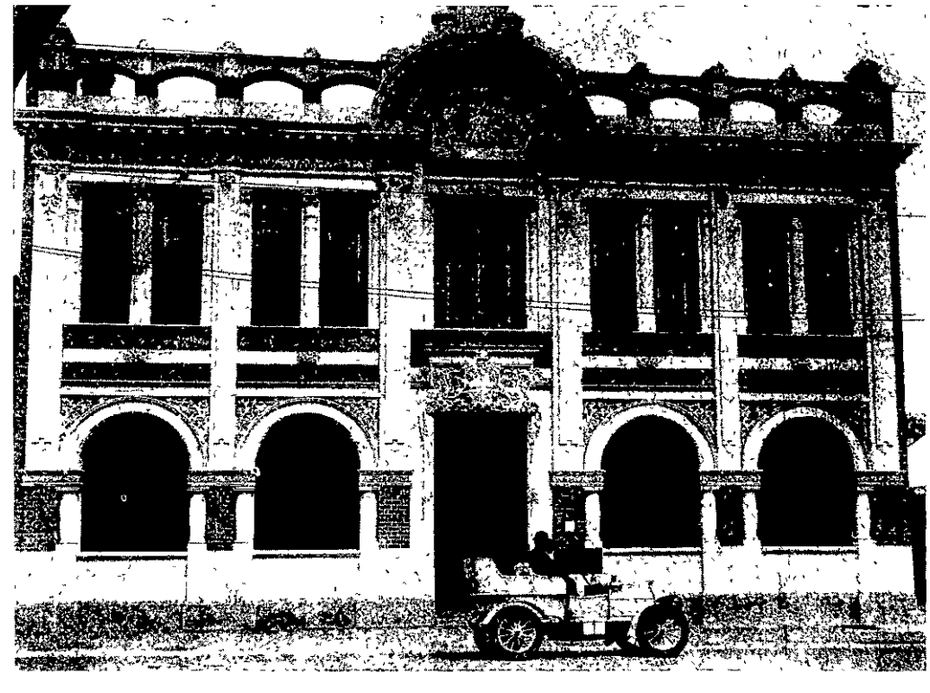
In laying out work on planed surfaces of steel or iron use blue vitriol and water on the surface This will copper-over the surface nicely, so that all lines will show plainly If on oily surfaces, add a little oil of vitriol; this will eat the oil off and leave a nicely coppered surface.

Constructional Lesson from San Francisco.

In the January number of *Concrete and Constructional Engineering*, Captain Sewell has a valuable article on reinforced concrete as a fire-resistant. The article was partly written before the catastrophe at San Francisco occurred, but its publication was deferred until the author had an opportunity of incorporating some additional matter suggested by the results of the catastrophe on concrete buildings. The article is illustrated by some striking photographs showing the effects of the earthquake and fire on buildings of various types. The author thus summarises his conclusions —

In general, the San Francisco fire brought out nothing new relative to the value of the various materials used for fire-resisting purposes. It demonstrated beyond question that the commercial work in the United States, both reinforced concrete and hollow tiles, have been applied in a flimsy and inadequate way. Both the San Francisco fire and the Baltimore fire demonstrated that commercial hollow tile work is very apt to fail by expansion stresses in the exposed webs, and that reinforced concrete was likely to be seriously damaged by the dehydration of the cement. Both fires indicated clearly, however, that both of these materials can be used so as to secure adequate and satisfactory results, and, in the writer's opinion, when so used, the cost will be about the same in both cases.



THE DUNLOP CO'S FINE NEW PREMISES IN WORCESTER STREET, CHRISTCHURCH.

While this is an article especially on reinforced concrete, the writer would point out that the serious problem in congested districts of large cities is not so much the securing of a fireproof covering for the street frame or a fireproof construction which will have such resistance that it will come through a fierce fire undamaged, as the devising of means of excluding an external fire.

The question of window protection is by all odds the most important one at the present time. Had the fire been kept out of the fireproof buildings in San Francisco, none of the weakness in either concrete or hollow tiles would have been developed, and even the flimsy commercial type would have been, on the whole good enough. However even a fire originating within would have done serious structural damage to the fire proof construction in San Francisco; so that, after the question of window protection is properly attended to the interior fire-resisting features should also be improved.

So far as the concrete itself is concerned, that which was used in San Francisco for fire-resisting purposes was so poor to begin with that the writer had great difficulty in many cases in determining whether its unsatisfactory condition at the time he examined it was due to the fire or to carelessness or neglect in its original installation Careful examination, however, indicated that the surfaces exposed to the fire were manifestly in worse condition than the portion which had been protected from the fire, although it was all so inferior that there was not very much room for a different quality.

PART OF PYNE AND CO 'S WOOL STORE, CHRISTCHURCH, SHOWING WOOL STACKED FOR DECEMBER SALE, 1906. CATALOGUE COMPRISED 6200 BALES

In order to determine the real relative efficiencies of the different types of flooring construction, those of each type that had evidently been subjected to the worst heat in a place like San Francisco ought to be tested to destruction by superimposed loads Of course, it is not at all probable that any such tests will be made It seems more than probable that the better appearance of the reinforced concrete floors will cause a great many people to ascribe a fictitious value to the fire-resisting qualities of reinforced concrete , as a matter of fact if both the tile floors and the concrete floors were tested, as above indicated, it is more than probable that it would be discovered that all the floors of both types that had been exposed to a really severe fire test ought to be taken out and renewed, in which case the floor loss would be total for both types

Pyne & Co.'s Wool Store, Christchurch.

Nothing shows more than the warehouse the extent of the business of the firm It is a truth specially noticeable in the wool trade Wherever you go you see the great firms whose finger is on the pulse of the wool community in palatial evidence In Melbourne and Sydney the firm of Goldsborough Mort & Co strikes all as first in the trade by reason of the large warehouses they have erected and the provision they have made for the comfort and well-being of their patrons The Dalgetys, the Trust and Mortgage Companies, and our own Loan and Mercantile Co bear similar evidence to the rank in the world of agency borne by these several firms, while in the aggregate they convey an adequate idea of the importance of the splendid industry by which they live In New Zealand we have also the same signs of the great industry which looms, as it does in Australia, the bulkiest in the list of the exports of the country. In Christchurch it is the same. The City of the Plains is remarkable as the centre of a vast district, from every part of which wool comes in large quantities to the city to be shipped to the old country or sold to the local or foreign buyer The business of attending to the wool interest is well furnished with both *material* and *personel*. The day for small things is over Time was when the wool was stored in some rough structure neither rain-proof nor wind-resisting, something after the heart of the pioneers who knew nothing of comfort and made only the bare provision for necessity The advent of the railways, the trams, and the motor car have changed all that, and we have handsome establishments replete with all modern convenience, roomy and well built, supplied with all necessary machinery accommodating the whole trade of the agencies These fine warehouses take in the stores destined for the farmer and the pastoralist, while they receive at the same time the vast yields of their wool and produce of various kinds

Of such is the wool warehouse of Messrs Pyne and Co of Christchurch, where wool is received throughout the season The sales are among the most characteristic features of colonial life Our illustrations show their new wool stores, South Belt, Christchurch The building is L-shaped the larger portion being 240 ft x 120 ft and the other 170 ft. x 90 ft , a total floor space of 44,100 sq ft The floor is solid and 3 ft above the railway siding, and consequently rat proof, and the wall from floor to tie beam of roof is 17 ft All light enters from the south By freely using steel construction there are only 26 standards supporting the roof This wool store is acknowledged to be the best lit wool store in New Zealand The architects of the building were S and A. Luttrell and the contractors D Scott and Sons

Disappearing Architecture.

THE LADIES' VIEW

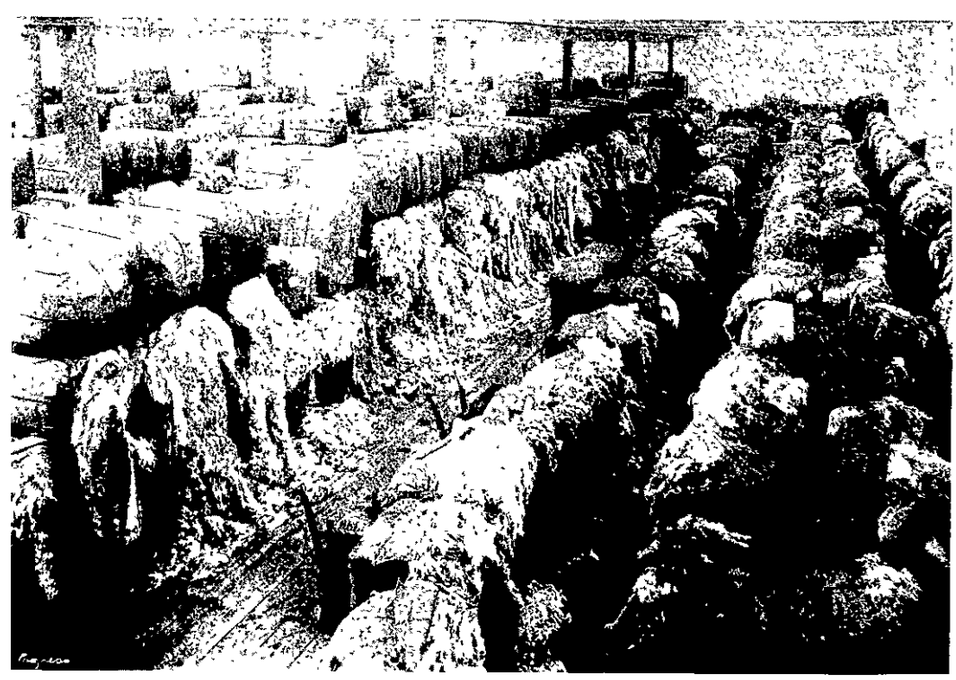
There is an art which is more especially than any other the art of the people—namely, architecture or the art of building At least the outsides of all buildings, and the insides of many, are for the enjoyment of all and it behoves us to remember this before it is too late There have been periods when the magnificence of kings and oligarchies, and the love of beauty, which in former days constrained not only princes, but also private individuals, endowed our towns not alone with buildings nobly built, but with all other enrichments that the vicissitudes of the weather would allow of, in the way of colour gilding marble, and sculpture England has produced a wonderful wealth of fine buildings, and in spite of terrible destruction, much still remains to gladden an undeserving and purblind generation , and during the months of holiday wandering we should take every opportunity that presents itself of making acquaintance, thoroughly and in detail, with the great art of masonry—not excluding brickwork and the many subsidiary crafts It was only in the year 1385 that the painters of Italy cut themselves adrift from the guild of builders, and not for the advantage of either Alas, we are still destroying our heritage, and all who love beauty and who care for the past, who think we should preserve everything we possibly can of the thought of those who were before us, should try to understand the methods and the causes of their destruction and do what in them lies to stop it There is hardly a spot we live in or travel to in England, where there is not some pleasant old street, some romantic old house, some quaint cottage, or row of almshouses, even an old garden-wall with an ancient gate-way, or a lane or alley between weather-worn gables—a bridge, or a mill, or a tower. Such things are a refreshment and a joy to all of us as we cover our daily miles of business or pleasure But what few people quite realise is that it is not only the age of the buildings that makes them pleasant, but the human thought and art that are in them, and the subtleties of proportion, and the satisfactoriness of really understood building—both very rare qualities, and now deprived of the support of the traditional knowledge handed on in the workshops of former times. Decay's effacing fingers will not efface the ugliness of our buildings will not turn our impertinent little villas into homely old cottages, nor our imitated Gothic into true Gothic, where every change was a development, and every moulding and rib represented a purpose scientific or beautiful

POEMS IN STONE

So many causes operate against the intact preservation of our histories and poems in stone , for we should always bear in mind the historical, as well as the beauty, value of our ancient homes and monuments. In towns they disappear before the urgent need for space, in the country often for the opposite reason that they are superfluous For instance town councils want to widen streets—in Worcester this now seems imminent—and delightful old houses are conveniently condemned as insanitary though wide roads and monotonous, meaningless houses may be very insanitary mentally for man does not live by town council improvement alone We want people on the watch all over the country to try to stop this destruction of our heritage Let us have the best new building which it is possible to have, but let us keep the old that are worth keeping It is our domestic architecture that is most seriously threatened with actual destruction—that domestic architecture which has been one of England's richest possessions—and smaller public buildings, such as the old market buildings. In Godalming, recently, the town council wanted to do away with the charming little old covered market-hall, because it rather inconveniently narrows a street (where there is very little traffic), but for the present it has been saved by individual enterprise

CHURCH RESTORATION

Churches suffer most from what is called restoration. First they are allowed to get out of repair and then they are scraped, smartened, smugged and pointed, releaded, repaired, and re-ceiled, till



VIEW OF WOOL AS EXHIBITED IN THE NEW ADDITION OF PYNE AND CO.'S STORE.

they are unrecognisable. The parish church at Minehead, in Somerset, became some years ago, not nearly, but quite unrecognisable. A remarkably quaint Dutch-like plastered interior with old pews and pulpit and many local features has been gathered to its fathers Now it merely resembles the ordinary villa suburban church The present writer imagined a mistaken memory, but was informed that the building is the same This is going on in France, too At Troyes, for instance, the cathedral has been scraped quite clean, and has been re-painted with black, and everything that gives tenderness and association has been taken away. You walk in, feel disappointed, and come out, and with a sinking heart you begin the round of the churches. But now all your feelings are pleasurable The churches are records of the past and the homes of the people. Each century has added much and seems to have taken away nothing Everything conspires to intensify the true feeling about architecture that it is rather a growth than a creation, and in natural growth there is never complete attainment, but only a more or less imperfect embodying of an impulse. The restorer stereotypes and makes this plastic life a corpse The inside of the cathedrals of Laon and Sens and Soissons have suffered similarly to that of Troyes More or less in all these churches a mania for black pointing the joints of the masonry has spread over the walls and pillars a ghastly reticulation which makes it almost impossible to follow the important lines and forms of the construction ; "you cannot see the building for its stones," or rather for the joints between them, which is the more serious blunder, as the mediæval masons undoubtedly whitewashed or plastered the whole surface and then painted patterns and pictures on the unbroken spaces

SPOLIATION BY GOVERNMENTS

The music-hall variety of renovation and decoration of the crypt at Chartres makes one hope fervently that money may remain deficient for work in the Cathedral proper, which at present is rather repaired than restored though it is said harm has been done by taking the splendid coloured windows away to be re-leaded in Paris, much new glass having been inserted.

Cultivated Frenchmen greatly deplore these barbarities, but are much more helpless than English people, for it is principally the State which is the sinner. But here we have no government department of destructive restauration, and individual influence may do much by remonstrance and suggestion

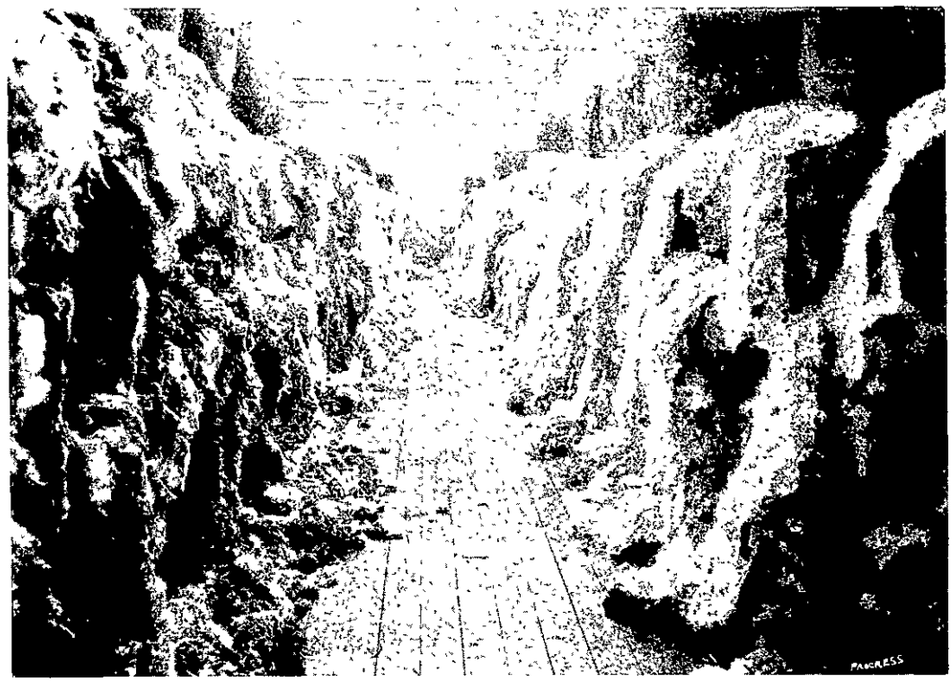
In Italy, again the government is more responsible than here There is restoration of all sorts and dates ; sometimes admirable repair sometimes deplorable substitution of bad modern work for priceless old as the abominable Salviati mosaic restorations, or falsifications, in the vaults of St Mark's, Venice, and in Ravenna, Any one, says the *Women's Tribune*, who will make a careful study of the damaged sculptures taken from the front of the Cathedral at Sienna, which are now at the Cathedral museum, with the copies actually in the facade will have an excellent object-lesson of how modern copies lose all the grace and intention of the originals We may see the same kind of difference in the west front at Salisbury With a little careful study the eye will soon distinguish between the old statues and the new ones, not only because of the darker colour of the stone, but from the intrinsic excellence of the design and carving of the genuine work If in this labour of love we feel isolated and powerless, we should do wisely if we turn for neutral aid to the Society for the Protection of Ancient Buildings called familiarly "Anti-Scrape," founded by William Morris, the offices of which are at 20, Buckingham street, Strand.—*J. L. in Building and Architecture.*

Demolition.

After a fire one is struck by the efforts of the up-to-date New Zealander to clear away the standing ruins. These efforts, by employing every imaginable material, from ropes to dynamite, chiefly demonstrate that our builders, however up-to-date they may be as builders, are, as unbuilders, hopelessly behind the times

In the United States that branch of the building trade has been raised to the level of an exact science There the scientific unbuilder takes apart the structure with as much skill as was employed by the up-to-date builder in putting the same together The country is full of "house-wrecking" companies whose operations are not by any means confined to clearing away after fires, but also include taking down houses that have grown too old for further use, or have proved unsuitable to the progress of their locality, or been condemned for various reasons under the sanitary laws now so wholesomely drastic in the world of civilisation They also find a great field after an International Exhibition, when piles of buildings covering acres of land are put into their hands House-wrecking companies have brought their work up to a high state of development in handling these problems They have their agents and representatives on the scene when it is proposed to tear down any important buildings to make room for new ones Some of the large house-wrecking companies are prepared to bid on the destruction of anything from a single small structure of four stories up to half a hundred or a whole city When the fire swept Baltimore and San Francisco the house wrecking companies were the first in the field Not all had been destroyed by the fire There was salvage in the heaps of ruins which the wreckers were quick to realize From under the debris they secured material which subsequently went into the rebuilding of the burnt portions The crumbling brick and stone walls and twisted and bent steel frames, and the shattered and broken timbers, were susceptible of rejuvenation scarcely conceivable to the uninitiated The wreckers should be called restorers They save the waste, and prepare it for further use Bent and twisted gas and plumbing pipes are straightened polished and repaired, so that they are nearly as good as new Bricks and stones which have not been broken are cleaned and sold for second-hand building material Twisted iron and steel work metal ceilings which have not been melted by the fire and even the nails, are recovered from the ruins to do service over again

The big wrecking organizations are systematic in their study of a prospective field Any big feature like the building of a Worlds' Fair or the destruction of a city by fire starts their whole office force to work Within a few days after the outbreak of the



ANOTHER VIEW OF PYNE AND CO.'S STORE, SHOWING WOOL AFTER EXAMINATION AND VALUATION BY PURCHASERS

San Francisco fire several of the large wrecking companies had their representatives on the field and before the excitement was over, or the flames entirely subdued the experts were ready to make cash bids for wrecking the buildings partly demolished. While others were fighting the fire or struggling to save their goods, the wreckers were plotting off the different blocks, drawing maps of the partly-destroyed buildings and figuring upon the possible amount of salvage None but experts could secure reliable data for such work but the contractors and engineers who had studied this particular field, could make pretty shrewd estimates of the value of the material left

When the contracts were closed the large force of men put at work quickly pulled down the few standing buildings and the good material was cleaned, repolished and sold for the construction of smaller houses The wrecking companies thus recovered from the ruins sufficient second-hand material to build a city of hundreds of houses San Francisco to-day owes much to the wreckers, who thus systematically recovered the waste from the burnt heaps of ruins and supplied local builders immediately with thousands of tons of material The amount of salvage they obtained will never be known but it is not likely they performed their arduous task without pecuniary reward

When a Worlds' Fair is built the wrecking companies have their agents on the scene during the whole course of construction In this case they know that the city is built to be torn down, and the closer they can figure out the work the better it will be for them. At both the St Louis and Chicago fairs the agents of the leading wrecking companies watched proceedings and took elaborate notes. The quality of the materials put into the different buildings were inspected, the method of construction studied, plans of architects and contractors copied, and maps of every line of piping laid underground taken. Hectograph drawings and specifications supplied the wreckers with such information as they needed. All available information was thus collected by agents during the building of the fairs, and when the gates were thrown open to the public the wreckers were ready to figure upon its demolition The cost and character of the water pipes, wireing, drainage system, pumps, and engines were filed and indexed away, as well as the value of the buildings, fences, paving brick, tents, bridges and furniture. When the time came the companies were ready to put in their bids with a good chance of making money.

The financial results are interesting These companies do not, of course, work for nothing. For example, after St Louis sundry buildings that had cost £48,000 were sold to some of these companies for £700. On the other hand fourteen of the largest buildings of the same Fair were bought by one company for £90,000 The structures were taken apart carefully and the material sedulously prepared for further use Windows, doors, locks, hinges, frames, sashes, mouldings, all of these were classified cobbled up, numbered, and stored Nails were carefully drawn, straightened and polished Even the plaster was recooked, regenerated, and made fit for use to the extent of 16,000 tons Every truss and girder was lowered gently and the bolts drawn and sorted by sizes On the whole one hundred million pounds of timber were recovered, millions of feet of iron and lead piping, tens of millions of nails and bolts, and tens of thousands of window frames and doors were made fit for useful domestic and public life

It can easily be imagined that these companies have vast warehouses, where as many things in the building line can be bought as are to be seen at Whitely's in every other line of requirement How catalogues are sent broadcast of everything as good as new filled with moving descriptions and set off with alluring prices, burning bargains into the eager brains of millions of buyers, these things are American history As to the dangers of the craft of what may be termed reconstructive demolition they are obvious Big things weighing tons have a knack of breaking away at unexpected times in unlooked for places, great fires play havoc with the equilibrium of structures, time and the white ant destroy the balance even more than the material What American ingenuity cannot dodge is faced by American pluck and the price of the balance is paid. This balance the American reduces to a minimum, and it is part of a great industry of his establishing

What is going to happen to the materials of the Christchurch Fair ?

Wandering minds make small wages.

..Legal..

Contributed by H. F. von Haast, M.A., LL.B.

RECENT DECISIONS.

Libel. Trade protection agency Privileged communication. Malice.—R. G. Dun and Co., a trade protection society in Sydney, furnished to a subscriber, in response to a request from the latter, a confidential report on Macintosh & Sons, a firm of hardware merchants containing damaging statements as to the firm's commercial standing and financial position. Macintosh & Son sued Dun & Co. for libel. Held by the High Court of Australia that the occasion was privileged and that malice was negatived by the finding of the jury that Dun & Co., in publishing the report, consisting mainly of matters of rumour and repute, acted from a sense of duty to their subscribers, and exercised care to ascertain whether the statements in the report were true or false that Dun and Co. were entitled to give evidence that the rumours referred to did exist, and that the burden of proof was on Macintosh & Sons to prove that the rumours either did not exist or were untrue to the knowledge of Dun & Co., and that a document dated some months later than the reports and found in Dun & Co.'s possession, instructing its officers to call in and cancel previous reports on the firm in consequence of fresh information received from one of the firm was properly rejected as irrelevant and affording no evidence that three months before Dun & Co. knew that what they then said was untrue Judgment was therefore given for Dun & Co. *Dun v. Macintosh.* 3 *Commonwealth L.R.* 1134.

Road. Destruction by river. Way of necessity.—Mr. Miller owned land bounded by a public road running along the bank of the Mataura river, Southland. The river changed its course and washed away part of the road, so that travellers, unless they took another and more circuitous road, would have to pass over Mr. Miller's land to proceed on their journey. The Southland County Council brought an action against Mr. Miller, claiming that, the river having altered its course, the course of the road was altered and that the public were entitled to a public road, of the width of the original road, along the existing bank of the river, and that Mr. Miller must shift his fences and continue to shift them, as the river changed, so as always to allow a line of road along the bank of the river of the width of the original one. Held by Cooper, J., that the public had no such right and that it was very doubtful whether any individual wayfarer has, when the road becomes impassable, by flood , snow or other obstruction, a right to go on the adjoining land to avoid the obstruction. *Attorney-General and Southland County v. Miller.* *IX Gaz. L.R.* 145.

Company. Incidental Business. Ultra vires The Mersey Railway Company owns an electric railway running under the river Mersey from Liverpool to Birkenhead and certain extensions and connecting railway lines in those towns. The Corporation of Birkenhead owns a ferry across the Mersey to Liverpool. The traffic on the railway line and on the ferry are to a considerable extent in competition. The Corporation owns a system of tramways which runs conveniently for the ferry boat, but not for the railway. The Railway Company instituted in December, 1905, *bona fide* for the purpose of obtaining traffic on the railway, a service of motor omnibuses for passengers at Birkenhead between the residential part of the town and the station near the river. The omnibuses took up not merely passengers to and from the station, but also "pick-up" passengers, who alighted at intermediate points. The fares varied according to the distance travelled, and included fares specially fixed for journeys between intermediate stopping places between the station and the other terminus The Corporation seeing that a fare given to the buses was a fare taken from the trams and the ferry, instituted an action through the Attorney General for an injunction to restrain the Company from running the buses on the ground that it was *ultra vires.* Warrington, J., granted the injunction holding that the Company could not carry on an omnibus service at all. The Company appealed. Held by the Court of Appeal that the running of omnibuses for the sole purpose of carrying passengers to and from the station was incidental to the business of the railway and therefore not *ultra vires* ; by Vaughan Williams, and Moulton, L.J.J., that the conveyance of passengers between intermediate points was *ultra vires,* and that therefore what the Railway Company was actually doing was *ultra vires,* and that the Company must in future decline to take persons other than passengers or intending passengers on their railway, and all fares must be fixed as fares to or from the railway station, by Buckley, L.J , that the omnibus service was run *bona fide* for the use of passengers, its employment did not become *ultra vires* by the Company taking to a reasonable extent extraneous traffic which added to the commercial prosperity of the undertaking and that therefore the omnibus service as run was not *ultra vires.* The Railway Company was therefore allowed to continue the omnibus service subject to its giving an undertaking as suggested by the majority of the Court *Attorney General v Mersey Railway Co* 23 *Times L R* 129.

Trade Name Secondary Meaning. Passing off "Bile Beans"—"Bile Beans" for Biliousness has been advertised with "damnable iteration" all over the world by The Bile Bean Manufacturing Co. Ltd , whose advertisements have stated that the basis of the beans was an Australian herb discovered by Charles Forde, an eminent scientist after long research The statements, like many others in the advertisements, were false, but enabled the Company to build up an extensive business Mr Davidson, an Edinburgh chemist, saw no reason why he also should not sell antibilious pills as "bile beans," and did so in boxes of a different size and marked by a label of a different colour on which his own name and not that of the imaginary scientist, Charles Forde, appeared. The Company promptly sued him in Scotland asking that he should be interdicted from selling as Bile Beans pills not made or supplied by them and claiming that the term "Bile Beans" had acquired a secondary meaning and denoted only the pills sold by the Company Held by the Court of Session that the false and fraudulent misrepresentations by which the Company had built up its business disentitled them to have that business protected by the Court, that the Company had not any right to the exclusive use of the words "Bile Beans," and that such words did not denote their manufacture alone so as to exclude the use of them by other traders, and the interdict was refused The Lord Justice Clerk said "The evidence in this case disclosed the history of a gigantic and too successful fraud The complainers, who ask interdict gainst others, do so to protect a business which they have brought to enormous proportions by a course of lying which has been persisted in for years. . . . The complainers cannot succeed in obtaining assistance from the Law for a business based on unblushing falsehood for the purpose of defrauding the public into a totally false belief as to the origin and materials of the goods they sell."

Judgment in Australia. Enforcement in England Jurisdiction. Partnership —Mr. Symon in 1895 was residing in Western Australia and became a partner in a syndicate to work a gold mine. After going backwards and forwards between Australia and England, he in 1899 left the colony and from that time resided in England In 1901 the other partners brought an action against him in Western Australia claiming that the partnership should be declared to be dissolved, the lease of the mine sold, and accounts taken He was served with the writ in England, and was kept informed about the course of the action, but did not appear. Judgment was pronounced as claimed The mine was sold under the order of the Court at a price which left a deficiency, and accounts were taken by which the defendant's share of the liabilities of the syndicate was fixed at £1218. The other partners then sued Mr Symon in England upon the judgment of the Court of Western Australia to recover that sum He defended the action on the ground that, as at no time during the suit he was domiciled in Western Australia, he was not bound by the judgment. Held by Channell, J , that by joining the partnership for the working of the mine in Western Australia Mr Symon thereby contracted that partnership disputes, not merely those arising during the partnership, but also those on its termination, should be settled in the Courts of that colony, and that therefore he had submitted to the jurisdiction of the Colonial Court, which was binding upon him A question having arisen as to the date of the dissolution of the partnership Channel, J., explained that it was a question of considerable doubt since the Partnership Act whether the assignment of shares by one partner to another partner dissolved a partnership *Emanuel v. Symon* 23 *Times L.R.* 94.

Company Liability of Receiver upon unexecuted Contract —Bell, Harrison & Co Ltd , colliery timber merchants, had a contract to supply Nixon's Navigation Company, Ltd , with certain quantities of pit props. The Company became in arrears with the deliveries and the time was extended to 30th June, 1906 In November, 1905, Mr. Forster was appointed by the Court receiver and manager of Bell, Harrison & Co Ltd. on behalf of the debenture holders, and notice was given to Nixon's Co. Mr. Forster delivered a quantity of props at different times, but subsequently gave notice to Nixon's Co. that he could not undertake to carry out the contract. He then sued Nixon's Co for the price of the timber delivered by him, and the Company claimed that they were entitled to set off and counterclaim against him for the difference between the contract price and the market price of the timber not delivered under the contract with Bell, Harrison & Co , the price of timber having risen so as to make the damages for non-delivery exceed the amount of Mr Forster's claim. Held by Channel, J., that although the receiver had delivered some timber under the contract, he did not hereby make himself personally liable on the contract, but that he could not recover on his claim except subject to the rights of Nixon's Co to set off their claim arising out of the contract against his, because he could only recover as assignee (if at all). *Forster v. Nixon's Navigation Company, Ltd.,* 23 *Times L.R.* 138.

Innkeeper. Lodger. Liability for Fire.—Mr. Cowan, the Landlord of the Blue Bell Hotel at Gladstone in Queensland, instructed his servants to burn sulphur in saucepans to fumigate two of the rooms. They did so and left the stuff in one of the rooms, which took fire and burnt down the hotel and in it the personal effects of Mr Kellett, a lodger, to the value of £140, who sued Mr Cowan for this loss. Held by the Full Court, reversing the judgment of Power J , that a man who starts a fire on his premises is responsible for all damages caused by the fire, unless he is able to prove that its spread was owing to or occasioned by some force against which it was not possible to contend; and he is guilty of negligence unless he uses all such means to subdue the fire and keep it within bounds as are frustrated only by non-preventible force, that the extension of the fire was due to the negligence of Mr. Cowan, and that he must pay for Mr Kellet's loss. *Kellet v. Cowan.* 1906 *State Reports of Queensland* 116.

Bankruptcy. After acquired Property.—Mr. A. Bennett became bankrupt in 1896 and died in 1905 intestate and undischarged. About a year before his death he insured his life for £300. This amount was paid to his brother Percy Bennett who took out letters of administration to his estate and who had no knowledge of the bankruptcy. Percy distributed the balance after payment of expenses amongst the next of kin of the intestate. He was one and his share was £38-7-0. When the trustee of the bankrupt heard of the policy moneys he demanded them all from Percy. The Court held that the moneys were the after-acquired property of the bankrupt and that Percy must pay back the £38-7-0 retained as his share as one of the next of kin, but not the shares paid to the other next of kin. The trustee accordingly proceeded to make them disgorge. Herbert Bennett, however, resisted on the ground that he had received the money without notice of the bankruptcy and before the trustee intervened. Held by Bigham, J , that until the trustee intervened all transactions by a bankrupt after his bankruptcy with any person dealing with him *bona fide* and for value in respect of his after-acquired property, whether with or without knowledge of the bankruptcy, are valid against the trustee, that here however Herbert had given no value for the money received, and therefore must pay it to the trustee. *In re. Bennett* 23 *Times L.R.* 99.

Lease. Right of Renewal Valuation.—A landlord and tenant executed a document headed Memorandum of Agreement, but couched in the language of an ordinary deed of lease, signed by the parties and attested as a deed. It contained a provision that "at the end of the herein-mentioned lease the lessee may release the said demised land for a further term at a valuation as may then be agreed upon. The landlord sued for possession and the tenant claimed a renewal of the lease. Held by Edwards, J., that the document was a deed, that the "further term" was to be of the same duration as that granted by the lease, and that the agreement for a renewal contained in the provision was a valid contract enforceable by a decree for specific performance referring it to the Registrar to ascertain a fair rent for the fresh term. *Malfroy v. Raymond.* *IX Gaz. L.R.* 236.

To Weld Cast Iron.

Take of good clean white sand, 3 parts; refined solution fosterine and rock salt, of each 1 part; heat the pieces to be welded in a moderate charcoal fire, occasionally taking out and dipping into the composition, until they are of a proper heat to weld. Then lay at once on the anvil and gently hammer together. If done carefully by one who understands welding iron, they will be nicely welded.

Our Industries.

No. XIII.—THE CARRARA CEILING CO., Ltd.

One of the most important, perhaps one of the finest, exhibits at the Christchurch Fair is the palatial structure erected and furnished by the Carrara Ceiling Company of Wellington. Occupying a prominent position, the corner in the Main Avenue leading north—next to the Grand Hall—it commands the attention of every visitor, with its three frontages of delicate white marble or what appears to be that material One asks at once about that material, and one is as promptly introduced to Stuccolin, the manufacture of the Carrara Ceiling Company. The elevation of the building, with its sharp detail and artistic design, impresses you with the quality of this material, more especially if you learn that the design and the execution all represent local work. Here clearly is a striking addition to the industries of the colony. You decide to enter the building and investigate. But before going in, the architectural beauty of the facade keeps you awhile. It is a handsome design in the Louis XVI. style, a fine arrangement of pilasters and capitals supporting the entablature, of characteristic and exquisitely designed architrave, frieze, and cornice. This duly leaves a portion of the side elevation and the whole of the front open to view, thus forming a portico of elegant proportions.

Within is a noble hall, the wall and ceilings of which are richly ornamented in a style in keeping with the exterior design. On the floor stand grouped in great variety collections of objects of artistic design and delicate ornamentation. These prove on examination to be panels, mantels, overmantels, central ornaments, shields, cornices, trophies, overdoors, all of the company's manufacture. Prominent among them, disposed on easels, are modellings of great beauty and artistic value. a peacock with tail spread out, admirable in detail and finish; a frieze panel with children at play in the midst of floral surroundings; a hunting trophy with boar's head superbly modelled—a most spirited design—with the weapons of the chase about it in picturesque confusion, well ordered

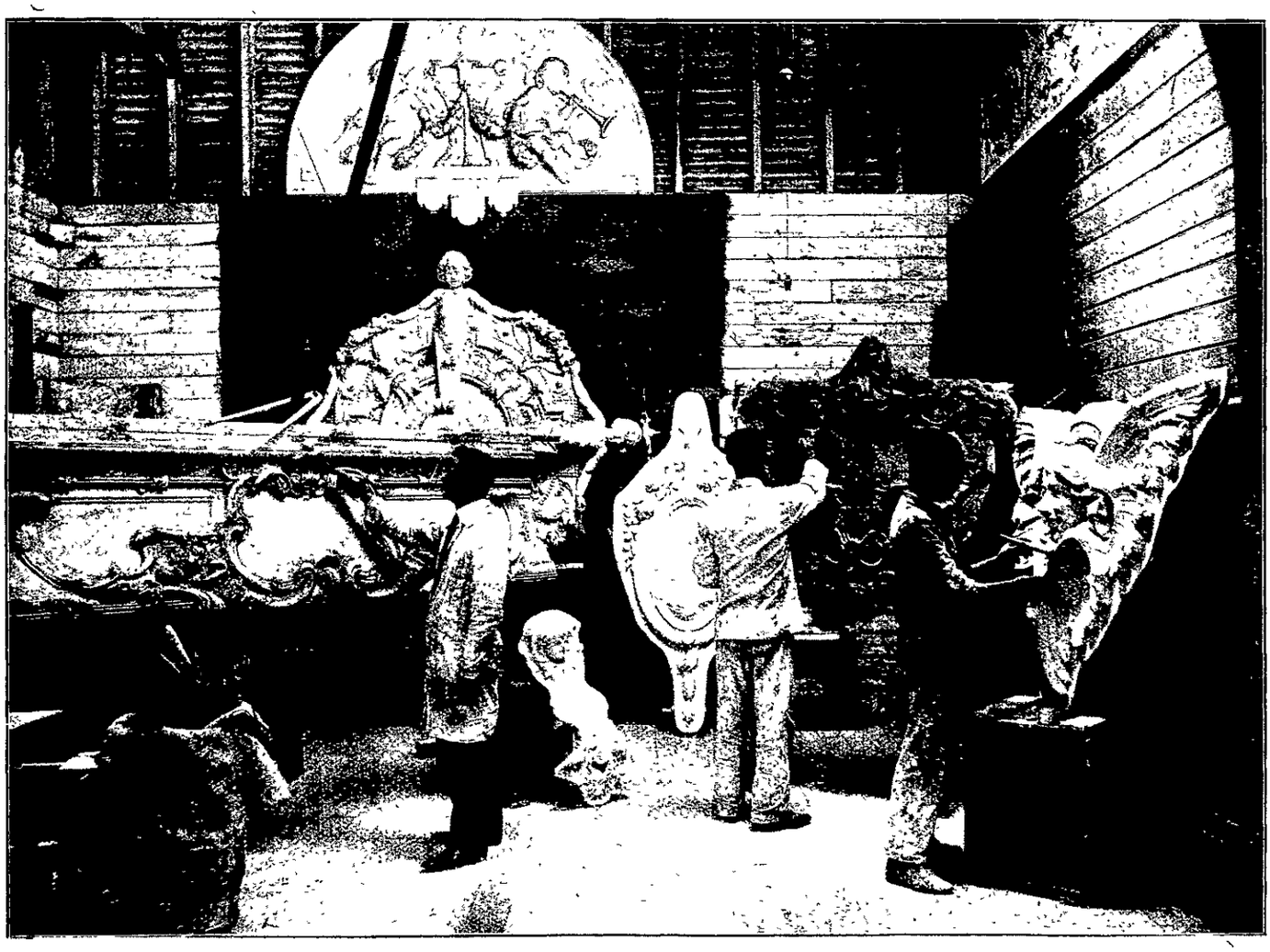
An archway of unique design, period of the first Empire, leads to the drawing-room, ornamented in the prevailing key, which here is in the Louis XV. style; walls and ceiling lavishly embellished with relief, a perfect masterpiece of stylish decoration The ceiling, carrying a fine outlined design of Cupids and flowers, culminates in a handsome dome of coloured glass, which gives a charming effect of light to the artistic details of the room. The groundwork of the ceiling consists mainly of "Calif"—an elastic plaster, one of the company's special importations—and the ceiling ends in a handsome cornice of delicate design, clear and sharp. Below this the walls are finished off with a handsome dado, and between dado and cornice the space is divided into panels, designed for framing some of the best artistic works, such as fishing trophies, centre-pieces, brackets, and the rest. "The very latest developments in plastic progress," it is claimed by the company's people, "pliable and practically unbreakable, showing conclusively that the application of this new material, Stuccolin, has no limits in the region of decorative art." The most striking feature of the Drawing Room is the mantel, together with its over-mantel, designed and produced of course by the company's art-workers—an innovation in plastic work. The fine head (of "Winter"), the harmonious outlines of both this mantel and the figures and floral decorative work of the under-mantel and overmantel, are as effective as marble, from the close resemblance the material bears to the best Carrara.

Such is the exhibit of this company at the Exhibition. It does not contain by any means all the work shown by the company at the great Fair. Comprised in that work are the facades of the Main Building, of the Machinery Hall, the Canadian Pavilion, and the Victorian Court. These have been so greatly admired by the visitors that it is hardly necessary to say anything more of them here. The only remark that seems to be called for is that the whole of the work was done in the colony, from material made in the factory.

All this gives food for thought to all who have at heart the advancement of the colony. So much so that the establishment wherein such work is turned out becomes of the first importance. Its appearance does not suggest anything of the kind to the passers-by on the thoroughfare of Riddiford street. The building is, like many other good things, plain and unpretentious. Within, it is a revelation of artistic preparation, well organised industry, and splendid results.

Firstly, what is Stuccolin? It is a new patent fibrous plaster composition, for which it is claimed that it is incomparably superior to any similar material made. It certainly is extremely light, very tough, exceedingly elastic, and keeps its sharp outlines undimmed by any condition of atmosphere, and being free of timber, is absolutely unshrinkable always. It is adapted for the most delicate open-work art designs, which may be fixed by any competent tradesman at a small cost to any plastered ceiling or wall, and lends itself equally well to the severe simplicity of the classical lines.

Those examples of the designs in the Exhibition have their counterpart in the factory show-room here in Wellington. With this difference, that for the most part they are here in stacks, against the single specimens shown there. The show-room is the first to engage the attention of the visitor. Here is a stack of twelve-foot panels covered with



THE MODELLING STUDIO.

rare detail of scroll and floral work, sharp as the first cut of the knife, guaranteed to keep its edge, light as a feather, handsome as marble. There, a dozen shields of various pattern, some close in detail, others broad; in all designs, classical, modern, renaissance, conventional, natural, formal, and sketchy in every style of the decorator's art. Stacks there are of brackets, pilasters, centre flowers, cornices, architraves, friezes adorned and plain, capitals, pediments, spandrils; arches, arch screens, over-doors, panelings, dadoes; consoles, soffits, beam-casings, everything that architects design and builders use in all the varieties of buildings, from cottage to palace, from public hall to garden porch. There are medallions of all sorts and conditions of artistic excellence—in short, everything imaginable. The satisfactory thing about them all is that they are examples of a great and growing local industry.

The stacks of things practical and workaday are not the sole occupants of the show-room so well lighted. There are examples of the special artistic work of the company's people. For example, an entablature of a girth of ten feet, ranged on the wall under the cornice, looming palatial and imposing; also hunting, fishing, and peace trophies brilliantly executed; likewise mantels of elegant design, and light apparently as they are elegant; specimen panels of the many put into the numerous buildings in all parts of the colony that have passed through the hands of the company, and are indebted to the same for their beauty of detail and fine finish. These things, specialities, and the rest, are advertisements of the company. They tell us both what the company can do, and what it has done, and what it is doing. Colonists in every part of the country will recognise the details as they have seen them in the Bank of New Zealand, Wanganui; the Royal Cafè, Christchurch; the Grand Hotel, Wellington; the dome of the Royal Oak in the same city; the details of the Railway Hotel, and the Municipal Opera House, Palmerston North; interior decoration of the new Hastie's Hotel at Feilding, interior of the rebuilt Nelson College; Young & Tripe's buildings, D.I.C. buildings, Wellington B. and I. Co.'s buildings, the ministerial residence, and a host of private houses; Invercargill Municipal Theatre, and other buildings too numerous to mention. These stand for the work done. There is statuary and ornamentation of all kinds for work that can be undertaken for special occasions. And there are the stacks and piles of workaday ornaments which await purchasers, and may be fixed to the ceilings or the walls with the help of a few galvanised iron screws.

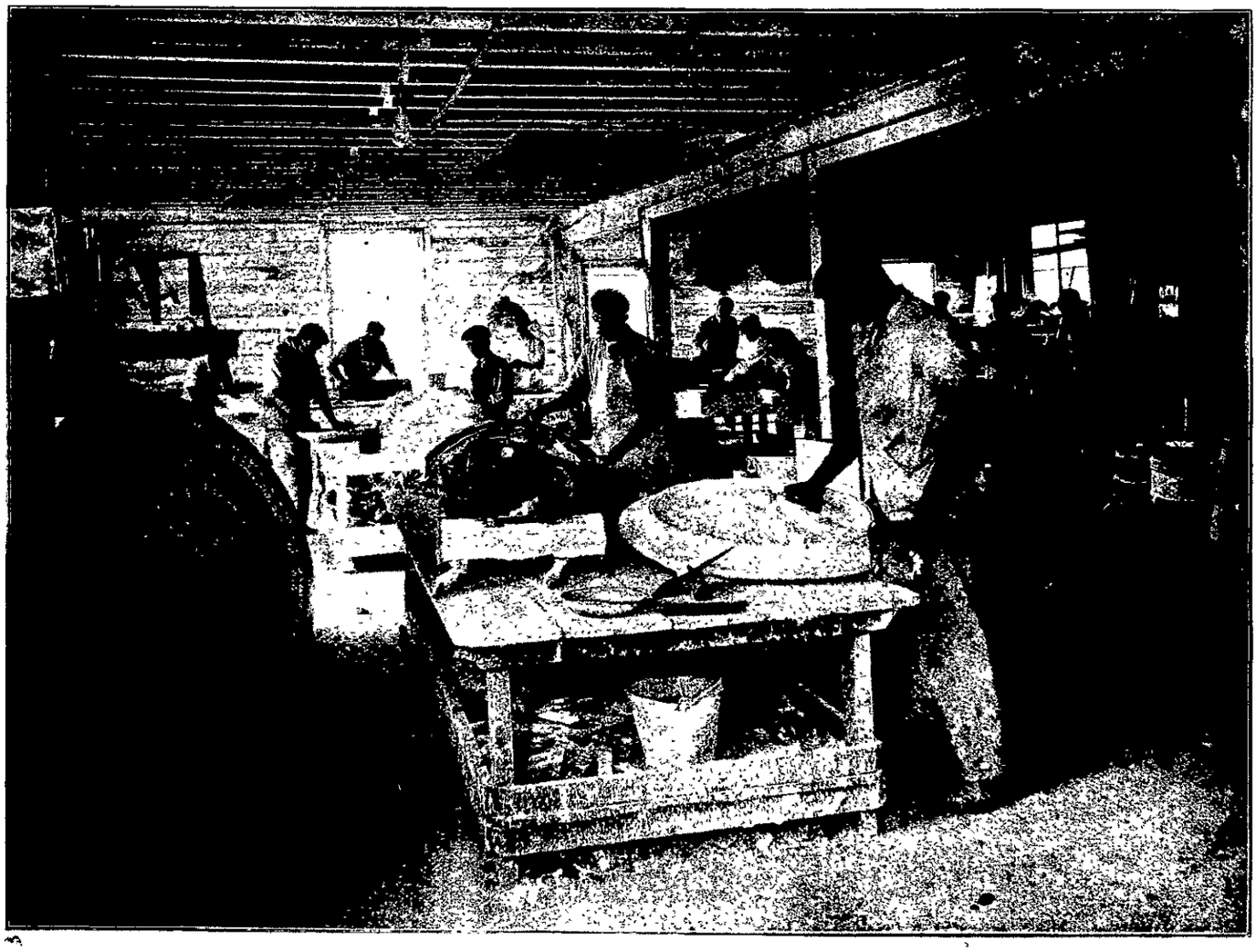
Adjacent is the modelling studio where the designs are prepared. The moment you enter you see that here is the place of a master of his craft. In one corner are a noble pair of eagles growing up in the clay form to adorn a corner and carry a shield for the National Bank new building. The breadth of the treatment, the richness of the correct detail, the splendid pose of the birds, the depth of the shadows, the freedom of the modelling, and its accuracy, all these proclaim the artist. Alongside is the clay presentment of the cornice for the skylight of the same building. Further on are designs of floral effect, classical studies, artistic every one both in the conception and the treatment. It reminds one that when Mr. Schaefer went home to buy the patent rights of this material he explained that he wanted to secure the best artist in modelling that it was possible to secure. He was told he would find the man he wanted at the exhibition at St. Louis. He went there and very soon discovered the artist, who had a considerable reputation and had been specially engaged to design work for leading Continental firms at the exhibition A French artist of the best French School, his work was the theme of universal praise at St. Louis, and won the grand prize, being the highest award and diploma offered. It is meeting with similar admiration all over New Zealand.

From the books and the papers and the tools of the modeller the designs descend to the workshop on the basement. Here the moulds are lying about in various conditions of use, and in all the stages of preparation. The indented parts and the plain relief portions of the design are confided to hard plaster, while the delicate intricate reliefs have to be moulded first in gelatine. This material is melted in a great pot, and when cool, comes out exactly like a rubber print of the modelling, flexible, soft, easily handled. It is placed with the rest of the mould and the complete casting is made with the Stuccolin mixture. When complete, the casting is taken out to be dried. This operation is performed in a large drying-room heated by an adjacent furnace to a heat of 150 to 200 deg. F. The castings are stacked in this chamber and from five to six hours is the time for them to come out "bone dry," as the workmen say. When dry they find their way to the stock rooms without delay. Thus there are two shifts of drying during every working day. The scene is busy and most interesting: men melting the gelatine in one place, pouring it into the moulds in another, taking it out in the rubber stage in another, adding it finally to the mould which is then fit for the Stuccolin. Men arranging the moulds for the Stuccolin, placing the same in the moulds, with deft strokes of their tools, stamping, cutting, plastering, going through every motion necessary for the soothing, so to speak, of refractory material. Further on you see them opening the moulds and taking out the castings, which they finish softly putting in the last touches, after which they prepare the moulds for the next casting—and so on, *da capo*, till the orders are filled. One can not consider a visit to the place complete without a visit to the drying-room. The average visitor enters and makes the customary expression about the heat. It is much like being in a Turkish bath, and one is very glad to get out again. One thinks it is lucky for the workmen that this is a light material; otherwise carrying the castings into the dryer would be terrible wor

Hard by is the store where the company's materials are stacked up ready for use. First—eliminating the Stuccolin which is made on the premises—to interest are the piles of "Calif" This material being elastic does not crack, and takes nails easily. It is used for the ground-work of walls and ceilings, to which the ornamental castings are affixed in the manner usual to this industry by galvanised iron screws. In addition there is cement in quantity, and plaster of Paris of all degrees, also the celebrated marble plaster. Laths (Oregon) are a speciality of the company likewise, and there are big stacks of these. Such are the incomers.

The outgoers are the packing cases, boxes, and crates, full of the castings going away in fulfilment of orders, which seem to keep the storemen pretty fully employed.

Such is the factory of the Carrara Ceiling Company at Wellington South. It represents a very important and rapidly growing industry, of which the growth



THE MOULDERS AT WORK.

CEILING OF ROYAL CAFE, CHRISTCHURCH.

is all the more rapid as it is without competition in its line throughout the colony. The company has the sole rights under the patent of the Stuccolin people. These were acquired together with the business in March, 1905, just about two years ago, from the Messrs. Schaefer & Co., who had purchased the rights a few months previously in Europe and established the business in Farish street, city. These gentlemen very soon discovered that the business had come to stay; also that its growth required very much larger accommodation to enable it to keep pace with the rapidly increasing demand for its productions. Accordingly, a company was formed, a site secured, the present factory erected, and business has been brisk ever since with a pleasing capacity for growing brisker and brisker as time goes on

One leaves the factory with a settled and somewhat surprised belief that here is an industry of high artistic capacities, which marks a great stride in the local manufacture of the country. The designs and work done are certainly of the highest possible artistic nature The designs of figures, flowers, animals, and the rest in ceilings, cornices, pilasters, medallions, and the other objects mentioned in detail in the description of the contents of the show room, are exhibited in the boldest relief, sharp in outline and of the freest treatment. Take, for example, a panel with the thistle decoration: the leaves are as sharp and clear as those growing on the stem, and the flowers stand out in all the grace of nature, without the formal conventionality or the monotonous rigidity characteristic of much that passes in the world for artistic treatment. A shield is another example of the artistic work of the company it carries the representation of a well-furnished drawing-room with every detail complete, of walls, ceiling, windows, frames, pictures carpets, musical instruments, bric-a-brac, books, and furniture. In addition there is some fine statuary, the character of which promises well for the response to any possible demand that may arise. The architects and the builders of the colony are aware of the excellence of these the company's productions. They like them not only for their artistic design and excellent finish, but for their material, which is light, elastic, unshrinkable, strong, and above all things enduring. With reference to the strength it may be mentioned that castings have been thrown to the ground without any breakage.

On the whole a magnificent industry, of which the colony ought to, and will, before very long, know a great deal more than it does now.

Originality.

By PETER ELLIS, WELLINGTON.

EXCEPT through exigency, there is little merit in copying what has already been done. He who expects to move the world, must do so by originality. To be original is to be progressive through the outcome of many failures; indeed failures may be considered as incidental to real progress, since from them we learn our best lessons. It is worthy of note that some of the most successful inventors have very large scrap heaps, scrap heaps which speak persistence, and persistence generally spells success. It has been said of Edison that, when in search of one of nature's secrets, in answer to an enquiry concerning his success his words were, "No, but I know where not to look!" After all to know "where not to look" constitutes a great part of the inventor's skill. Had more of this kind of knowledge been possessed by erstwhile pseudo-inventors of the so-called perpetual motions, much stress of mind and wasted energy would have been saved and perhaps employed in useful channels. Provided an inventor is working on reasonable lines (and so many marvels have astonished the world lately that he is a bold fellow who will limit possibilities), he should not be discouraged by a succession of failures; the flying-machine will come, but it is not yet. Failures are strewn all along the line. Motor cars were failures time and again, yet they are with us to-day, not quite perfect 'tis true, but they have arrived.

Persistency coupled with reason is the main road to success. Unfortunately, however, many talented inventors tire of their work, while others are crippled in resources, leaving a great accumulation of flotsam and jetsam in the patent offices of the world, containing priceless gems of real merit among a chaotic mass of unfinished ideas. "There is nothing new under the sun," which seems to say there is no originality. Though there be "nothing new," there certainly may be new combinations, and it is chiefly in original combinations that originality lies. One can hardly say to an inventor: "Be original." To be an inventor he must be so, and his success is likely to be in proportion to his discernment of facts, his knowledge of failures, and his perseverance. Strictly orthodox engineers look coldly on originality, but a moment's thought suggests that but for it their occupation would be gone. The steam turbine and many other inventions have fought their way through discouraging opinions and still come out on top. The wisest of men's powers are limited, and the ever-flowing stream of progress cannot wait for the theories of the learned. It will burst the banks of science and overflow the dams of philosophy.

The Mephan Ferguson Patent Locking Bar Steel Pipe Company, at Avondale, Auckland, have finished the contract for supplying pipes to the Auckland city council, and have also nearly finished delivery of the same. These pipes, though light compared with cast iron, are very strong, bearing a test of over 400 lb per sq. in. Though the plant to make these is large and in many parts heavy, it is intended to remove it to wherever pipes in quantity are required.

Ballooning has a curious effect on the vision. The pressure on the visual organs decreases and the sense of sight becomes so keen that at an altitude of 6000 ft. a bottle dropped to a body of water below may be observed in detail as it disappears beneath the surface.

No man can blaze his way through the world with his grandfather's hatchet.

The Mastery of the Air.

A Record of the Achievements of Science in the Realm of Aerial Navigation.

PART II.

In 1903 the men with means had taken the hint of Dr. Bell, and a machine of full size was constructed on the lines of the model which had flown so successfully. The United States Board of Ordnance found 50,000 dollars, and the Smithsonian Institute devoted a considerable sum of money. It was two years before this machine was constructed. The great difficulty was to find a motor light enough to give it the speed on which its relative buoyancy so greatly depended. Langley went to all the workshops in Europe without success, and coming back to the States finally managed, with the assistance of American engineers, to design an adaptation of the gasoline motor, weighing less than 4 lbs. to the horse-power. It was of five cylinders, there was no appreciable vibration, and it was of 50 h.p. There was an idea that in the contruction of the wings it would be better to favour the principle of the box kite—used afterwards by Santos Dumont, as will be noticed presently—instead of the single aeroplane as used in the model. But it was ultimately, and naturally, concluded to abide by the conditions of the model which had done so well in the air. Among improvements effected was the construction of hollow wooden ribs for the frame work, which were found to be each as strong relatively and as light as the quill of the Harpy Eagle, which is the strongest and lightest in nature.

After these delays, the inventor flattered himself that he had at last a machine perfect in every respect, and prepared to launch it from the houseboat with his aeronaut, Professor Mason. The launch proved his undoing. For the sake of the larger size of the machine it had to be taken down the Potomac to where the river was three miles broad The idea was to give it a course worthy of its perfections But there came storms and fogs; the first delaying the launch and destroying the boats and material collected for the great event; the second deteriorating the fabric and the more delicate parts of the machinery. The gasoline motor required constant repairs, and the ribs—that fine discovery of the constructor who had gone straight to the book of nature—became utterly unreliable He had not penetrated the secret of nature's oiling or of her various protections against damp and changing temperatures. The day came at last in August of 1903. Everything was ready, every one was in his place, the photographers swarmed at every coign of vantage. The engineer took his station, and the word was given to "let go" The machine began to glide, and at once it became evident that something was wrong. Before anything could be done the machine started head downwards and plunged into the sea, to be presently picked up seriously damaged. Something had caught the fore part of the gear and dragged. Then came the equinoctial gales and the time for operating in the broad part of the river went by. In November they got the machine patched up and determined to rig up a temporary make-shift in place of the carefully planned elaborate launch-ways provided for the August performance. The fact was that the large sums of money provided had got near their end, and it was clear to all that unless something were done there would be no hope of more. But the temporary makeshift proved no better than the elaborate plan. Again the machine was caught, this time at the stern, and again it plunged into the waves and was again most seriously damaged. Happily there was no loss of life. With this incident all hope passed away of further finance, and Langley's aerodrome was relegated to the failures of history. Public opinion declared that the machine had failed through defects in design. But the inventor proved in a somewhat elaborate and certainly very cogent paper that the fault lay entirely in the launching. This, however, was the greatest possible condemnation, for no machine could survive the proof of its inability to raise itself in the air. The story of this machine is placed after that of the Henson machine for purposes of comparison. It is necessary to return to the chronological order

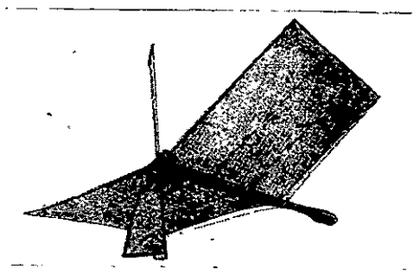
MISCELLANEOUS INVENTORS.

In 1857 a Frenchman named Breant designed a pair of valvular wings of 108 sq. ft. of area These were to be attached to the arms and legs of a man. But it never got beyond the paper stage, probably because the difficulty of inducing any human creature to take the risk proved insuperable

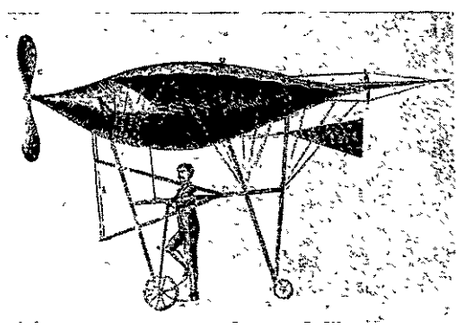
In the early seventies M Dienaide published a monograph giving illustrations of fifty-three machines designed to fly.

The most notable of these was the invention of M. Villeneuve, for twenty years secretary to the French Aeronautical Society. He had a device for the supply of steam by hose from a stationary boiler—a bright idea for getting over the weight difficulty. But he succeeded so well that, when he turned on the steam, the machine became so lively that he was seized with a panic and shut off the steam in a hurry. His machine came down with a smash, from which it never recovered.

The next machine noted—outside the ruck of the above mentioned fifty-three flyers was Hargraves' aeroplane, which saw the light in 1890 and caused much interesting speculation in the New South Wales capital. His first effort was the screw-propelled aeroplane of the illustration. It weighed two pounds and was driven by the contractile power of forty-eight elastic bands geared in tension It propelled itself 120 feet at an expenditure of 196 foot pounds. His second effort was the aeroplane of the second illustration. The machine consisted of a tube two inches in diameter, 48½ inches long, weighing 19½ ounces, of a cubic capacity of 144 6 inches, supplied with paper wings; the machine and wings together having a total area of 2344 sq. ft. The air in the tube was compressed to 230 lbs. to the square inch, and the weight of the machine was 2.53 lbs. The total weight of the engine was only 6½ ounces; the cylinder had a diameter of 1½ inches, with a 1½ stroke of piston In an experimental trip the machine flew 368 feet horizontally at an expenditure of 870 foot pounds of energy.



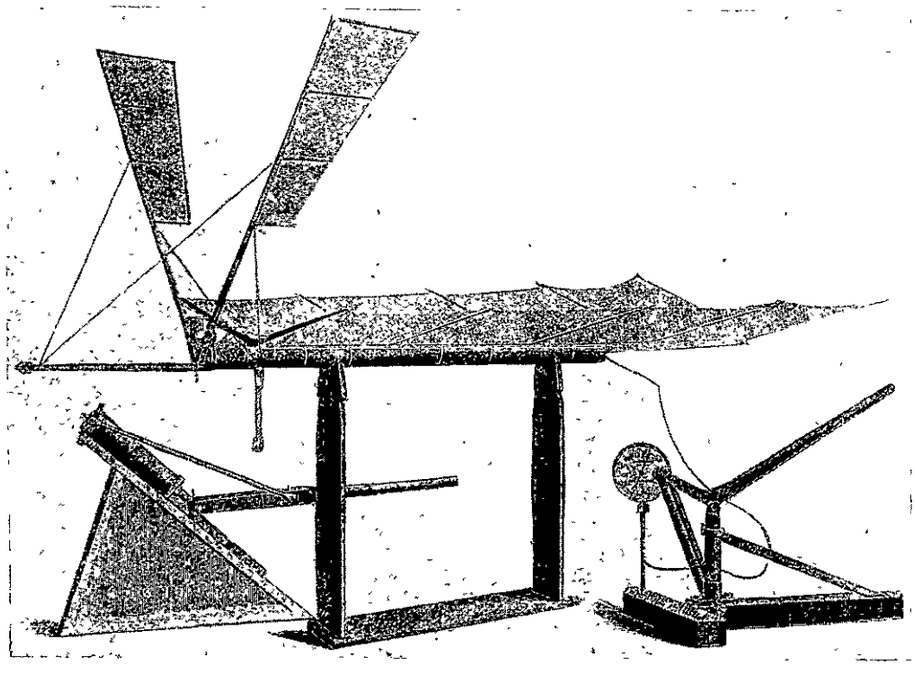
HARGRAVE'S AEROPLANE: FIRST MODEL.



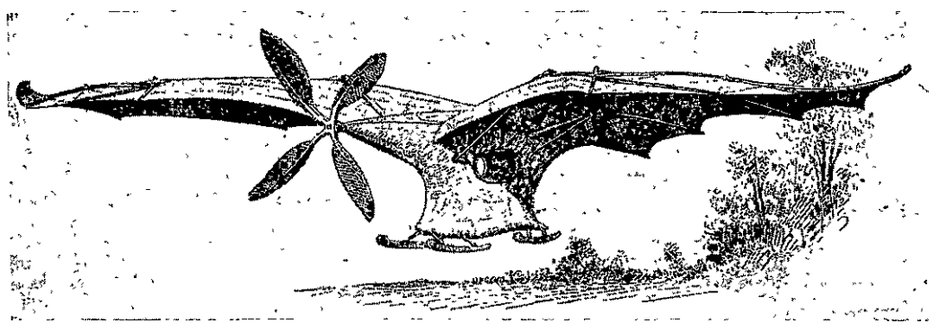
GOUPIL'S FLYING MACHINE.

M Trouvè came next with a toy bird which he made to fly 80 yards by a series of powder explosions, each causing the wings of the bird to flap and propel it through the air. From the first there was nothing to win the respect of practical men in that machine. For practical flying-machines the inventor proposed to derive most of the motive power from the atmosphere by taking up a supply of compressed hydrogen only. This, when mixed with a due quantity of air, forms an explosive mixture, which M Trouvè expects some day to use. He may be heard of again; but it is unlikely as a flyer.

M. Goupil in 1883 constructed a machine weighing 110 lbs.; it had a spread of canvas giving a supporting area of 290 sq. ft. and was 26 ft. in length by 20 in breadth. Experiments showed that it would lift a total of 440 lbs., or 330 lbs in addition to its own weight, provided the speed of the wind did not exceed 20 ft. per second—25 miles per hour. Above that the machine became unmanageable. "It unfortunately happened," says the official chronicle, "that the



HARGRAVE'S SCREW-PROPELLED AEROPLANE: 2ND MODEL.



MOUILLARD AND ADER'S FLYER.

model actually tried was too flimsily constructed to bear the strain, but the experiment was by no means discouraging."

Mouillard, whose work *L'Empire de l'air* has been noticed above, made some experiments relating chiefly to forms of aeroplanes which can be adapted to the individual human body. It was the logical result of his treatise on the wing areas. In one of these it is alleged that after taking a running jump across a ten-foot ditch, he was picked up and sailed against the wind for a distance of 138 ft., his legs dangling within a foot of the ground without his being able to alight. Of him it was said by scientific authority that "there is nothing inherently improbable in the belief that a suitable aeroplane might be devised by the aid of which individuals could greatly lessen the fatigue of walking." Observe also Lendenfeld's estimate of 2.7 square metres as enough to "fly" a man.

MR. ADER'S FLYING-MACHINE.

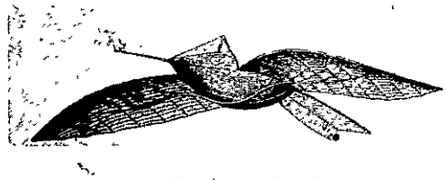
In 1890 Ader built a machine which filled a large space in the public eye. Considerable secrecy was observed as to the trials, but the picture (first published in the *Engineering Magazine*) gives a general idea of the shape The screw, made of canvas on a strong light frame, was fixed at the head of the apparatus, the wings being fixed to act as aeroplanes only and not as raising media.

In 1897 this inventor had progressed so far that the French war office took him up, providing £20,000 for a machine on a large scale after the model. He constructed one (at that cost) with a supporting surface of 270 ft, weighing 1100 lbs. propelled by a pair of screws driven by a motor of 40 h p. of the weight of 7 lbs. per horse-power. When it was brought out for trial the officers of the department refused to sanction any experiment on the ground of want of stability, and the government refused further funds.

LEBRIS'S APPARATUS.

The most remarkable of all the attempts at aviation was that of the Breton sailor Captain Lebris. He had for many years paid particular attention to the flight of the albatross in the Southern Ocean. One day he took it into his head to kill one of the birds for the purpose of closer study. Having caught, killed, and dissected, he proceeded to investigate in detail One of the results he described thus: "I took a wing of the albatross and exposed it to the breeze and lo! in spite of me it drew forward into the wind: notwithstanding my resistance it tended to rise. Thus I had discovered the secret of the bird. I comprehended the whole mystery of its flight."

The next step was to build an artificial bird. This he did not far from Cape Finisterre. It consisted of a body in the shape of a sabot or wooden shoe, the front portion decked over, provided with two flexible wings and a tail. The body was canoe built, 13½ ft. long and 4 ft. wide at the broadest point, of light ash ribs well stayed, and covered on the outside with impermeable cloth, so that it could float. A small inclined mast supported the pulleys and cords intended to work the wings. The latter were 23 ft. long thus making the whole apparatus 50 ft. across with about 215 square feet of supporting surface. The total weight of this artificial albatross was 92 lbs. The tail was hinged so as to steer both up and down, and sideways The front edge of the wings was made of a flexible piece of wood fashioned like the front edge of an albatross' wing, to this cross wands were fastened and covered with Canton flannel the flocculent side downwards An ingenious device which Lebris called his *rotules* (knee pans) worked by two powerful levers, imparted a rotary motion to the front edge of the wings and also permitted of their adjustment to various currents of wind The inventor expected that, given a strong wind, he would rise in the car and reproduce all the evolutions of the soaring albatross, without having recourse to flapping at all.



LEBRIS' ALBATROSS.

The trial was very interesting. The new albatross succeeded with the aid of a friendly carter in rising Thus, the bird was loaded up on a cart, the horse was made to trot, the inventor stood in the canoe holding the gear, with his feet on the pedals for working the tail. Presently he depressed the front edges of the wings, his assistants let go the ends of the same, together with the rope which held the bird down, and in a few moments she was sailing along three hundred feet above ground. Unfortunately a rope trailing behind caught the driver of the cart and took him up. As a matter of fact the unhappy man acted as the balancing tail of a kite and gave the machine equilibrium from an unexpected source. His cries soon attracted the attention of the Captain, who at once manœuvred a descent, bringing his bird down near enough to the ground to enable his unwilling passenger to free himself and jump clear. After that, however, the bird could not rise again, and had to come down, which it did with great deliberation, the Captain showing the greatest command of his machine On this first trip he flew altogether a distance of about three hundred yards On the second trip the bird in moving over a quarry, encountered a vertical eddy and, being but a young bird, lost balance and fell a victim at once, tumbling down into the quarry. Fortunately for the Captain, the bird righted on getting into the quarry and checked its downward fall sufficiently to enable him to jump off when he got near the bottom with no worse mishap than a broken leg The bird however was smashed to pieces. In 1867, having been put in funds by public subscription and having built another bird, the indefatigable captain made some more trials. In one of these he flew several hundred yards at the height of 150 ft., It was said that he had lost the nerve of his young days, in the above quarry presumably Anyhow, he left the bird untended and unattached one fatal day A wind coming suddenly struck it, carried it away on a wild career through space, dropped it suddenly as it had wrapt it up into the heavens, and that was the end of the story of the artificial albatross. Its bones, however, lie buried under a most encouraging moral.

SIR HIRAM MAXIM.

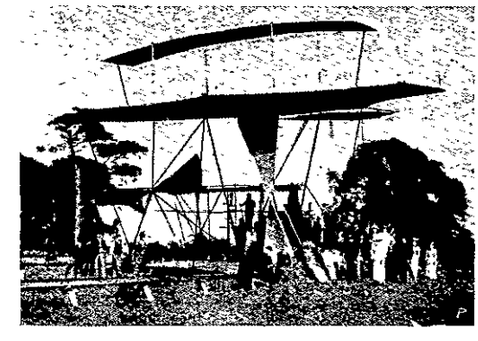
"For the first time in the history of aerial effort on July 31, 1894, for the first time indeed in the history of the world, a flying machine actually left the ground fully equipped with engines, boiler, fuel, water, and a crew of three persons. It is true that it did not remain long up; but the fact that it rose into the air, actually tearing itself free from the guides placed to limit its flight, and only fell to earth when its sails became entangled, attested its success."

This is the laudatory style employed by a well-known chronicler in stating the results of Sir Hiram Maxim's experiment. Mr Maxim, as he was then, constructed the machine shown in the illustration in firm reliance on air and motive power without any aid from gas. He was not the first to try, but he was the first to construct a machine of the working size It cost him £20,000; it had a supporting surface of 4000 sq. ft.; weighed 8000 lbs; was furnished with two screws 18 ft. in diameter, driven by an engine of 363 h p. working up to a pressure of 275 lbs., with a screw thrust of rather more than 2000 lbs. For the purpose of facilitating the start and the rise into the air, there was a track of eight-foot gauge On this it was found on setting the airship in motion at 30 miles an hour that very little load remained on the track, while at 36 miles the whole machine was completely lifted. But the machine absolutely refused to rise: one front wheel obstinately kept down, ripping and tearing the track. Steam was at last shut off, and the machine, coming down heavily, was badly smashed

The broad conclusion has been stated, that the experiment proved that a flying-machine carrying its own engine, fuel, and passengers, can be made powerful and light enough to lift itself in the air. It was certainly clearly proved that a well-made screw-propeller obtains sufficient grip of the air to propel a machine at almost any speed, and that the greater the speed the higher the efficiency of the screw. These results were accepted as having advanced the problem of aerial navigation much nearer to solution. Lord Kelvin declared that Maxim had solved three out of the five divisions into which this problem is divided. It is a broad way of putting it. Certain it is, however, that Maxim stands high on the list of those who have contributed to the solution He himself did not claim more than two of the points "Propulsion and lifting," said he, "are solved. The rest is a matter of time."

LILIENTHAL AND PILCHER.

In the later nineties, while the above inventors were experimenting, with actual flight motor driven, Lilienthal, an enthusiastic and reflective aeronaut, conceived the idea that it would be better to walk before trying to run. What was the use of putting a motor into any machine before you understood the control of the machine, and had become familiar with the conditions of the supporting atmosphere, and the manner of meeting them? Even the birds after their centuries of evolution had to be taught to fly before venturing on their own account. He devoted himself therefore to "gliding." He constructed aeroplanes and studied their behaviour in the air. The idea he got from the flight, if flight it may be called, of the flying squirrel, and the flying fish. He spent some years at the work and became expert in the management of the aeroplane, making not less than 2000 descents from more or less high places. He studied particularly the movement of the centre of pressure and he found that by curving the surfaces of his aeroplanes he diminished appreciably the travel of that centre, acquiring as a consequence some control and a balancing power. One unhappy day he was sailing well, when he met a sudden unexpected gust; his aeroplane turned over and, falling from a great height, the unfortunate aeronaut was killed on the spot. After his death the brothers Wright, who followed in his footsteps, said that



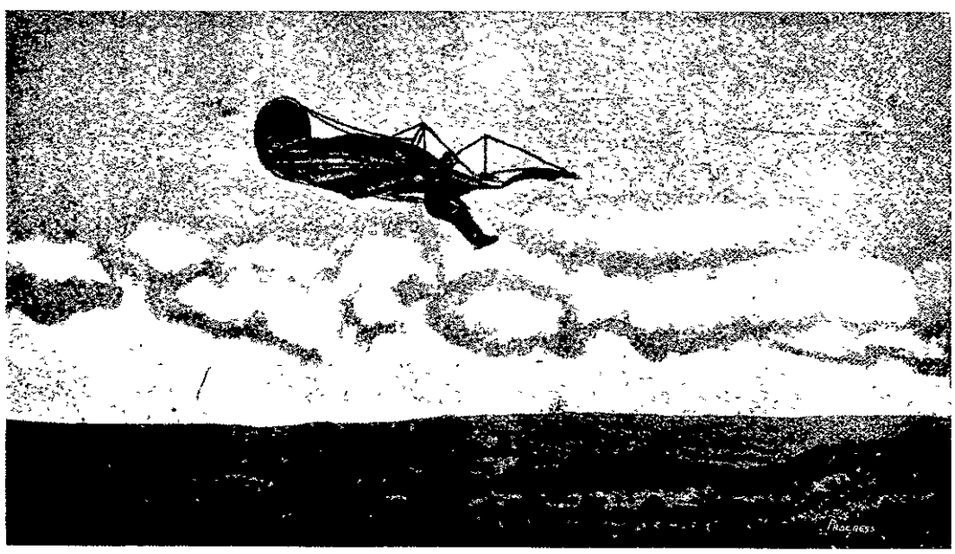
HIRAM MAXIM'S MACHINE.

he had made the greatest contributions to the study of the problem of flight One of them, speaking of Lilienthal's five years of work, speaking out of the fulness of his own experience of the preliminary practice of gliding, said that probably Lilienthal, who descended from as high as 1000 feet, had not been in the air an aggregate of more than five hours during the whole of that period. It is eloquent testimony to the brevity of the flights of experiment of this kind, and the smallness of the practice to the number of the hours spent in the work. One thus realises the difficulties of the art of flying.

Pilcher, who followed the Lilienthal method attained to similar skill, and met with a similar fate, through, in his case, some flaw in the material of the aeroplane with which he was experimenting.

Lilienthal had the idea that one day he might solve the problem of aviation by hitting upon the method of the soaring birds—the one demanding the least effort. Experiments had shown that surfaces can acquire a horizontal motion by the action of the wind only, when their curvature bears a certain relation to their superficies, and that this relation corresponds exactly with that which is observed in the wings of birds. The machine that Lilienthal, following this reasoning, constructed, consisted of a correctly curved surface of an area of fourteen square yards, made by stretching linen over a light wooden frame. It weighed some forty

pounds. In the centre was an aperture for the experimenter's body, and the apparatus was held in position by his arms. On running down a hill (with the machine firmly grasped) against the wind, the latter acquired a vertical component, which soon carried the apparatus up into the air and propelled it against the wind. These experiments persevered with soon attracted the attention of all Europe, and many were the disciples of the daring aeronaut. Having been moderately successful in calm, Lilienthal determined to try what he could do towards compelling strong winds to do his bidding, carrying him in any direction he chose. At first he practised in moderately rough weather, and was often obliged to perform the most fantastic feats of contortion to preserve his life. Then he substituted for one large frame-work two smaller ones, placed parallel one above the other—an idea on which the brothers Wright improved later on—and he obtained some remarkable results. For instance, a wind of some six miles an hour carried him from the top of a hill without any starting run downwards, against itself almost horizontally. Sometimes indeed he found himself at a standstill in the air at a higher altitude than that from which he had started. Here is an interesting human document in this connection, the utterance of a man on the point of solving, as he thought, the problem of soaring in circles like the larger birds of prey. "I feel very certain that if I leaned a little to one side and described a circle and further partook of the motion of the lifting air around me, I should sustain my position. I have made up my mind by means either of a stronger wind, or by flapping the wings to get higher and further away from the hills, so that, sailing round in circles, I can follow the strong uplifting currents." It was soon after making these observations that the end came, as above mentioned.



LILIENTHAL FLYING.

THE BROTHERS WRIGHT.

They studied the flying-problem in their native town of Dayton, Ohio, faithfully following the methods of Lilienthal. They divided the problem into three essential parts: stability, control and propulsion, and practice. Of the three, they gave the place of first importance to practice, and they spent five years in practising to find out something about stability. At the end of that time they had corrected the working tables compiled by Lilienthal out of his experience, and they had succeeded in embarking on machines of larger construction by far than any one had dared to think of before. After careful experiments they had altered the curvature of their plane, and found a perceptible diminution of the eccentricities of the centre of pressure. The main problem of stability consists, they point out, in reconciling (bringing together, and keeping together) the centres of gravity and pressure. They found, as all find who trust to the support of the air, that between these two there seems to be a boundless incompatibility of temper, which prevents their remaining together for a single instant, to the great injury often of the operator whose business it is to reconcile them. Happily for themselves, they managed to avoid that injury, while they made surprising and useful discoveries. They constructed their aeroplanes with two decks instead of one, thus securing "the advantage of the system of the modern truss bridge", they added a smaller surface placed a short distance in front, and a tail slightly mobile vertically. Lastly they curved the surfaces of their planes, following the principles of Lilienthal and improving on his curves after very careful experiment long continued. By these methods they secured for their machines (gliding) a greater stability than had ever been experienced before. Their curvatures were all in front like the curvatures of the front upper surfaces of the flying wings of birds. Their machines were in the end, of 308 sq. ft. of area, with curves of 1 in 12, the dimensions being 22 ft., by 14 by 6. Our illustration shows one of these gliding through the air with one of the brothers riding in a horizontal position. They are described as very clever mechanics, and they have designed and themselves made everything they use.

From stability and practice they proceeded to power, and they designed a method of applying a gasoline engine. Then they constructed their machine. No pictures were ever taken of it and the brothers have only given a general description. They state that they do not intend to take part in any trials for prizes, their plan being to deal with some powerful government to buy the machine. The following are the particulars supplied. Length fore and aft 20 ft.; width of wings from tip to tip 40 ft.; weight 700 lbs; two aerial screws, one behind the wings for direction, the other under the machine for suspension (this coincides with Jules Verne's idea); the gasoline engine, of 16 brake h.p., capable of driving the screws at 1200 revolutions a minute, four cylinders with four-inch stroke. There was a track for ascension, carrying a single rail eight inches above the ground. On December 17th 1904 the machine was put on the track. It was moved along the rail by the motor, and after running for about 40 ft. ascended into the air and flew a little over half a mile by actual measurement, being steered round the paddock in which it was constructed. The speed maintained was between 30 and 35 miles per hour. These facts were verified by the testimony of several persons who witnessed the flight. The trip ended unexpectedly, by the machine striking against a sand hummock, but no damage was done.

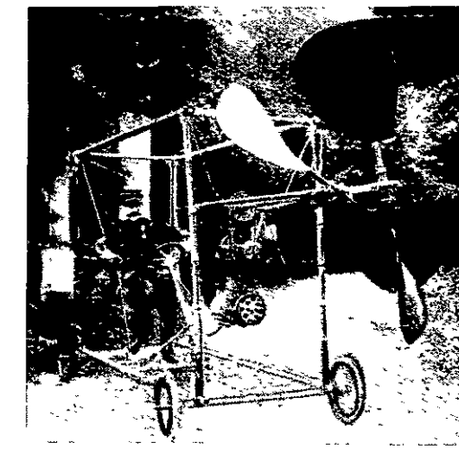
ARCHDEACON.

Of the school of the Wrights. He constructed an aeroplane in 1905, which he raised by means of an automobile of 60 h.p., but something went wrong with the rudder immediately after the start and the machine came to grief. This inventor has done great service with a new form of propeller.

PAULHAN-PEYRET.

This machine—an aeroplane after the example

WRIGHT'S GLIDER



CAPT. FERBER'S AIR-PROPELLER DRIVEN VOITURETTE.

of Langley's—was the most conspicuous machine of all those tried at the Concourse of Aeroplanes in Paris in the year 1905. They were of all sorts and conditions, and as they were all tried in-doors (in the Machinery Hall left by the International Exposition) they all lacked the only condition that counts in experiment, the condition of experiment in the open. They were all in the model stage, which is a further element of unreliability, and all were started from a launching tower expressly constructed. The Paulhan-Peyret was in appearance suggestive to a certain extent of the aeroplane of Hargraves. It had a front plane for a rudder after the manner of the Wrights, and it behaved under shelter in the best manner.

GILLESPIE.

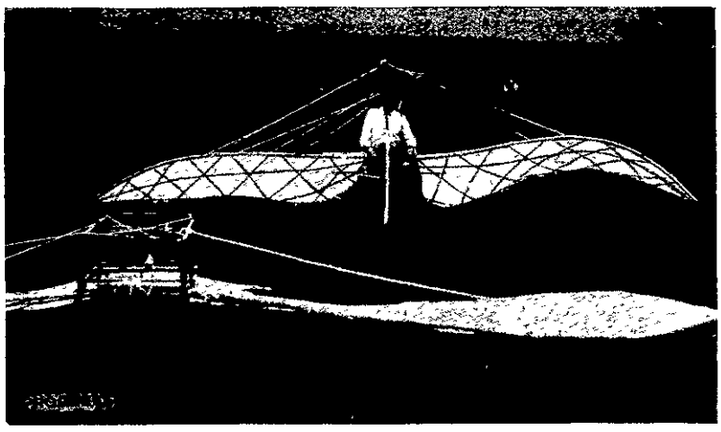
This inventor is at the head of a school of aviation which has adopted as a leading principle the idea that no contrivance for equilibrium that is not automatic can be relied on for a moment. Consequently, he constructed a machine the chief characteristic of which is that the wings and planes of which it is composed are all connected by wires with the central point, where sits the aeronaut, whose chief function it is to adjust the angle of incidence according to the varying circumstances of the moment. The machine is like a great flat aeroplane—all box kite and truss arrangements being discarded—driven by a motor of 20 h.p. It measures 24 feet by 10, and it is claimed for it that it is not easily capsized, provided the adjustment machinery is worked sufficiently smartly to make it in practice as the automatic action of birds. The official verdict was that it would be hard to either capsize or up-end. No satisfactory trial, at least not in public, has yet been attempted.

MONTGOMERY,

The machine of Montgomery of Santa Clara College—after which it was named—and his collaborator, Professor Bell, of the same institution—not to be confounded with Dr. Graham Bell, the friend of Langley—but for all that a proficient in the principles of aeronautics, which he has studied with great success—this aeroplane is not a flying-machine but a glider. It was raised 2000 ft. in 1905 by a balloon and at that altitude cut off, descending to the earth with great deliberation and success, if the phrase may be permitted in relation to an inanimate object. In the descent, which took some twenty minutes, the machine was under the control perfectly of the aeronaut, who went up with it and did the severing of the connection, and made it manœuvre on the way down. The official verdict was that it had demonstrated the solution on perfect lines of the problem of stability. But as the inventor had still to devise for it the power of continuous flight and the faculty of raising itself from the ground to fly, there was clearly much to be desired before this machine could be regarded as perfect. For preservation of the equilibrium Montgomery relies exclusively on the rudder.

CAPTAIN FERBER.

This distinguished aeronaut of the French military service followed the lead of Langley and the Wrights. In 1905 he tried an aeroplane of his own construction. But as soon as he let go for a flight unaided something went wrong promptly and the machine came to earth and was broken to pieces. He has summed up the proposals of the time for enabling airships to raise themselves from the ground for flight. Said he "Every aviator has been confronted by this problem of starting. Lilienthal built himself an artificial hill 15 metres high, Pilcher suggested a kite cord; Langley used a catapult, Eiffel proposed to stretch an inclined wire from the first story of his tower; Goupil a circular railway; Bazin has patented



TWO PETTIGREW WINGS.

an aerial merry-go-round: which, though it introduces centrifugal force, permits the safe study of continued flight."

Our illustration, page 190, represents a construction devised by Captain Ferber of the French army, well known amongst advanced motorists, for the purpose of further experimenting with screw propellers and, if possible, beating the record of Mr. Archdeacon's machine. Anzani with that machine, carrying a 6-h.p. Buchet V twin cylinder engine, attained a speed of about 50 miles an hour. Captain Ferber's machine is to be fitted with an Antoinette engine of 24 h.p. It is a mere skeleton of tubing with four wheels which, according to the *Autocar*, has been made with the view of finding out the power of the engine required, the power developed by the propeller, and the number of revolutions it has to run per minute; and also to discover what are the advantages, if any, of this method of propulsion. Anzani's engine worked up to 1160 revolutions a minute, and Captain's Ferber is to attain to 2500. This spells a large future for the aviator.

Wilson and Pettigrew.

The Pettigrew wings, constructed in 1905 by Wilson after the theory of the celebrated Pettigrew, an acknowledged authority on aviation, were designed for both sustaining and propulsion. Their weight (including that of the aeronaut) was 250 lbs., they carried a motor of 6 h.p., the wings were 22 ft from tip to tip, and there was a tail of 5 by 3. At the trial the beating of the wings pitched the machine forwards and downwards, and the experiment was a failure.

The next experiment was more successful. The machine, launched from a tower, (Watkin Tower Wimble Park, England) in a wind of 40 miles an hour, kept its balance with no more fluctuation than a bird exhibits under similar circumstances, and reached the ground gently.

Subsequent experience has, says Mr. Wilson, justified the construction of two full-sized machines on the natural plan, one for individual flight (that of an individual man) the other on a larger scale. The former has a motor of 6 h.p. and a pair of wings 8 ft. by 6, each, deeply concave with semi-rigid anterior margins, and graduated posterior edges, with a fan-shaped tail. The other machine has four pairs of wings 18 ft. from tip to tip, flapping alternately to conserve the weight and power, and was to have been tested with a gasoline motor of 50 h.p.

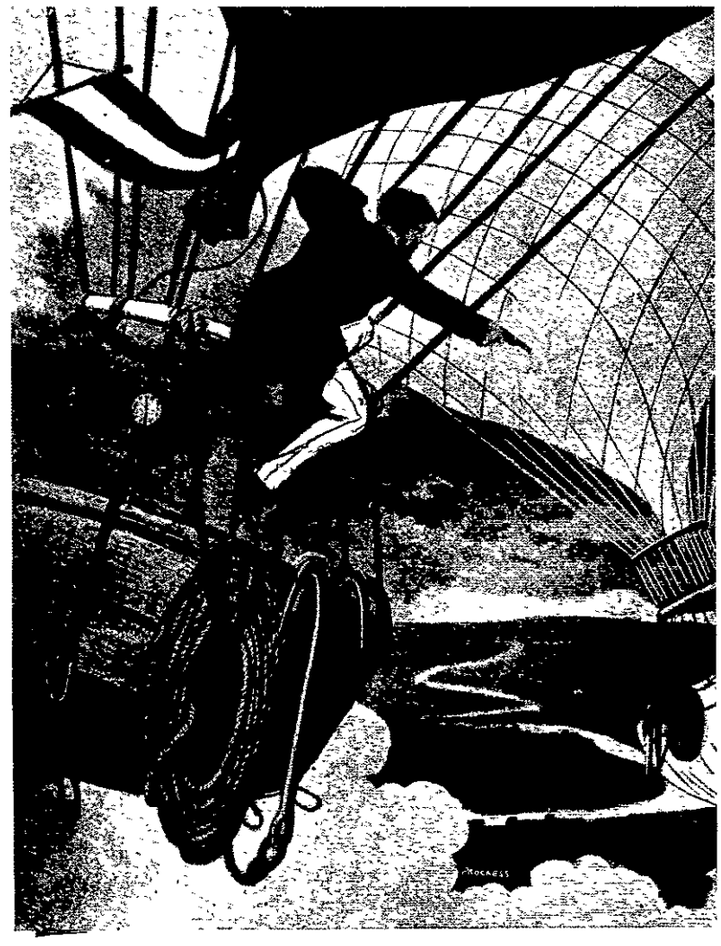
There was a third and much larger machine, which at the close of 1905 was ready for a trial in Wimbly Park (Watkin Tower). This was the inventor's favourite machine. The dimensions are 70 ft. by 10 at the centre; there are 36 ascensional screws, 5 ft. in diameter, with fine pitch; and four propelling screws, revolving different ways, of 7 ft. diameter, driven by a gasoline motor of 100 h.p. This is the nearest approach to the lines of Jules Verne's "Clipper of the Clouds." Not much has been since heard of these machines, which represent a separate and distinct school of aviation. It is reasonable, however, to suppose that on the day of the trial flight to Manchester they or one of them will put in an appearance.

Santos Dumont.

His air-ship, the famous "Bird of Prey," which flew two hundred and fifty yards at Bagatelle, in the Bois de Boulogne, the other day, is fitted with three rudders. Direction is given to the ship by means of a rudder in front, operated by a steering wheel. The aeronaut is a perfect adept with this apparatus, but the other two rudders, which are situated in the planes or wings, are less easy to master. These side-rudders are for correcting the line of flight in case of a puff of wind, or other cause of deviation from the straight course. They are worked by cords attached to iron hoops passed over the aeronaut's arms, and it is by swaying the body in either direction that the movements are produced. When the motor moves forward in the air the intrepid pilot inclines first one rudder and then the other. The wicker basket-car in which he stands is balanced on pivots, and takes any required angle.

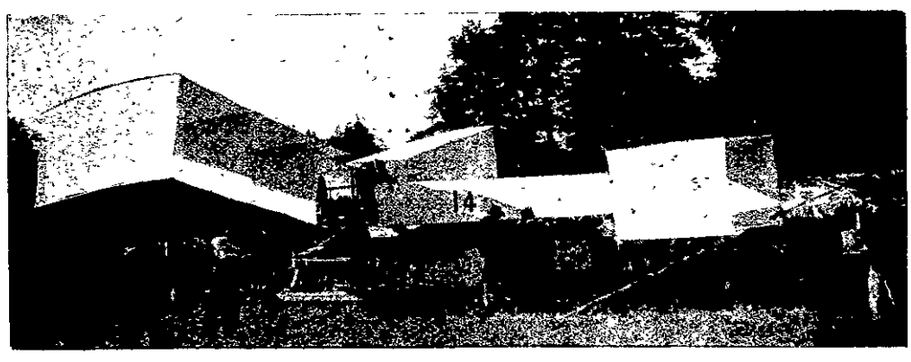
Retrospect.

We look back over the century of aerostation and mark the names and the vast numbers of inventors and their patents. We distinguish, besides the men whose histories we have told, the names of Green and Glaisher, of Nadar (Napoleon of balloonists), and Severo, the unfortunate compatriot of Santos Dumont, who perished on a certain spring



A DUEL IN THE AIR.

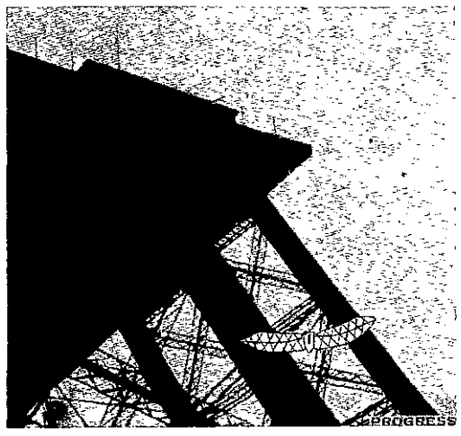
day in sight of a gay Parisian crowd; of Schwarz, whose balloon of aluminium was sent up after his death and failed to find equilibrium, and was dashed to pieces, though its aeronaut had a wonderful escape. We think silently of Wise, the great American balloonist, who was blown out into the Atlantic and never heard of more, of Powell, the intrepid member of the House of Commons, who was lost in precisely the same way, only from an English instead of an American coast; and of a hundred others who have fought and suffered and lost in the cause of ballooning. The last picture we permit ourselves to dwell upon is of that memorable duel in the air outside and above Paris during the famous siege in which the Frenchman's balloon was forced to the ground and was repaired immediately by the intrepid aeronaut who, mounting again, went straight at his Prussian opponent and drove him to earth with a hole in his balloon that not all the Uhlans in his master's army availed to mend. The cheer of the Parisian crowd is the last sound out of the past we will permit ourselves to enjoy.



SANTOS DUMONT'S 14 BIS BEFORE THE START.

CONCLUSION.

After reading the story of the air-ships and the aeroplanes, one thing strikes one forcibly. It is that no one has yet approached within quite measurable distance of the ability to stand the test proposed by the various prize givers who are encouraging the development of the flying art by that method. There is not in the whole crowd of machines—vast as it is—the English Patent Office alone records 279 in fifty years, of which 106 are of the "lighter" and 83 of the "heavier" than air type—a single one



160 FOOT TOWER FROM WHICH THE PETTIGREW WINGS WERE LAUNCHED.

that can be said to have displayed the remotest chance of being able to fly from London to Manchester. Under three-fourths of the usual prevailing conditions of the atmosphere the *dirigible* raised by a gas-bag will never do it before the Crack of Doom, so much has been proved by the records of attempt. Until we have more records of achievement it will be impossible to say whether the heavier-than-air type will succeed where the lighter has found its limitation. The Wrights stand best; for their machine has flown round a course, though with the disadvantage of an unexpected compulsory ending. Santos Dumont comes next, who has at the utmost, while sharing with the Wrights the honour of an automatic start, not managed really to do very much more than the flight of the pebble which is thrown in the game of "ducks and drakes," so well described by Henson in his introduction to the specifications which he sent of his own machine to the Patent Office Inasmuch, however, as that advance is on the line of continuous power, the little is something, and that little Santos has to share with the Wrights

We look forward to the convincing day at Manchester with more interest than hope. The time is short, and the list of vast difficulties is enormously long.

Applications for Patents.

THE following list of applications for Patents, filed in New Zealand during the month ending 15th Febr., has been specially prepared for PROGRESS.

22312—G. Mackaness and J. Barnes, Sydney, N.S.W.: Screw propeller.
22313—F. Bailey and F. H. Jackson, London, Eng.: Clutching-device for communicating rotary motion.
22314—H. H. Johnson, Forbes, and E. Moin, Sydney, N.S.W.: Gas-lamp lighter and extinguisher.
22315—G. C. de Witt, Melbourne, Vic.: Production of pigment from sulphide ores.
22316—G. B. Johnson, Westminster, Eng: Machinery for corrugating metal sheets.
22317—T. O'Neil, Hinde's Ferry: Wire distributor and collector.
22318—A. H. Byron and R. R. Richmond, Wellington · Billiard toy.
22319—T. Roberts, Wellington: Window.
22320—W. C. Bradshaw, Christchurch · Propelling steam vessels.
22321—F. J. Arthur, N. Mooroopna, Vic. · Tire-inflation device.
22322—J. Smart, Auckland Ventilating-cover for drains.
22323—H. Corbett, South Yarra, Vic.: Food and tonic.
22324—J. A. Rollo, Christchurch; Weeding-implement.
22325—J. H, Pollock, Wellington: Racehorse-controller.
22326—B. F. H. Dawson, Johannesburg, Transvaal · Candle-protector.
22327—B. W. White, Kaitoke · Spoon.
22328—A McCorkindale, Island Block Water-motor for pipe lines.
22329—J. Lowden, jun., Matauia: Preventing punctures in tyres.
22330—D. and F. W. Smith, Christchurch: Golosh.
22331—E. H. Featon, Gisborne: Vehicle-brake.
22332—F. G. Philpott, Lindenow, Vic. · Washboard.
22333—R. B. Topp, St. Omer: Liquid gauge for oil-engine.
22334—T. Whitehorn, Coburg, Vic.. Packing predetermined quantities in bags
22335—J. W. Dalton, Sandwich, U.S A. Breeches buoys.
22336—W. E Hughes, Wellington Wave-motor.
22337—A. S. Francis, London Eng. · Gas lamp for inverted incandescent burner
22338—T. Hines, London, Eng., and T. Coleman, Derby, Eng · Distributing liquids on roads
22339—R. Brown, Westminster, Eng. · Switches for electric traction.
22340—W. George, Invercargill · Milking-pail
22341—The Chemical Industrial Syndicate (Limited), London, Eng. · Manufacture of matches and igniting-surface therefor.
22342—British-American Tobacco Company, Ltd, London, Eng. · Mouthpiece cigarette machine.
22343—H. J. West & Co., Limited, Surrey, Eng: Chilling and carbonating beer.
22344—W. C. Bradshaw, Christchurch: Plaster.
22345—G. W. Berry, Moonee Ponds, Vic.: Soldering ends of cans.
22346—M. Robertson, Fitzroy, Vic · Manufacturing coated articles—*e.g.*, chocolate confections.
22347—H. R. Lees, Daylesford, Vic.: Potato harvester.
22348—F. S. Buckingham, N. Carlton, Vic · Animal-trap.
22349—J. Gascard and R. Shimmen, Ballan, Vic.: Grading and cleaning potatoes, etc.
22350—J. Higgison, jun., Greytown N.: Retaining in position teat-cup mouthpieces.
22351—F. Raven, Korumburra, Vic · Milking-machine and connections.
22352—W. F. Cropley (of firm of J. Cropley & Sons), Sydney, N.S.W.: Boot or shoe.
22353—C. C. Bullock, Sydney, N.S.W. · Capture of rabbits, etc
22354—J. Aivaz, St Petersburg, Russia Dividing-table for punching-press.
22355—J. E Wilhams, Greymouth. Game.
22356—A H Byron and R R. Richmond, Wellington · Calculating-protractor for scales for setting out drawings
22357—A H. Byron and R. R Richmond, Wellington Shafting of steam-vessel.
22358—J. Reid, Hamilton · Binder-apron
22359—A. Ashcroft and C. Richardson, Auckland Electrically distilling and purifying gum
22360—H. J. Edwards, Dunedin: Revolving-grate
22361—R. S Shepherd Auckland · Bedstead-foot.
22362—W. Evans and D. Y. Cunningham, Timaru · Weatherboard joint.
22363—W R Comings, Surrey, Eng · Box-making machine.
22364—T. E Raleigh, Corop, Vic. Drafting-gates for animals
22365—W. E. Adams, Sydney, N S.W. · Construction of walls.
22366—W. J. Dibdin and H C. Woltereck, London, Eng. · Illuminating and heating gas.
22367—G. Kelly, Napier · Boot-marker.
22368—T Williams, Elmore, Vic.: Animal-trap
22369—H Corbett, S. Yarra, Vic · Siphon
22370—C. Martin, Eltham Vehicle-seat.
22371—F. P Vize and H. J. Broderick, Echuca, Vic. · Brush
22372—J Molas and J. A. Smeeton, London, Eng · Turbine.
22373—J. C. Preston, Sydney, N.S.W.: Elastic fluid motor.
22374—J. C. Preston, Sydney, N.S.W.: Sheep shears
22375—G. Gibbins, Footscray, Vic. · Plough.
22376—T. B. Brock, Kapunda, S Austr · Filling bags with grain.
22377—J. T. Meredith, Geraldine · Construction of motor or cycle tyre.
22378—W Knowles, Christchurch · Boot or shoe
22379—J. W. Jensen, Palmerston N · Cow's-tail holder.
22380—A. H. Rogers, Wanganui · Cooling beer.
22381—J Graham, Gisborne · Increasing speed of grindstone
22382—R M Maunder, Ashhurst: Washing-board.
22383—R. M., J. B., and A. Maunder, Ashhurst · Operating window-blinds and curtain-poles.
22384—T. Hawes, Wellington: Indicator.
22385—T. J. Lovett, Chicago, U.S.A.. Magnetic separator.
22386—A. Parsons, Leeds, J. A. Morton, Leicester, and J, C. and B. Wright, Leeds, Eng.: Lasting-machine for boots and shoes.
22387—J. H. Smith, Kawana · Non-refillable bottle.
22388—A. G. Jackson, Brisbane, Queensland: Electric clock mechanism
22389—A. G. Jackson, Brisbane, Queensland: Mechanism for totalisator, etc.
22390—T. R. Christie, Dunedin: Yard-gully and level inlet for drainage purposes.
22391—H. Mote, Sydney, N.S.W.: Extension step-ladder.
22392—C. G. Lehmann, Lockhart, N.S.W.: Harvesting-machine.
22393—W. R. Gover, Burwood, N.S.W.: Spinal corselet.
22394—F. W. Hellberg, Sydney, N.S.W. · Hammock and tent.
22395—W. H. Waycott and W. Wilson, Moonee Ponds, Vic. · Indicator for screw-cutting lathe.
22396—W. McEachern, Rosewood, N.S.W.: Measured-charge-delivery device.
22397—H. A. Hudson, Mauriceville: Parlour game.
22398—W. Stocks, Vancouver, B.C.: Stave-built pipes.
22399—W. Silver, Tamworth, N.S.W.: Sheep-shearing machine.
22400—J. E. Henry, Bundarra, N.S.W. · Pneumatic tyre
22401—R. E. G. Borroughs, New Liskeard, Canada: Pipe-cleaner.
22402—C. J. Tuck, Makotuku · Spoon.
22403—A. R Dietz, Albert Park, Vic., T. R. Ricketts, Warragul, Vic., and F. H. Cook, Dandenong, Vic.: Rotary engine
22404—A. and J. Burfoot, Auckland: Drain-pipe socket.
22405—A. Schwartz, Christchurch: Feed-bag for horses, etc.
22406—R. S. C. Brown, Dunedin: Trolly-pole.
22407—E. R. B. Daniel, Masterton: Guard for circular saw.
22408—G. F. Hutchinson, Kapuni: Hydraulic vacuum pump.
22409—H. Mayr, Auckland: Preventing ring slipping from finger.
22410—A. Gray and D. G. Thornton, Wellington: Pocket of wearing-apparel.
22411—R. L. H. Murray, Auckland: Acetylene-gas-lamp generator.
22412—H. Parsons, Southampton, Eng.: Device for applying to tyre to prevent puncture and skidding.
22413—J. Lilley, Christchurch: Fencing wire-twister.
22414—A B Johnson, Auckland: Curtain or screen elevator.
22415—H. Rochfort, Auckland: Extracting metals from slimed ore.
22416—W. Wilkins and J. Nobbs, Wellington: Bridge back plates of furnace.
22417—W. T. J. Auckram, Otahuhu · Sewing-machine.
22418—W. McEachern, Rosewood, N.S.W.: Bottle attachment and aerated-liquid delivering.
22419—G. Saur, Esch S/A, Luxembourg: Flushing-cistern.
22420—C. J. Walker, Fitzroy, Vic.: Manufacture of boots and shoes.
22421—M. D. Wreathall, Christchurch: Ice-making machine.
22422—W. F. Dugins and H Haggarty, jun. Kew, Vic.: Automatically delivering food to horses.
22423—J Montgomery, Dunedin · Cooling-chamber.
22424—A. J. Hall, Thornleigh, N.S.W.: Scarifier.
22425—G. S. Evans, Corryong, Vic.: Link-lock hook.
22426—G. S. Evans, Corryong, Vic.: Safety-clip hook appliance.
22427—W. A. Merralls, San Francisco, U.S.A.: Process and apparatus for cyaniding.
22428—H. W. E Josling, London, Eng.: Preventing fraudulent refilling of bottles.
22429—A. J. Way, Wellington: Apparatus for producing hydrocarbon.
22430—F. Raper, Alexander S and W. J. P. Dixon, Rock and Pillar · Wire-strainer
22431—S. Kendall, Abbotsford, Vic. · Gas-burner.

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.

To Soften Cast Iron for Drilling.

Heat to a cherry-red, having it lie level in the fire. Then with tongs put on a piece of brimstone, a little less in size than the whole is to be. This softens the iron entirely through. Let it lie in the fire until slightly cooled, when it is ready to drill.

OUR FOOD SUPPLIES.

THE strength of a chain is no more than the strength of its weakest link; a chain that has a failing link has no strength at all; the links of a chain are useless until they are put together into the chain. Such is the law of chains. In considering modern systems of hygiene in relation to our food supply, various steps and processes may be considered as links of a chain which is dependent for its strength upon the merit of each individual link.

A case in point is the system under which the retail meat trade of this country is carried on. It is a chain with a flaw. Let us assume that in all other respects the system is perfect, that the law prescribes absolutely all that it ought to prescribe in the matter of killing under proper conditions, that it allows no carcase to be removed to the place of retail without a certificate given after expert examination; that it demands loftiness, airiness, and cleanliness in the slaughter-house and surroundings. As a matter of fact there are many exceptions to the rule which aims at perfection in these respects. The regulation of the abattoir is not universal; for example, the useful but unclean pig is, in certain cases, exempt from the law of scientific examination. Assuming, however that the system is perfect, in every respect, the fact would remain that all the meat so admirably safeguarded would be a prey to the army of cells and microbes which is borne upon the wind in every street at every hour, seeking what it may devour, numbering in its ranks the germs of every disease imaginable, advancing stealthily and invisibly in the wake of the great plague of flies buzzing and circling among noisome things, in places hideous and unmentionable, and then with disease-infected bodies crawling upon meat intended for human consumption. Here we see the last link of this chain which imperatively requires strengthening. And it is easily strengthened. Put the meat away in a room cooled by a refrigerator, and inflict a heavy fine in every case where it is exposed to the flies and dirt from which it ought to be protected. There need be no hardship, for nowadays refrigerating plants can be obtained at small cost. Every butcher's shop should be licensed, and after the expiration of a certain period no license should be given in respect of any shop within a municipality unless the same is provided with a refrigerating room, equal in capacity to the trade undertaken by the shopkeeper.

Another side of our food supply offers considerations similar in character, but rather more extended in scope. There is in the trade of the baker of our cities room for reflection on the forging of links and the making of chains. The conditions under which a loaf is produced are never perfect, and in many cases the process is carried on in a manner which would revolt the stomach of a hardy garbage collector. When finished, whatever may have been the conditions of its genesis and its surroundings in the place of storage, the loaf is carried forth for delivery to the consumer exposed as it came from the oven to the assaults of the microbic horde, and against contact with which, as against other things of evil repute, it has no protection whatever.

Now for the various stages of manufacture there are existent, although some of them are employed for other purposes, processes and machines which would, if assembled and combined in a bakery, make a perfectly ideal chain for the production of a loaf absolutely pure and protected from contaminating influences. There are machines that mix, machines that knead, machines that shape and cut and weigh, machines that bake and machines that wrap in papers. Now what is there to prevent all these links from being assembled under some well thought out plan to make a chain complete in itself? An apparatus which will receive the ingredients at one end and deliver the paper-wrapped loaf at the other? a complete baking-machine, economical in operation and sanitary from every point?

The picture is easily drawn. The factory lined with glazed white tiles; receiving hoppers for the flour; shutes carrying it to the mixing-machine, from which it is delivered to the kneading-apparatus; endless wire conveyers conducting the dough to the steam-heated "raising-chamber" and subsequently to the machine cutters, weighers, and steam baking-ovens; the baked loaf being finally conveyed to a mould in which it is automatically wrapped in paper drawn from a reel.

A glance at the future career of the loaf so produced is reassuring. Consider the accidents of the road; it falls upon the ground, its coat of prepared paper tough and staunch protects it against the assaults of the microbe legions. The hand of the delivery car driver reeking from contact with greasy harness or filthy wheel-chain lifts it for delivery, The unkempt guest of the cheap restaurant extends towards it his unwashed fist and his knife of all trades, but from the point of view of wholesome human food the loaf remains uncontaminated. We have drawn a fascinating sketch of what easily might be.

Will any one make it a reality? It is a mere question of bringing together a series of links which are now individually used for other but analogous purposes.

There is another chain devoted entirely to the retail supply of milk to the consumers of our towns. Take Wellington for instance, whose supply sources extend on one side as far as Longburn and on the other as far as the Wairarapa. Two railway lines bring in a large proportion of the bulk of this supply every day, and the rest is carried down by a thousand carts from a thousand hills. The links of the chain where it tries to hold the byres and the yards and the thousand details of the dairy, its cleansings and washings and scrapings and precautions expedient and sanitary, are not at all what they ought to be, considering that milk is the greatest of all carriers of infection known to human experience. But it is where the milk approaches the consumer, the place where the chain ought to be strongest, that it is the weakest. So weak is it that the very existence of any links at all may well be doubted The fact may be observed by any one who likes to take the trouble any day he chooses that the jugs and cans used for its reception are many of them imperfectly clean and, as he can see at a glance, seldom sterilised At the same time milkmen are attainted by prevailing epidemics of influenza and bronchitis, and hovering ever over the heads of seller and customer alike is the dread scourge of tubercle.

It may be safely asserted that the clothing of very few milkmen is as clean as it should be, and that milk is often ladled from the can by filth-contaminated hands, the milk running over the fingers and back into the can.

It is clear as daylight that if the delivery is not effected in a cleanly manner, efforts to protect the other parts of the service of milk are reduced to absurdity. Open delivery cans are a fertile source of the dissemination of disease from affected milkmen and should be prohibited. Every can should be fitted with a draw-off tap, readily removable for cleansing purposes, and for convenience the can might have a light base to raise it from the ground so that the measuring vessel could be held beneath the tap; milk should where possible be pasteurised and delivered to consumers in glass-stoppered bottles, such as are widely used in many European countries. Ensure a safe delivery, and you have the best encouragement for perfecting the whole chain of milk supply. There is every reason to believe that the efforts of our health Department will before long result in great improvement in the system of retailing milk. When that consummation is reached there will be promise for the strengthening of the at present practically worthless links in the chain of general control. The result must be increase of human health and considerable reduction in the death rate.

In this connection it is interesting to remember that it was reported from Paris early in last October that a new method of sterilising milk had been discovered by Professor Behring This is done without boiling, which is objected to by so many consumers for reasons of flavour; or the destruction of any of its essential principles—a far more important consideration. The method according to *Engineering* is based on the powerful qualities of German perphydrol simply oxygenated, one gramine per litre being sufficient to destroy all noxious germs It is important that milk thus sterilised can be kept a long time, and is not injured by travelling It cannot, however, be drunk until it has been gently warmed, and a drop of catalytic substance added.

Another circumstance very noteworthy, irrespective of the sterilisation, is the discovery of the same competent observer and authority that light has a very harmful effect upon milk, whether sterilised hot, or cold. Hence his recommendation that all milk should be kept in a dark place and in red or green bottles.

House-Moving by Water.

Chicago still has so many frame houses that house-moving is frequently undertaken. The crowded condition of the streets, with both elevated and trolley lines, is, however, a heavy obstacle. Consequently, when the buildings are near the water, they are often carried to their new destination on scows

The oldest university in the world is the "School for the Sons of the Empire" at Peking China. The names of its 60,000 graduates are carved on 320 stone pillars.

THE FUTURE OF WIRELESS.

A MONTH ago the proposals of the Marconi company were before the government. To-day they stand postponed to enable the government to study recent developments. Australia will probably follow the example, and it has been said that New Zealand ought not to decide in a matter of such importance until co-operation of Australia is secured. In some degree there is truth in this, because it would be absurd to deny that the co-operation of Australia is both important and desirable. But that New Zealand must not consider her position on its own merits without reference to any other dependency of the Empire, is equally unthinkable. New Zealand, moreover, there is no reason against it, may very well take the lead, especially where all hesitate.

In this case the facts are of the simplest. Britain has the command of strategic points enough to make a girdle of communication round her whole empire. Therefore, should the cable services suffer, as they are sure to suffer at the hands of an enterprising enemy in war time, the girdle of communication can still be maintained intact by a series of wireless stations safe from attack. Secondly, the colony is ready to bear a larger share of the cost of the navy that protects her commerce so effectually and guarantees her existence as a component part of the empire with irresistible power; it is one of the questions to be settled at the Imperial Conference to which the Prime Minister is now journeying. But what better assistance could we give the navy than by providing wireless stations for the King's ships, which all carry the instruments of the Marconi system of wireless telegraphy? It is the kind of assistance by which the vision of the admiral in command of the Australasian station would be increased by vast distances, and his plans in the hour of emergency kept inviolable. Thirdly, there is our own shipping. Undoubtedly the advantage of wireless news daily delivered would be popular with all travellers by sea here as it is popular with the travellers of the Atlantic Ocean. It is also certain that the companies carrying passengers in the intercolonial trade are ready to take advantage whenever a wireless system is installed. Fourthly the advantages of a wireless installation on a ship are obvious. Take for instance the case of the steamer abandoned the other day and still drifting about at the back of nowhere, and add all the cases of broken-down drifters which would have been heard of very much earlier in their wanderings, and add, too, all other possibilities of disaster. Fifthly the claim of meteorology is impressive. The difficulty of the forecasts of the marine departments of these countries consists mainly in the small number of stations. But if every steamer plying in these seas were a travelling observing station with facility of instant reporting, that difficulty would be greatly diminished, with, moreover, great advantage to the success of climatology. Here be five irrefragable reasons for the installation of wireless. The only argument as yet raised against them is that the disasters to shipping in these seas are too few, and the visits of the coastal shipping to coast ports are too many to make an economic case for the establishment of wireless. The "pros" are imperial—strategic, mercantile, popular, humanitarian, scientific; the "cons" are £10,000 a year. It is Lombard street to the China orange on wireless.

For postponement there is a better case. It is that the late international conference decided to make all stations common as far as possible. This was qualified, it is said, by the British delegates in some way, in a direction of a recommendation that the British government, which admittedly commands the position by virtue of the great extent of territory over which it has permitted the installation of wireless telegraphy, may permit some further installation common to the nations of the civilised world. If this be so, it only means that the British representatives, while maintaining the advantages gained by superior British enterprise, have advised a generous action for the benefit of the civilised world. But there is some doubt on the subject unhappily, for it is known that the action of these delegates has caused a great commotion of discontent and protest in the War Office and at the Admiralty. Therefore it may be well to wait until the question is cleared up of what did really happen at the conference. In other words, to what is Britain committed, and if Britain, being committed by the British representatives, will refuse to ratify their action? Such is the argument for postponement of decision. It is scarcely strong enough, however, to counterbalance the Imperial, scientific, commercial, humanitarian, and other advantages above enumerated. Of course, the case for postponement would be better, if the question of whose wireless system is to be adopted were open. But the fact that the King's ships are supplied with the Marconi system settles that point. The only question that remains is whether the

Marconi system is good enough for the venture into wireless. To that there seems but one answer. Therefore we regret the six months postponement. When they are over, there should be no further delay.

THE TURBINE AT SEA.

A PHENOMENAL DEVELOPMENT.

By Robert Cromie
In *The World's Work.*

The Hon. Charles Algernon Parsons, M.A., D.Sc., F.R.S., etc., proprietor of the electrical and engineering works of C. A. Parsons & Co., at Heaton, Newcastle-on-Tyne, and Managing Director of the Parsons Marine Steam Turbine Co., Ltd., is the fourth son of the third Earl of Rosse, the celebrated astronomer whose telescope at Parsonstown was for a long time the largest in the world. Mr. Parsons is thus the distinguished son of a distinguished father, and as inventor, or perfector, of the marine steam turbine he is now one of the most prominent figures in modern engineering. Mr. Parsons was educated by private tuition and at St. John's College, Cambridge. The biographical brevity, "Scholar 1873; 11th Wrangler 1876," attests the distinction he won. While working hard at his studies he did not neglect the physical culture without which the mind cannot achieve its full stature. The first L.M.B.C. boat had no stauncher oarsman than the subject of this sketch, and his example may be pointed to profitably at a time when the doctrine of "cram" is perhaps too prevalent. (*It also justifies the basic policy of the Rhodesian Scholarships.—Ed. P.*)

Having achieved so much distinction at his university, it was only fitting that Mr. Parsons should be elected a member of the Royal Society (1898), when his great contribution to the evolution of mechanics, although still in its infancy, had been proved a practical invention. Mr Parsons is a director of the Newcastle and District Electric Lighting Co., the Cambridge Electric Supply Co., Ltd., and the Scarborough Electric Supply Co., Ltd, in addition to the important offices already mentioned. But all other honours and activities must give place to his position as the sponsor of the Marine Steam Turbine, albeit that innovation has an ostensible history of less than a decade. By "ostensible" I mean that it is only nine years since the *Turbinia* made that marvellous dash of forty miles an hour round the fleet at Spithead, on the occasion of the Diamond Jubilee of Queen Victoria. That epoch-marking incident introduced a new feature into practical mechanics, although we may be certain that the little vessel, in spite of her meteor-like appearance and performance, was not the result of a lucky guess, but rather the outcome of many years of patient experiments and searching investigation. From that first, I might say sensational, public performance of the *Turbinia* the progress of the engine has been always steady; latterly, it has entered upon a triumphal march. The *Turbinia* was only 100 ft. long, the *Lusitania*, the mammoth Cunarder, is nearly 800 ft. long. The *Turbinia* was engined up to 2300 h.p; the *Lusitania* will be engined up to nearly 70,000 h.p. That is an extraordinary advance in a decade. There is nothing like it in the history of mechanics.

It must be remembered that the reciprocating or piston engine had been the subject of a century's experiments and improvements when the turbine challenged it on even terms. I am aware that the whole of the turbine case is not admitted by all engineers; indeed I am acquainted with some, whose opinion I value, who stoutly dispute the turbine's superiority. But I think there are few would deny Mr. Rankin Kennedy's carefully weighed declaration that, whatever may be in store for the turbine, the piston engine has now reached finality in that form. In order to introduce a short sketch of the present position and probable future of the steam turbine I shall briefly indicate its history in the last decade.

The *Turbinia* having demonstrated the practicality of the invention she was succeeded by the gunboats *Viper* and *Cobra* and, these having met with mishaps, timid soothsayers prophesied evil for the turbine. In spite of their jeremiads the engine was installed on the Clyde steamer *King Edward*, built by Messrs. Denny Bros. of Dumbarton. That was the first start of the Steam Turbine for use in commercial steamers Speaking at the annual dinner of the Institute of Marine Engineers in the Liverpool Street Station Hotel, London, on October 19, 1904, over which he presided, Mr. Parsons said, "If the *King Edward* had not been launched I should probably not be here to-night." In the year which followed the advent of the *King Edward*, the *Queen Alexandra* was added to the turbine list by the same firm, and several improvements were introduced which added to the speed of the vessel without increasing proportionately the power of her engines or her coal consumption. Then more gunboats were turbine-engined; private yachts followed the lead; the Royal Navy joined in with larger ships, and while the first turbine cruiser, the *Amethyst*, was only 9800 h.p, the turbine *Dreadnought*, launched a few months ago, will be the most powerful warship afloat. Meantime the commercial progress of the turbine was not less of the leaping and bounding character. The Anglo-French cross-channel service followed the example of the Clyde, and in turn was followed by the Irish and English Channel boats. Long-distance steamers to Australia and New Zealand took a hand in this wonderful game (the *Loongana* proved very satisfactory) and the attack on the Atlantic was led by the Allan Liners *Victorian* and *Virginian*. In the last phase, it is true, fortune proved unkind for a time, and the turbine's future seemed to have passed under a cloud. But the cloud since then has cleared away, and the sun of destiny shines as strongly as ever on the new engine.* With the launch of the *Lusitania* most progressive marine architects and engineers have agreed that at least for fast passenger steamers the day of the piston engine is passing, and will soon have passed, like so many of man's inventions, into the void of things that have been.

This matter of fast steamers is important, for it is a limitation of the turbine in its present development that it is not a profitable engine for a slow ship. This—a single limitation—namely the high speed necessary if the turbine is to show its best efficiency, was accentuated by Mr. Parsons himself at the dinner above mentioned. The steamers sailing under the British flag, he stated, represented 9,000,000 h.p. "The turbine in its present stage might be applied to nearly 3,000,000 h.p.; the remaining ships are too slow for it to be applied to at the present time. The relative horse-power of machines that have been made, are working, or on order is about 340,000 h.p." In his presidential address to the same society (the Institute of Marine Engineers) at Stratford in January 1905, Mr. Parsons put the matter of high revolutions in the piston and turbine engine very succinctly: "The high revolutions which we dread in the reciprocating engine are a boon with the turbine, where bearings and thrust bearings are automatically lubricated, and the higher revolutions mean smaller screw shafts and propellers, and less weight on the tunnel blocks." Another feature is the deeper immersion of the propellers, owing to which even turbine yachts can cross the Atlantic in heavy weather without any perceptible racing of the engines.

As regards the turbine's future, Mr Parsons has no fears. In vessels of 16 knots sea-speed and upwards, and of over 5000 indicated horse-power, he is confident that it will soon entirely supersede the reciprocating engine; and this limit will possibly include before long vessels down to 13 knots of 20,000 tons and upwards. Even slower ships may be brought into line later, and although only in its early infancy the turbine would now be suitable for one-fifth the total steam tonnage of the world This is a striking object-lesson on the rapidity of the march of modern mechanics.

It is interesting to learn that Mr Parsons thinks it probable a combination of the reciprocating and turbine engine will be found the best machinery for vessels of the "tramp" class in the immediate future. This field is a large and important one, and fills an extremely useful purpose in commerce, besides supplying our best sea story writers with an effective *mise-en-scene*. In a slow vessel it is manifest the revolutions must be slow because a certain disc area of propeller and a certain number of square feet of blade area are necessary in order to avoid too great a slip ratio, and consequent loss of propeller efficiency. The highest revolutions possible must be accepted but these in say, a 10-knot ship are but a low figure. From technical reasons into which I need not enter here, the turbine is not highly efficient under these conditions. But the turbine can deal economically with very low-pressure steam, and in the ordinary "tramp" the steam, although usefully expanded down to about 7 lb. pressure absolute, is then released into the condenser, and the remaining energy, down to about 1½ lb, is almost entirely lost. The turbine picks up 70 per cent. of this waste product, as I might call it, and turns it on to help in the driving of the ship. Mr Parsons is very clear and also very confident on this really wide field for turbine employment, and on this phase of the subject I may make yet another quotation from his presidential address,

"The additional power gained by the use of this low-pressure turbine has been calculated to be between 15 per cent. and 20 per cent. of the whole now realised—a gain of the same order as was obtained in the advance from the compound to the triple engine. This is the main feature of the case; minor points, of course, there are, such as improvements of the condenser (as a good vacuum is very essential to all turbines for the best results) and also feed-heaters fed from the exhaust of auxiliaries, or low-pressure steam drawn from the main engines for heating the necessarily colder feed. And there are also other minor points; but I am sure that some arrangement, such as I have endeavoured to indicate, will be largely used for the "tramp" engines of the near future."

There is still another new field for the marine steam turbine, and in it a beginning has now been made, namely, the propulsion of torpedoes. In some respects the United States Bliss-Leavitt turbine torpedo is much like the Whitehead, but it far surpasses its prototype in speed, range, and accuracy. While the Whitehead goes 1200 yards at 28 knots, and up to 2000 yards at 22 knots, the Bliss-Leavitt goes 36 knots up to 1200 yards, and 28 knots up to 3500 yards. The new torpedo is being made in two sizes. One is 18 in., which can be fired from the 18-in. tubes on existing battleships and torpedo-boats; the other will be much more powerful, the size being 21 in. The engine employed for the propulsion of this miniature war ship is the Curtis turbine, compound type, with two propellers adapted to run in opposite directions. The turbine runs at 10,000 revolutions a minute, geared down to 900 revolutions for the propellers, and at this speed the new torpedo developed 40 knots, although the contract was only for 36. A turbo-gyroscope is driven at a speed of 18,000 revolutions per minute, and by this ingenious invention the torpedo is prevented from deflecting from its course.

I believe most engineers admit that an "internal combustion" turbine would be an ideal machine, and although there are difficulties in the construction of a satisfactory gas turbine, scientific invention has not yet said its last word on the subject. Heinrich Zoelly of Zurich has patented a gas turbine which is said to be a good machine, but I am not acquainted with its design or results. Last year, Emil Capitaine installed a producer-gas turbine engine on a little vessel 60 ft. long, and during a ten hours' run, at 13 knots, only 467 lb. of anthracite were consumed, at a cost of about four shillings.

* Since the above was written the *Virginian* has broken by several hours all previous records between Rimouski and Moville.

Theoretically the gas-turbine offers as good a thermo-dynamic efficiency as the piston engine, but the main difficulties in its progress are the apparent necessity of working at such high initial temperatures that no known constructional material could long withstand their action ; the high rotative speed demanded in order to realise good efficiency ; and the difficulty of compressing the elements of combustion to the high pressure of the turbine, and burning them under this pressure. It is believed that the wet gas turbine will remove the first two of these difficulties, and that it is the third which will prove the most serious. When it has been overcome the engine will be a splendid drive for the automobile.

Before concluding, I would like to mention only a few instances of the present position of the turbine ashore. Neuchatel has now a combined system of steam turbine and hydraulic power for delivering current. At the Rhenanian-Westphalian Electricity Works at Essen two units are being (or have been) installed of 10,000 h.p. each. These are the largest stationary machines ever built in Europe. and a Westphalian mining company intends putting in another 10,000 h.p. engine, also of the Boveri-Parsons type. The French-Belgian syndicate control a number of electric plants at St. Denis (30,000 h.p.), Sclessin near Liege (15,000 h.p.), and Charleroi (3500 h.p.), all turbine-driven. New plants are being erected at Brussels, Ostend, Cairo, etc., bringing the total horse-power up to 65,000, all installed within three years by the same company. In America progress is also reported ; but I must return to Mr. Parsons himself for a moment, and leave the foregoing figures to stand for themselves. They can easily be verified.

Mr. James Denny tells a good story of the trial of the *Viper* which throws a light on Mr. Parsons' character more vivid than any words of mine could pass. A preliminary trial trip was made early in the day, and the bearing of the engineers was ominous. They differed with Mr. Parsons as to the trial trip rate of wages, and as the latter knew his own mind the engineers walked off the ship. Every one thought the day's proceeding must end there and then ; but Mr. Parsons thought otherwise. He turned on his apprentices to do journeymen's work, picked up some men off the quay, borrowed some more from Messrs. Hawthorn, Leslie and Co., who had the contract for the hull and boilers, and made all into a scratch crew for the trial trip. Under these extraordinary circumstances the *Viper* ran her trial, and on that day did the unparalleled speed of 37 knots. When Mr. Parsons emerged from the engine-room, dirty and warm, all crowded round him to congratulate him, but he took the whole thing as a matter of course It is a modern instance of how dangers retreat when boldly they're confronted. But it is not given to every one to confront mechanical difficulties so successfully. The incident is typical of the character of the creator of the marine steam turbine.

Displaces Celluloid.

United States Consul McFarland, who is stationed at Reichenberg, Bohemia, reports that a substitute for celluloid has been discovered by a Gablontz experimenter. The new material is durable and cheap, costing but little more than glass.

Mr. E. Sutton, of Thornbury, has installed a milking-machine, and manages his herd of 26 cows with the help of a boy, his usual time of working being one hour. He has been using the machine for a month, and has had no trouble with sore teats His return of milk for the month was 28,780 lb , the butter-fat test being between 3.7 and 3.8.

THE GRAPHOPHONE.

We all know the difficulties of getting right away with the correspondence. It is bad enough for the methodical man of business who has to wait for his stenographer and sometimes to postpone his duty to let the stenographer deal with the press of other work. When the letter in reply has to be written quickly and there are so many points that in writing some of them may get dropped out, the reflection is disturbing enough to produce that very consummation. In each of these cases how pleasant to have a graphophone at your elbow. You just sit down and talk into the machine : result—your typist comes when the other work is done to find a voice ready made and in possession of the subject, to type or take down whichever is most convenient.

Now take the lawyer, the journalist, and the prime minister. The first has to jot down the telling points for his briefs, the sceond wants to transcribe a long and important document, full of information to be used, and the third must issue a complete set of instructions. If the Graphophone is the friend of any of these once, it is their friend for life : never apart ,never far off

Have you ever watched a typist reeling off copy stopping every now and then to find the place, stopping the click clack of the machine and the flow of good temper to find it ? Watch one typing from the Graphophone and it will take you a long time to see any stoppage from that cause.

Have you ever remarked how men differ about a thing they have all heard ? Have you ever noted that there are differences of meaning in shades of expression which one hearer may miss and another make much of ? A Graphophone settles such doubts very simply.

Do you remember your horror when reaching your friend's house in full fig with that gorgeous button hole, and the most perfect dancing pumps in the world on a certain memorable Tuesday evening ? His house was in darkness, all but his study and the nursery He received you in his comfortable old coat, and he eyed you over a cigar cocked up at the angle of ridicule, and you heard him announce in the voice of a Chief Justice settling a law point for ever that he had said "Wednesday my dear fellow". What were your feelings then ?

What were they when on tendering Mr. Coper the dealer five and twenty for the little horse with the curby hocks, price so low because of those very curby hocks–he said "'ocks" the villain–he scornfully asked if you propose1 to give a " P Hen, for the balance of the fifty quid you agreed for don't you know "

How much more were you disgusted when he calmly added " You know dear boy "–yes-dear-boy and to you–" you said that the little nag was dirt cheap at the money."

Remembering all these things buy a Graphophone and secure lifelong happiness which as the privileged people of the world know, consists of accuracy punctuality and right understanding, besides music bottled up for daily life use.—Advt.

Concrete Pipe Line.

A concrete aqueduct recently completed at Cambridge, Mass., affords a remarkable example of the growing tendency to replace iron, brick, clay, tile, and other materials of construction in the building of waterways with concrete, and there by secure permanency. The new conduit, which is said to be the first of this kind in the United States, is 2½ miles long and 6 feet in diameter, and is designed to sustain any pressure. It replaces an old iron pipe line.

In this connection it may be interesting to note that the Syracuse (New York) University contemplates establishing a complete course upon cementing and concrete construction, for which a new building is now being erected, to be devoted exclusively to this branch of instruction.

Your concern should be, not so much what you get, as what you do for what you get.

A farmer of long experience in the Bruce district informs the *Herald* that the present dry season is really the best thing the farmers could have He argues that the land has been so soured by constant wet that farming for grain and root crops was becoming an expensive matter. The present dry spell opens up the ground particularly the heavy clay lands, lets the air in, and aerates it, making it more fruitful. sweeter, and better in every way than all the manures in the world could do. A normal season following on a dry one has always seen abundant crops.

ENGINES, MACHINERY, APPLIANCES,
&c., WANTED AND FOR SALE.

FOR SALE — Two Astronomical Telescopes. One 3½ in. and one 6in. (Cook & Son). Apply to F. Hitchings, Sydenham Observatory.

WANTED to sell two small Dynamos, one of 6 amperes, the other 12. Both will work at any voltage up to 50. Apply to "X," Progress Office.

PICTURE FRAMING executed in all the latest and most up-to-date styles; Antique Brown Stained Moulding a speciality. Write for our illustrated catalogue. R. & E. Tingey & Co., Ltd., Wellington.

MOTOR CARS.

THE GARAGE, 81 Manners St. Motor Cars for Sale · Beeston Humber, 6½ h.p., £225 terms; new Covert chainless, any trial, £215; Winton Touring Car, 4 seat, £175. Cars cleaned and stabled from 2/6 per week. Nicholls, The Garage, 81 Manners St., Wellington.

WALTER GEE & COMPANY—Manufacturers of Self-coiling Revolving Shutters and Venetian and Holland Blinds of every description. Factory: Quin St., off Dixon St., Wellington.

PURCHASERS of real estate, either houses, sections or farms, should apply to H. Ernest Leighton, 9 Featherston St., or Hutt, who has the finest selection on the market.

WANTED KNOWN—All Classes of Electro-Plating and Engraving executed at Chas. H. Williams & Sons, 85 Willis street, Wellington. We are not experimenters but have been established over 30 years. Write for Price List.

WANTED—Everyone to know that they can have their old electroplate ware made equal to new; Bedsteads relacquered, Fenders, Lamps, Screens, etc., antique coppered; Bicycle and Coach-builder's work, Nickel or Brass Plated; Electro-plating of all descriptions executed at the Sterling Electro-Plating Co., 34 Lower Cuba street, Wellington.

Winged Aero Machine.

With gigantic wings measuring 45 feet from tip to tip, M. Florencie, member of the Aero Club of Paris, seeks to solve the secret of successful aerial navigation. The "orthopter" or "flapping-wing" machine, as it is called, consists of two aeroplanes partly covered with canvas, the remaining portion of each being designed so as to imitate the action of a bird's feathers in flight. The machine, which weighs but thirty pounds, is fitted to the aeronaut's body. His legs furnish the propelling force. He stands in stirrups, and by means of a cord from foot to wing, flaps the great pinions. The wings are lowered by outstretching the legs; a spring fixed to the frame raises them. A series of longitudinal flaps make up the "feathers" of the machine. A rudder in the rear acts as the tail.

Rich lodes of antimony have been found north of Auckland, are being developed, and are easily accessible; it requires no assay, as the ordinary observer can readily detect the metal Cinnobar -the ore from which mercury is procured- usually accompanies antimony, and does so in this instance. The outcrop gives a good assay, and a drive is being put in to test it at a lower level before erecting machinery.