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Progress

The Scientific New Zealander.

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EDITORIAL COMMENT.

Oil Wells at Taranaki.

In another column we give some account of the wells of Taranaki, as well as pictures of the plant and scene of operations. It will be seen by readers of PROGRESS that the industry is in a more promising condition than it has ever been in its history. Some years ago the only result was rank failure. But to-day the perseverance of the true believers, if it has not been crowned with success, has come not far from the success which its efforts have undoubtedly deserved. At all events, the whole business now wears the air of something not far from a settled industry

The fame of the wells, even if they are only prospective, has got far beyond the boundaries of the Dominion. A cable message during the middle of the month speaks of inquiries received from London and prospects of purchase. The story reminds us that the Admiralty is said to have made up its mind to abandon coal for the navy and take to petroleum to drive the King's ships, as those of the Czar are driven in the neighbourhood of the Baku oil district, and as many ships are driven now all the world over. There are many advantages in favour of the newer fuel, the chief of which is that there is less chance of damage from labour disorganisation. Oil flows of itself to the surface or has to be pumped with a minimum of labour. But coal must be won by hands, and the owners of the hands are now displaying some rare powers of "sticking up" the whole business of the world for their own ends.

Without going into the controversy that rages round that point, it is easy to understand that this is a power most inconvenient to a nation dependent upon its fleet for the very life of its people Of what use is it to build Dreadnoughts and submarines and torpedo boats and cruisers if there is no coal for driving them. At the critical moment there may be a strike of colliers, and the whole fleet of a country may be paralysed. What would be the feelings of the nation if two announcements appeared suddenly in the morning papers, one of a coal strike, and another of the German Fleet racing across the North Sea, bound for a British port?

Of course the Admiralty keeps a stock of coal for emergencies The nation would not, therefore, be in a panic at the double announcement above mentioned But there would be dire fear lest the supply gathered by the Admiralty might not be sufficient for the needs of the coming war. As it would be impossible to replace the miners at a moment's notice, for mining is a skilled profession, there would be no telling what a few weeks might bring forth. On the whole, the decision of the rulers of the King's Navee to use oil fuel as much as possible is commendably prudent. It is probable enough that the recent request for information comes from the Admiralty.

It is possible at the same time that it may have come from some German or American house. Although Rochfeller seems to have got tired of the monopoly of piling up dollars through the oil pipes of his gigantic concerns, it may be regarded as tolerably certain that the others of the gang who have been bleeding the American people and the world for some years are determined to enjoy their repasts some time longer. At any rate, they are go-ahead enough to see great possibilities for this oil business opening out in this new and far-off country. It has been their habit through life never to neglect the prospects of rising fields.

If the Germans were to get possession, there would be no fuel for the Admiralty when occasion arose, except on the terms dictated by the Kaiser. If the Americans got ahead first there would be exploitation of the national resources by strangers for strangers. It behoves the Government of the Dominion to keep a wary eye and to advise all concerned that they shall touch these walls at their peril. A great national resource ought not to be allowed to pass out of the hands of British subjects. That can not be prevented now. The only resource would be the imposition of such taxation as would make the holding of the property financially impossible. By the time the Parliament meets it will be possible to go by a shorter and better road, namely, by the passing of an Act prohibiting the sale of national property to foreigners under any pretext whatever.

Repairing the Kaipara.

In some illustrations of the present issue we show the shipwrights working at the "Kaipara" in the bottom of the Dock of the Auckland Harbour Board It is a sufficiently commonplace business from the point of view of the man accustomed to life in the neighbourhood of the great dockyards of the Old Country. But here it is in reality a spectacle unique and suggestive. When the direct steamers ran into greatness it was objected by the critics, who are always timid, that their repair in case of accident would be the occasion of the owners' undoing. Now here is a dock in which a very serious damage is being repaired with cheerful promptness. It is good news for the merchant shipping of the Dominion and for the ships of the King's Navy also. What is more, there is a touch of two local colours that do not usually blend well. The dock is Auckland enterprise, but the contractors for the repairs are Messrs. Hutchison and Campbell, of Wellington, and Adams, of Auckland. The combine has distinguished itself by effacing all the other contractors, and has shown its mettle by the manner in which it has overcome the difficulty presented by the absence of rolling machinery for the plates it requires for its work. It has just managed with jacks and blocks. This is the spirit of the early pioneers in the midst of modern appliances. The pioneers may be thought to have had the best of the deal, for they had to improvise everything. But, on the other hand, the men of to-day, when they have to improvise—a thing which few of them ever think of doing—have to find something to do the work of very big machinery. On the whole, the business about the "Kaipara" in the Auckland Dock is decidedly interesting, and, as we have said, suggestive.

The Dominion Water Power.

At last the Government has determined to utilise the water power under State control, spending half a million a year. As it estimates being able to sell power to the public at one-tenth the price of private enterprise, there is much reason to applaud the Government for accepting so practically a responsibility of such moment.

THE REPAIR OF THE S.S. KAIPARA.

A Big Undertaking.

(By Our Special Reporter.)

The stranding of the New Zealand Shipping Company's s.s. "Kaipara," through striking a submerged rock in Rangitoto Channel, is now a matter of history, and whatever other result may accrue, it has, at least, given the nautical men of this Dominion an opportunity of showing that they are able to cope with the great task of salving and repairing an ocean liner which even in the Mother Country, is considered a big undertaking.

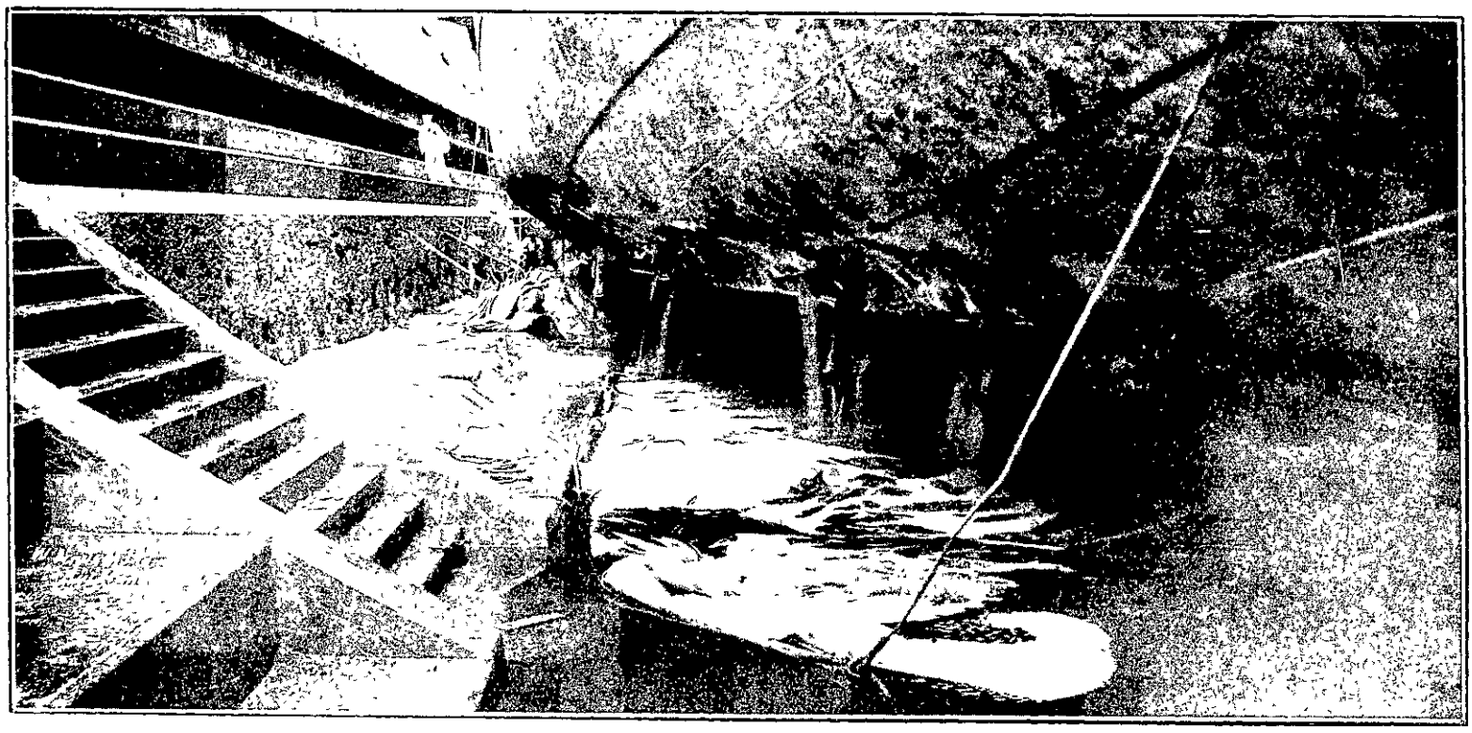
The particulars of the salving are well-known, and we propose to deal in this article with the larger work of repairing the vessel.

On being placed in dock it was at once apparent that the "Kaipara" had sustained extensive damage and, after survey, tenders were called for the work of reinstatement. For this the competition was keen, most of the leading engineering firms of the Dominion being competitors. In the result the contract was let to Messrs. J. H. Adams and Co., of Auckland, and Messrs. Hutchison and Campbell, of Wellington, who have combined for the purpose of carrying out the work. The successful tenderers estimate the time to be occupied upon the contract as forty-two working days, and as this is far below the estimate of any other competitor, the opinion has been freely expressed that the work cannot be done in the time. However, after viewing the work at its present stage, and seeing the energetic and resourceful way in which all are working, your contributor ventures to predict that the contractors will succeed, and if they do they will be justly entitled to a proud position among leading ship repair contractors of the Dominion.

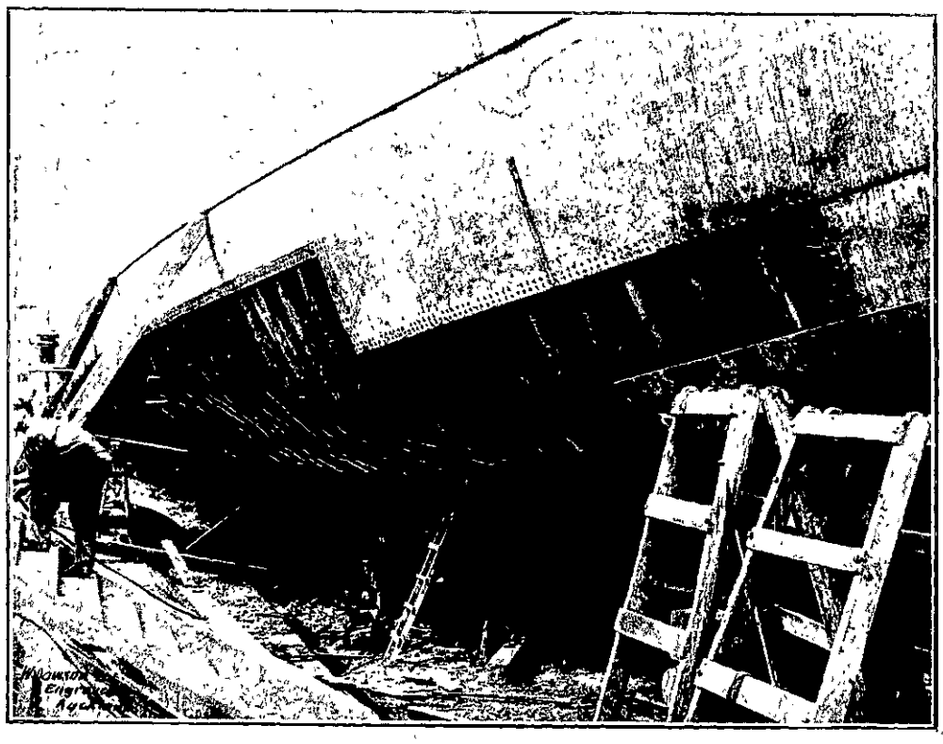
The s.s. "Kaipara" is a steel, twin screw, 4-masted steamer, and is a fine specimen of the high-class Intermediate Boats of the New Zealand Company's fleet, and as she lies in Calliope Dock she presents a striking picture of beautiful lines and proportions.

Her dimensions are: Length over all, 460ft.; moulded, depth, 34ft.; beam, 58ft.; net tonnage, 4741 tons; and gross tonnage, 7392 tons.

The damage extends from under her fore-foot for a length of 150 feet along her starboard side, and has necessitated the cutting out, renewing and replacing of the whole of that portion of the vessel from her keel plate to the waterline.



THIS PHOTO WAS TAKEN IMMEDIATELY AFTER ENTERING DOCK, AND SHOWS EXTERNAL DAMAGE.



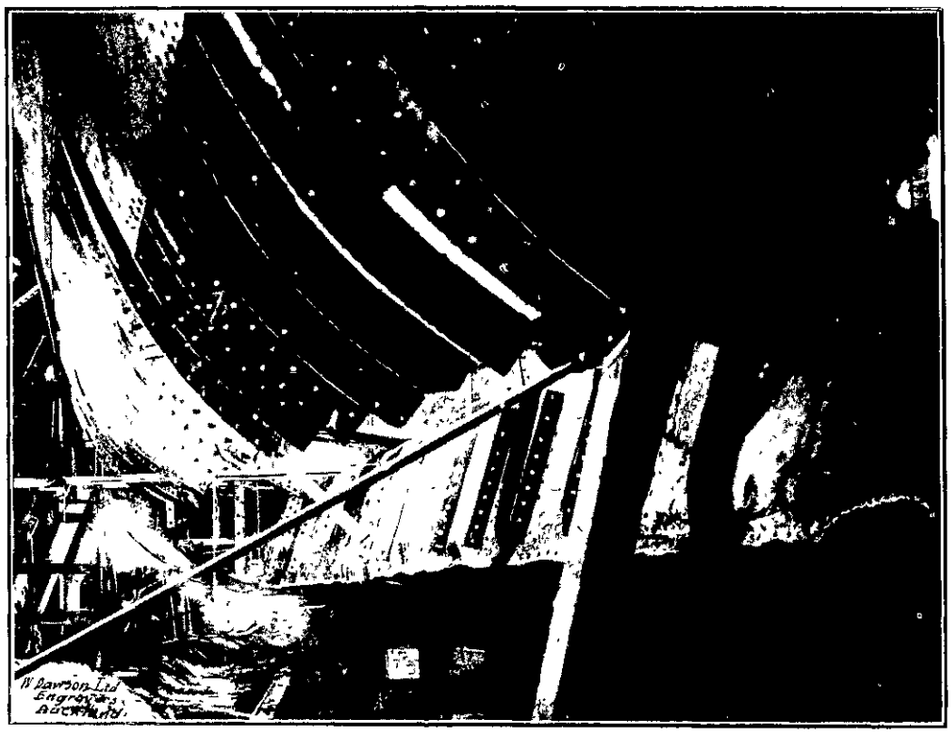
THE DAMAGED PLATES ARE HERE REMOVED. The Photo shows the bent and twisted frames.

No fewer than fifty-six of her large frames and reverse bars have had to be cut out and renewed. The plates which cover these are of the largest size, ranging from twenty feet by six feet to twenty-seven feet by six feet, and from 5/8in. to 3/4in. in thickness. Twenty-one of these plates had to be cut, out of which seven are straightened and returned, and fourteen are new. The new plates have been collected from all ports of Australasia, Sydney supplying the largest number.

The internal damage is considerable and has necessitated the removal and straightening of some of the ballast tank sides and also the cutting out of a large number of floors, bilgeplates and intercostalplates; of these a considerable number have been straightened and replaced, while of the first, twelve have had to be renewed and also sixteen of the bilge plates.

The keel plate, which was badly damaged was successfully straightened into place by means of one hundred ton Hydraulic jacks.

The propeller shaft had to be withdrawn



Taken by "Lux" light. Shows the broken and twisted water tank.

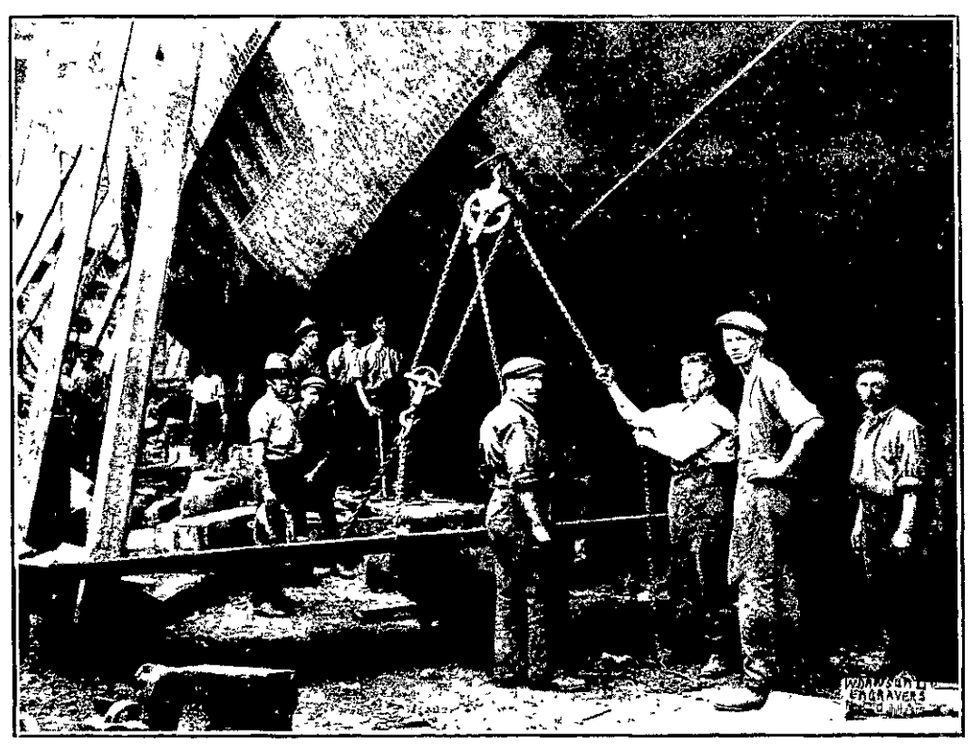
and the propeller, which weighs ten tons, lowered to the foot of the dock where it was fitted with a new blade and replaced in position.

There being no plate rolling machine in the Dominion having rolls sufficiently long to roll the plates an ingenious method of shaping them by means of hydraulic jacks and cast-iron blocks has been resorted to, this ingenious but primitive method of overcoming a difficulty indicating the resourcefulness of the contractors, and in practice proving entirely successful.

No time is being wasted on the work, 150 men in three shifts being continuously employed, and picked men have been brought to Auckland from all over New Zealand to assist in the undertaking.

The Pneumatic Drill at Work.

A great feature in carrying out the work is the fine air compression plant employed. This was lately imported from England by Mr. J. H. Adams, and is capable of running nine air drills simultaneously, thus enabling the contractors to make light of the otherwise formidable task of drilling out some 8500 rivets which have to be replaced, and which alone weigh approximately four tons.



Lifting the New Plates into Position for Rivetting.

The compressing plant is also used for caulking the plates and for internal rivetting, such as floor and wash plates, intercostals, etc., but all shell and tank work is rivetted by hand, as being preferable in connection with work which has to be watertight.

The insulating of the holds is being undertaken by Messrs. Philcox and Sons, Auckland, who have practically finished Nos. 1 and 2 holds 'tween decks. No. 2 lower hold is about half finished, and No. 1 has not been started yet. The first operation was to remove the silica cotton, which was the insulating material destroyed, from the holds and clean them out, and this took a fortnight. The holds were fumigated and all the ironwork which had rusted with the salt water had to be scraped and painted. The floors also have to be renewed. The insulating material being used is charcoal, as silica cotton is not obtainable. The ceiling and walls of the holds 'tween decks are being lined with 7½ inches of charcoal, the ceiling of the lower holds with 12 inches, and the walls with 9 inches. Something like 5000 bags of charcoal will be used. Linings of zinc and insulating paper are also being introduced as a necessary part of the insulation The cost of putting the holds in order is understood to be very considerable.

In conclusion, we may state that the contractors speak highly of the invariable courtesy and assistance rendered them by the surveyors and the ship's officers, amongst whom Mr. Tyrell, an experienced shipbuilder, is specially mentioned as giving valuable assistance.

The work is handled by Mr. J. H. Adams, of Auckland, and Mr. W. Campbell, of Wellington, and in view of the magnitude and important nature of the work and the short time allowed for its performance, the contractors are to be complimented upon their enterprise.

The undertaking of the repair of the "Kaipara" is evidence that we have in New Zealand men and plant adapted to handle work of almost any magnitude, and we look forward to being able, in the near future, to announce the successful termination of the contract.

This important piece of work draws attention to the future possibilities of the Auckland harbour, of which the dock is the largest and the most ambitious structure. There are miles of reclamation going on and in prospect, which will be the site of a vast collection of warehouses, to accommodate the trade of the growing district which centres in the Waitemata. The trade of the Auckland district, Hokianga, and of the Pacific Islands will want all the accommodation provided, and it is well to know that the repairing facilities are already such as will amply fill the needs of this great development. Wellington harbour will be developing in similar fashion, and as quickly. Advance New Zealand!

Otago Harbour from the Hills above the City.

Motor Boating in Otago Harbour.

Great progress has been made in Otago Harbour, and in fact all around the Otago coast from Oamaru to the Bluff, in the marine motor boat industry.

It is quite a novelty to see a yacht being built in any of the boat building yards.

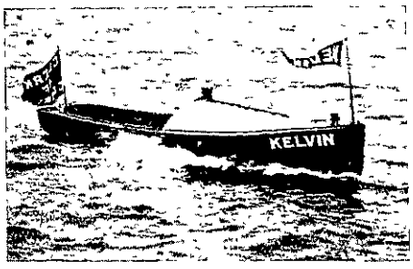
The yacht seems as though its day had passed, although yachting is an extremely pleasant and exciting pastime

But the motor boat seems to have more than filled the place of the yacht, many of the yachts having been dismasted and had engines fitted

Among the most conspicuous converts are the "Leader" (a once champion), which is fitted with a 6 h.p. heavy duty Buffalo engine, the "White Wings," the "Winifred," "Dream," "Waterwitch," "Waiteri," and many other good old sailing craft. Their sailing days are o'er.

When I've done with blocks and tackles,
And I'm tired of running gear;
When I've burst the binding shackles,
That so long have kept me here
Then I'll travel up the harbour.
At a pace, and without toil,
And feel my craft just quiver,
When propelled along by oil.

During the last few years there have been many engines and launches built locally, but the greater number of engines are imported from Great Britain and America.



Mr W. J P McCulloch's "Kelvin."
25 feet, 14 h.p., 14 knots.

A few engineering firms have started to manufacture oil engines, and some have given fairly good results .

A large number of the motor boats are being used for fishing and commercial purposes, but the greater number in Otago harbour are used for pleasure.

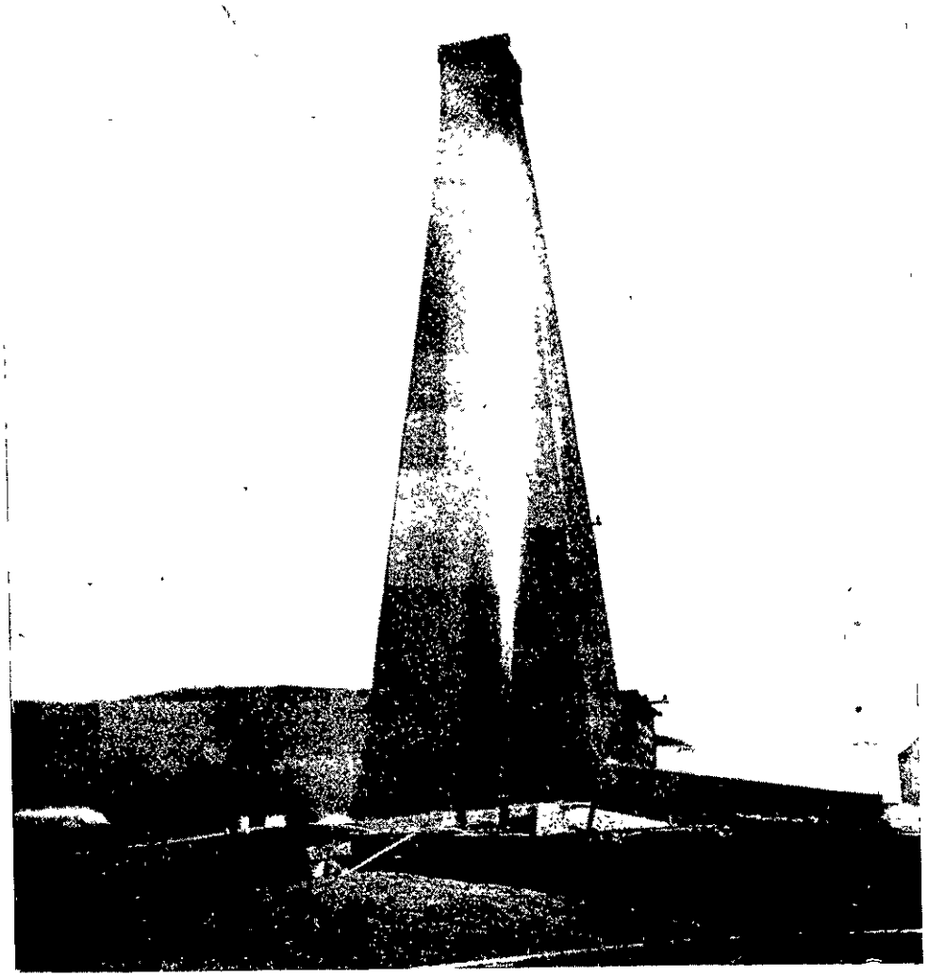
Launch racing, too, has become very popular, one of the most interesting races of the year was the Hislop Cup Race, which was run from Dunedin to the Otago Heads and back.

Approximately eighteen boats entered, the limit boat having 100 minutes start, and the nearest boat to scratch had 40 odd minutes.

The scratch boat, "Kelvin," was built by the enterprising firm of Miller Bros., Port Chalmers, to the order of Mr. W. J. P. McCulloch, the well-known motor enthusiast.

The handicapping of this race was extremely good, the scratch boat "Kelvin," had a long chase, and only passed the leading launches within a few minutes of the winning post.

The last race of the season was the McCulloch Cup, run on Good Friday, from Dunedin Wharf to Oamaru breakwater, a distance of about sixty miles.



Taranaki Oil. Tap usually discharging downward to tank is turned up showing normal pressure.

Taranaki Oil Field. Breakwater and Sugar Loaves in the distance.

Our Industries.

Petroleum.

Boring for Oil at Moturoa.

(By Our Travelling Representative.)

It was by the courtesy of Mr. Walter Bewley, of New Plymouth, that I was conveyed on that gentleman's motor to the scene of operations, and had the unique opportunity of seeing the oily geysers which have been spouting of late so frequently from the bores. These are still being sunk to tap the principal oil stratum which it is confidently supposed will be met with at a great depth.

The morning was propitious and a few moments were enough to cover the distance to the spot, where I was at once introduced to Mr. L. Keith, the manager in charge, who placed every information at my disposal and showed me over the whole place. There are three bores, all of which we visited, and these I shall now refer to separately.

No. 1, which had been idle for several months, was resumed in the middle of February, 1910. Sinking to a total depth of 2340 had actually been completed, but in the interval between closing and resumption of work silting up had occurred to 2166 feet. At the date of my visit some 20 feet of this had been cleaned off, but it must be some little time before the old depth is reached for the new start. At this bore the flow is now about equal to two barrels (80 gallons) a week. No one who has open eyes can fail to be impressed with the unmistakeable greasiness everywhere apparent. The derricks (56 feet high) are saturated with oily deposits, the ground reeks with petroleum, and the very air is strongly impregnated.

No. 2 bore, which has been continuously worked since November, 1908, has reached a depth of 2740 feet, is still being sunk, and has passed through oil strata after reaching the 2200 feet level. A strong pressure of gas was tapped at 2620 feet, which caused a big blow out of oil water and debris.

During 50 hours the display was practically continuous and some eighty 40-gallon barrels of crude oil were secured. This large flow was shut off by the lowering of the casing, as the manager advises further sinking to reach one of the main sources believed to be in the sandstone country below. This bore has been continuously flowing since the end of January last at the rate of about five gallons a day. The present flow in its crude state is utilised by means of an oil burner as fuel for the 30 h.p. steam boiler which serves the 2-10 horizontal h.p. engines operating Nos. 1 and 2 bores. A saving of fully a ton of coal a day is thus effected.

At No. 2 bore are three storage tanks for the oily product. They are constructed underground and are capable of containing respectively as follows:—No. 1—31,000 gallons now empty. No. 2—21,000 gallons; now containing 18,294 gallons. No. 3—27,000 gallons, now containing 8,000 gallons. There are also 110 barrels, containing 4,400 gallons, on hand, making a total of considerably over 30,000 gallons on hand at the time of my visit.

No. 3 is known as "Samuel's old bore," and was originally put down over ten years ago. Work was commenced here by the company soon after its incorporation in 1906. A six inch casing has been lowered to a depth of 2540 feet, where the bore was shut off dry. Within is a five inch pipe which has been driven to a total depth of 2708 feet. Between 2568 and 2580 there were very strong eruptions of gas and oil, debris being often ejected 30 to 40 feet above the top of the derrick. Since that date gas accompanied by oil is steadily increasing as sinking progresses.

It was here that I saw a strong outburst, the floor and the interior walls of the derrick being thoroughly drenched with the oil, water, and debris forced out of the bore by the violent pressure. On that occasion fully 80 gallons of crude oil was baled out of the sump. An earth tank at this spot with a capacity of 18,000 gallons has been considerably more than half filled, and this brings up the total quantity on hand at the works to upwards of 40,000 gallons. No. 3 is operated by a 15 h.p. boiler and a 10 h.p. steam engine.

Large quantities of gas are escaping from Nos. 2 and 3 bores, and it is estimated that a pressure of fully 600lbs. to the square inch is often reached. The latest strike of oil in No. 3 is richer in quality than any yet found, and strong hopes are entertained that a large and highly payable flow will shortly be reached.

With such a result, when it comes, as the outcome of the plucky and persistent efforts of the shareholders, it is hardly possible to overestimate the value of the industry to Taranaki and the Dominion. The oil bearing country has already been traced over an area of 21 square miles, and may extend indefinitely. Although but 10 or 12 men are at present employed, the ultimate amount of labour when refineries, candle works, and other subsidiary industries are in full swing, cannot more be estimated than the value of the underground wealth which only awaits man's ingenuity and industry to bring to profitable use.

The company's No. 3 bore is on freehold land, but the rest of the land held is either Government or private leasehold.

Crude oil to the value of about £220, representing 12,000 gallons, were sold by the company up to Sept. 12th of last year, at four pence a gallon.

The directors of the company, as I write, are Messrs. C. Carter (chairman), D. Berry (deputy-chaiman), C. E. Bellringer, J. J. Elwin, J. Little, H. Okey, and J. B. Roy (all of Taranaki, and J. J. Craig and S. N. Kingswell, of Auckland. And the secretary is Mr. F. U. Dobell.

The balance-sheet at September last showed the contributing capital of the company to have been £31,672, of which £5822 remained uncalled or uncollected, £15,154 had been actually expended on boring operations, and over £4000 on tools, casing, and general plant, and there was at the company's bankers £2000 available cash.

Some products of the oil wells have been tested within the Dominion, and a parcel was sent to Glasgow. One of the results of these tests, which were very satisfactory, is given below.

COPY OF ANALYSES MADE BY THE DOMINION ANALYST OF OIL FROM THE WELLS OF THE TARANAKI PETROLEUM COY., LTD.

Wellington, Dec. 3rd, 1909.

Report on Specimen No. 236 2 & 3.
Forwarded by H. Okey, Esq., M.P., per Honourable Minister of Mines.
Particulars—From the Taranaki Petroleum Company's Property, in Taranaki.
Sample Marked No. 2 from No. 2 Bore.
Sample marked No. 3 from No. 3 Bore.

CRUDE PETROLEUM.

When distilled, the samples gave the following results:—

	No. 2	Spec. Grav.	No. 3	Spec. Grav.
Oil distilling below 150°C. (benzine, etc.) ...	17.2	.7768	12.4	.7782
Oil distilling between 105° and 300°C. (burning oil)	46.6	.8354	43.6	.8482
Residue left in still (heavy lubricating oil, paraffin, etc.)	36.2	—	44.0	—

No. 3 was solid at original temperatures.

(Signed) J. S. MACLAURIN,
Dominion Analyst.

While the above was being written, the cable brought news of a mysterious enquiry from London about these works. In commercial circles it is thought to be from the Admiralty, which, since the big Welsh strike, has made up its mind to substitute oil fuel for coal as the motive power of the Royal Navy. Of course, there are other possibilities. At the present juncture the utmost circumspection is required from all connected with the industry.

To let the wells fall into the hands of the Standard Oil Trust would be unthinkable. To hand them over to the Germans would be even worse, for in the critical moment of a war with a Power favoured by them, they might refuse to permit the oil to be supplied to the British ships. That would be as bad as being at the mercy of an unreasonable union bent on striking. All this is gratifying to the Taranaki Company. But it enjoins much care on their part.

Mastery of the Air.

High Flying.

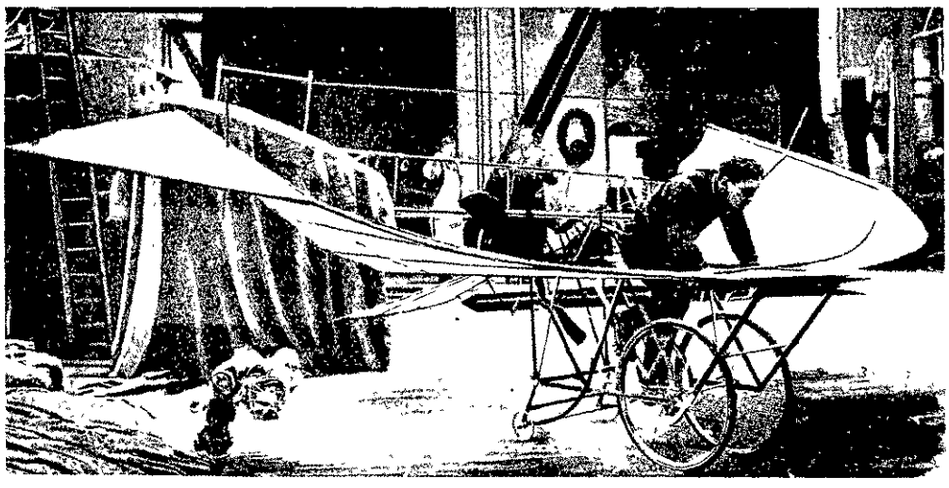
The question of height has lately assumed very different proportion from those attained at the beginning of last year. When Wilbur Wright reached at Berlin the height of 564 feet he was acclaimed as having performed a desperate feat. He replied the month following (October) by rising to the height of 1100 feet. Paulhan in November fell short of that performance, getting no higher than 997 feet. In the month of November Latham got as high as 1330 feet, and in December Paulhan reached the height of 1950 feet. But this was thrown into the shade by his attainment of the height of 4156 feet at the Los Angeles meeting. Presently there can be little doubt that the dirigible record (Capazza's 4929) will be beaten. Thus it is plain that the swifter aeroplane will always in war, if both types ever become used for war purposes, get the better of the dirigible.

The effect of the rarer atmosphere on the propellers and engines and the difficulty of descending with a spent engine, are questions receiving attention from aviators as of enormous importance.

As to the power of the engine, it is supposed that it must diminish necessarily in proportion to the density of the atmosphere. So long ago as 1898 the French scientific weekly periodical *La Nature* published an article on the loss of power of ordinary paraffin motors employed on mountains. It estimated the loss at 10 per cent. at an altitude of 2,625 feet, 20 per cent. at 5741 feet, 30 per cent. at 9184 feet, 40 per cent. at 13,120 feet, and 50 per cent. at 18,040 feet. Those are the figures on which, for instance, the Gnome Company bases its calculations for ordinary stationary paraffin motors destined to be used on mountains. It has one working on the Himalayas at an altitude of 13,120 feet, but it does not lose more than between 30 per cent. and 35 per cent. of its power on sea level. It is, however, very evident the motor on an aeroplane must lose a small fraction of its power with every foot it ascends. Therefore the aviator who may seek to attain, as Paulhan did on his Farman biplane furnished with a 50-h.p. Gnome rotary motor, the altitude of nearly 5,000 feet must have on his machine an engine giving a much greater power than is required to raise the aeroplane off the ground. There are also the questions of the diminished thrust of the propeller in a thinner element, the decreased capacity of the bearing surfaces to support the flying apparatus in a rarefied atmosphere, and the diminished resistance to the progress of the machine through the less dense air, which may, however, offer some compensation for the loss of power of the motor and the diminished thrust of the propeller. These problems, like so many others connected with aviation, are not yet solved.

On the other question of the descent with a broken engine, a distinguished authority has placed his views on record. "Most people," he says, "especially those who do not follow very closely all the ex-

ploits of the men engaged in the conquest of the air, imagine that if, for instance, Paulhan's motor had stopped suddenly when he was flying at an altitude of 4000 feet the aeroplane would have fallen to the earth with such tremendous force that the bold pilot would infallibly have been killed on the spot. Though, of course, the situation would have been full of peril, nevertheless it is by no means certain that the result of such an accident would have been so tragic. Numerous aviators have purposely stopped their motors when flying at a considerable height, and have reached the ground safely by utilising the force of the fall to keep up the necessary speed to continue the forward movement of the aeroplane. Paulhan has himself practised that means of descent, called in French *vol plane*. When flying at Brooklands last autumn he stopped his motor at an altitude estimated at over 900 feet He first allowed his machine to sweep downwards, and then, checking the descent by a skilful play of the horizontal rudder, used the force of the fall to propel the machine in a horizontal direction. Repeating that manoeuvre more than once, he brought the machine to the ground as gently as if the motor had been working all the time. The descent would of course, be much longer from the height of 5,000 feet, but if it can be effected safely from the altitude of 900 feet, I see no reason why it should be impossible to accomplish it from five, six, or even ten times that height, as the result of the unchecked fall of an aeroplane weighing half a ton must be identical if it came from 900 or 9000 feet."



The Pedal-Power Aeroplane

NOTES.

(From Our London Correspondent.)

A new departure by an English firm is chronicled. It is the construction of a machine (aeroplane) designed to fly with no other power than the pedalling of the aeronaut. Spencer and Son, of Highbury, are the builders. The total area is 100 square feet, and the weight about fifty pounds. The wings measure from tip to tip 20 feet, and the propeller can be worked up to 600 revolutions by pedalling as on an ordinary cycle, and when in the air a descent can be easily made at the will of the aeronaut. The ends of the wings are movable and are controlled from a handbar by wires which, it is claimed, will easily control the machine in flight. The tail is moved in the same way. In shape the new machine is like a bird, and a running start is said to be necessary on the summit of rising ground. We have been struck by the descriptions of the machine, which on paper promises well. But we have not yet come across any allusion to actual flight.

* * *

Prince Borghese, who, it will be remembered, made a motor trip across Asia and Europe a few years ago, is the latest recruit to the ranks of would-be pilots of aeroplanes, he having just ordered a machine in France.

* * *

The Aeroplane Supply Company are responsible for what is quite the best and most comprehensive aeroplane catalogue yet printed. This company is prepared to supply anything from a Zeppelin to a Bleriot, and they quote also for all sorts of ready-made fittings for people making their own machines. This catalogue should be in the possession of every one interested in flying.

* * *

The trend of design for aeroplanes just now is on Bleriot cum Antoinette lines, which, I think is a pity, as indicating a lack of originality, as well as a craze for a fast acrobatic machine. The Farman or Curtiss biplanes are perhaps not so artistic but have advantages which cannot be denied. Supporting area for horse-power they are more efficient. It amounts to this, that a Bleriot, for instance, requires large horse power and raked planes, and as their plane area is so small, are capable of keeping up only so long as they are making their best speed. A Farman, on the other hand, has big planes, and rises easier. It may not be so fast, but assuredly would be the better for descent from a height in case of stoppage of the engine. I have seen a Bleriot come down, on account of engine stoppage, and it was a terrifying sight. It can be gauged better by reversing the process and considering the aeroplane as a glider. The better a machine is at gliding, the better and safer it will be when an engine is installed and soaring flights are made.

* * *

Mr. Moore-Brabazon has made another flight in his British built Wright type aeroplane. Starting from the Aero Club's ground at Shell beach, he reached Eastchurch, a distance of six and a half miles.

Mechanics are busy at work at Lewisham on the aeroplane of Mr. Barnes, of cycle fame. I have met Mr. Barnes. He is quite a young fellow, and silent as you make them—a thing astonishing at his age, and a sign that he will, bar accidents—go far. He showed me his machine fitted with a 40-50 h.p. four-cylinder Green engine. The warping of the wings, a lateral stabilising method, is new, and the subject of his patents. Briefly, it is effected by moving a flexing cord, which in operation raises the back tip of one wing, whilst it depresses the other. A very usual form of horizontal rudder is fitted at the tail end.

* * *

It is reported that a Midland gentleman has accomplished a most successful flight under cover of darkness. The distance, according to rumour, was seventy miles, and the speed very high.

The Framework of Aeroplanes.

("Engineering.")

Aeroplanes fall, generally, into two classes—the biplane and monoplane, the former having two main planes superposed, and the latter a single main plane. It will be convenient to deal with the former first, as the construction is the more uniform.

Figs 1, 2 and 3 show an elevation plan and end view respectively of the frame of a biplane of ordinary construction divested of its chassis, engine, driving seats, rudders, etc It will be seen that the framing of each of the main planes consists of two main cross members A A, connected by short longitudinals B; the plane itself, whose position is shown by the dotted lines, consists of numerous longitudinal battens (not shown) on which the fabric is stretched. These main planes are connected by vertical wood struts, C, and steel wire diagonal ties, W, in such a manner as to form a trussed girder. The struts are generally placed nearer to each other at the centre of the plane, where the weight of the engine, etc., has to be carried, than they are towards the sides; but their exact arrangement depends on the disposition of various other parts and on the ideas of the designer.

The backbone forming the tail is constructed in a very similar manner to the framing of the main planes, and consists of two top and two bottom members E, E, tied together with struts C and wires W in a similar manner to the main planes. In the majority of cases biplanes have the propeller placed on the centre line, and behind the main planes, and therefore the two parts of the backbone must be kept far enough apart to clear it, as shown.

The wood usually used is either ash or pine, or in some cases both. Ash is considered the more reliable, as it bends considerably before breaking, but pine is the lighter. In some cases ash is used for the principal members, such as A, A, E, E, and for the struts C, near the engine, where the greatest strain comes, while pine is used for those struts which have less strain. It will be observed that in this construction there are some 25 to 30 vertical struts, and these have to be forced through the air at 45 miles an hour. They are therefore made of a section somewhat as shown in Fig. 4, to diminish the air resistance, and in order to make them as light as possible they are made largest in the middle and tapered away at the top and bottom.

The actual main planes, as also those of the tail, are constructed of battens fixed to the main members A, A, about 1ft. to 1ft. 6in. apart, carrying the fabric. These are fixed in various ways, of which two common ones are shown in Figs. 5 and 6. In the former's case the battens are simply pieces of wood curved to the shape the planes are required to take, and fixed to the under side of the main members. In the latter the battens themselves are built up of thin pieces of pine with distance-pieces at intervals to keep them in shape, and to form the two into a girder, a transverse section near a distance-piece being shown in Fig. 7. In Fig. 5 the main members A A are not enclosed in the fabric, and, therefore, the air-resistance should theoretically be greater than in Fig. 6, especially if the battens of the latter type are prolonged in front of the cross-piece and brought to a sharp edge, as

is usual in monoplanes. In practice, however, excellent results are obtained with machines having wings as Fig. 5; these are certainly cheaper to build, and possibly in practice lighter, as there is only one thickness of fabric. In many cases the longitudinal struts are curved to form part of the wing surface, while in others no special struts are provided, the battens themselves serving to keep the main pieces A A apart.

The exact sizes of the various parts of a frame will obviously vary considerably with the size of the machine, weights carried, and other details. It would theoretically be possible to calculate the stresses on the various members and proportion them accordingly, but owing to the very great depth of the girder in proportion to the weight carried, this would probably, in most cases, give sizes impracticably small, as it is necessary that there should be a certain amount of local strength. An idea of the lightness of the whole structure can, however, be obtained from the fact that in an aeroplane of 30ft. spread across the wings the main members A A will be 1½ in. square or slightly less, while the main longitudinals E E will probably be slightly smaller. The vertical struts C will be 2in. by 1in. to 1½ in., being thickest at the middle of their length If the wings are built as in Fig. 5, the battens are about ⅜in. by ¾in., with stiffer longitudinals at the uprights; while if built as in Fig 6, the materials may be under ¼in.

The wire tie-rods are usually about 1-10in. in diameter, though some of the less important ones are somewhat thinner, and some constructors prefer to use a very large number of very thin wires Tightening screws are usual, but not by any means invariable, this being apparently a matter on which there is a difference of opinion among designers. The wires appear to be one of the parts of the machine which requires a good deal of attention, and a coil of wire and a pair of pliers were very much in evidence in the aeroplane sheds at Blackpool. The breakages seem to be due to vibration, as the calculated stresses must be, in most cases, very small. It is no doubt for this reason that the best results appear to be got with a soft grade of steel, the harder grades being more liable to break in spite of their higher tensile strength. "Piano wire," while often spoken of in connection with aeroplanes, is therefore not so much used, being very hard. In view of their liability to break, it would at first sight appear dangerous to trust to wires, but in practice it is probable that with such an extensive system or trussing the breakage of one or two wires in no way endangers the whole structure. The wires are kept carefully oiled to prevent rust.

The framing for carrying the elevating plane in front is variously arranged in different makes, that shown in Fig. 1 being the arrangement adopted by Farman. In the Voisin machine, however, the longitudinal bearers which carry the engine and driving seat are built up as a trussed girder and are prolonged to carry the elevating plane, as in Fig. 8; and this girder is cased in so as to form a protection to the steersman. In the Wright machine the skids on which it rests on the ground are prolonged for the same purpose, and a system of wood trusses with no wires is used (Fig. 9).

If the wings are arranged so that they are warped to maintain the balance, the diagonal wires towards the outer ends of the after pair of main members A are omitted, and replaced by wires leading to the control-lever. In many biplanes, however, the main wings are not warped, balance being maintained by supplementary wings.

The principal variations in the construction of the tail are those due to the nature of the surfaces to be supported and the position of the propeller. Where the latter is placed in the centre line and behind the main planes, the backbone must of necessity be so arranged as to leave room for it. In some cases, however, there are two propellers driven by chains, one on each side of the centre line—*e.g.*, the Wright and Cody machines—and in this case the backbone can be much more compact. In the case of the Wright machine, also, there is no supporting surface in the tail, and the rudders are comparatively near to the main planes; hence the backbone is shorter and of more simple construction.

In the case of the latest Voisin aeroplane the engine is placed in front of the steersman, and the propeller is direct-coupled, working in front of the main planes, as in a monoplane, while the front elevating plane is dispensed with, and a hand-control to the tail plane substituted. The backbone is then made a compact trussed girder, very much like that of a monoplane, and is carried right through from the tail to the front of the main planes, the engine, steersman's seat, etc., all being placed on it. In fact, the construction is much like that of a monoplane, with the exception that there are two main planes.

The framing of the monoplane is in many ways much simpler than that of the biplane, as the wings need not be built into the machine in the same way as in the biplane, but are usually constructed as more or less separate units, which, are attached to the backbone. It is possibly in consequence of this that the frames of monoplanes present a very much greater divergence in their construction than those of biplanes.

The construction of the monoplane is simplified by the fact that it is invariably controlled entirely by a tail, and has no elevating rudder in front, while the engine is mounted, as a rule, on the backbone itself, and has a direct-coupled propeller working in front of the main plane. Hence the backbone can be of compact dimensions, as there is no need of special provision for the propeller to clear it. The construction which is most similar to the biplane is that in which the backbone is a similarly-trussed girder, an example of which is shown in Figs 10, 11, and 12, this being the general arrangement used by Bleriot and others. In this case four main longitudinals E E are joined together by suitable wooden struts C and wire-ties W,

Fig 19

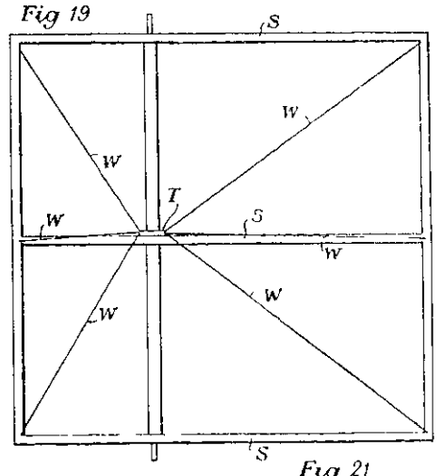


Fig 21

Fig 20

AEROPLANE PLANS AND ELEVATIONS.

the outside dimensions being usually large enough for the steersman to sit inside, or from 18in. to 2ft. square at the front, tapering towards the tail. The main longitudinals are prolonged beyond the wings to form an attachment for the engine, and at the after-end there are suitable attachments for the tail. The wings can in this case be built as entirely separate portions fitting into two sockets in the main members. In order to sustain the upward pressure when in flight, a strut G is provided below the backbone, and from this ties H are stretched to the wings. A similar strut and ties are provided above the backbone to take the weight when the machine is at rest. In addition to these, there are ties J leading from the strut G to the after part of the wings for the purpose of altering their angle, these being under the control of the steersman. There are usually two main ties to each wing, as shown, and two to the after edge. These ties are often made of flat steel ribbon to diminish the air resistance. The lower strut sometimes forms part of the framing which carries the wheels.

Although in the monoplane the depth of the girder forming the backbone is very much less than in the biplane, the main longitudinals are not, in practice, made heavier as a rule, but rather the reverse. The vertical struts are, on the whole, distinctly lighter, and, as they are shorter, this is doubtless justifiable. This being so, it is evident that the deep girder of the biplane will not be any lighter than the shallow one of the monoplane, the reason being that full advantage cannot be taken of the depth in reducing the scantlings of the parts on account of the necessity for local strength.

There are several modifications of the type of backbone shown in Figs. 10 and 11. In some cases the section is made triangular, the two bottom longitudinals being replaced by a single one. In the "Antoinette" not only is the section triangular, but the vertical struts and diagonal wire ties are replaced by diagonal wood struts, the general arrangement of these being as Figs. 13 and 14. In some cases, instead of the backbone being built as an open girder, it is planked over with very thin wood, generally ⅛in. mahogany, and this can, if desired, be formed into a sharp nose in front, as in a boat, to cut the wind In the "Antoinette" part of the length is planked with wood, and part covered with canvas, the planking being used for the part just aft of the main wings, where the strains are probably greatest.

Several monoplanes have been built with framings varying considerably from the wood and steel girder. The R.E.P., for instance, has a frame composed entirely of steel tube. The "Demoiselle," of Santos Dumont, originally had a single bamboo to form the backbone and support the tail, the seat, etc. being really supported direct from the wings. This has, however, now given place to an arrangement of three bamboos, about 2in. in daimeter, connected with struts of steel tube and wire ties, the general arrangement being as Figs. 15 and 16. The engine is fixed to the top longitudinal, while the seat consists of straps across the two bottom ones. The members L, L form part of the wings, and are built into the framing, and help to support the engine. The carrying-wheels are on a cross-piece fixed to the lower bamboos.

The construction of the main planes or wings of the monoplane varies somewhat from that of the biplane In the latter the wings simply consist of ribs laid on the main framing, which is itself an elaborately trussed girder. In the former, however, the wings are generally made as separate units and must therefore have considerable strength, as they are only attached to the main structure at a few points. While there are many variations in detail, the general structure consists of two main spars M and N (Fig. 11), which fit into sockets at O in the backbone. The forward of these sockets may be a tube going right across the backbone as shown, but the after one is usually of some more flexible type to allow of the warping of the wings, the greater part of the weight being apparently intended to be borne by the front spar. Each of these spars is supported by the ties H and J, but as these are not numerous, the spars must have considerable depth. To expose them would therefore entail considerable wind resistance, and the wings are therefore so arranged that there are suitably curved surfaces to enclose them, as shown in Fig. 17. The spar M is in this case not placed at the extreme front edge of the plane, as is often the case in biplanes, but is sufficiently far from it to allow of the two surfaces being brought to a more or less sharp edge, the exact sharpness varying very much with different makes.

The main spars are usually of wood, and various makers adopt very different sections to secure the greatest lightness for strength. Solid sections are sometimes used, as shown at N, and in other cases H sections, as shown at M. In some cases the spars are built-up lattice girders. Steel tube has also been employed, but it is not adapted for easy attachment.

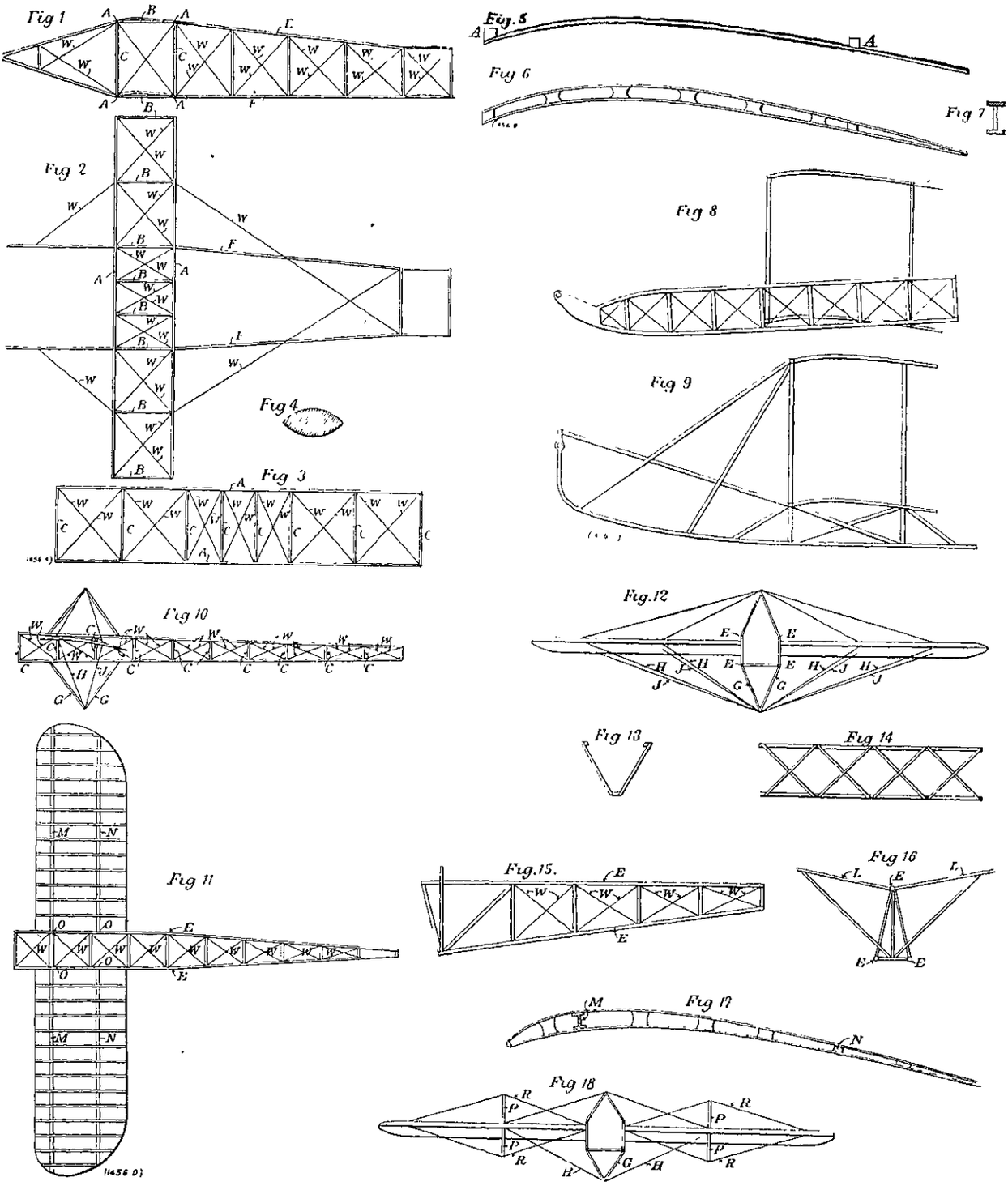
In some cases, where the wings are large, the system of having direct ties only to the wings is not considered enough, and they are in themselves trussed, as shown in Fig. 18. In this case struts P are provided about the mid length of the wing, and wires R lead from the root of the wings over the struts to a point near the tip. The main ties are then brought to the root of the strut P. The general construction is similar to the crosstrees of a sailing-boat, but it seems doubtful whether it would not be more satisfactory to arrange for taking the strains more directly, as the struts must entail some wind resistance.

The framing of the various subsidiary planes, rudders, etc., is in general on the same lines as the main framing. Figs. 19 and 20, subjoined show the framing of a rudder, from which it will be seen that it consists essentially of a frame S, having a cross-piece T for the attachment of the controlling wires, and that this is stayed to the frame of the rudder by various wires W.

Both surfaces of such a rudder are usually covered with fabric, and the number of battens to carry it varies with the size, as also does the number of wires.

Comparing the various constructions of monoplane backbones, the triangular section should probably be slightly lighter than the square, as it eliminates one longitudinal. The result will, however, probably depend on whether the arrangements of the machine are such that it is as easy to attach the parts to the triangle as to the square. The system of diagonal wood struts also appears to be lighter in practice than the vertical struts and wire ties with their attachments. There seem to be distinct advantages in carry the steersman some way from the ground, etc., are dispensed with, and it is probably mainly to this economy that its lightness is due. The wings are also very small and of very light construction, with the supporting wires very close together.

Altogether the construction of aeroplane frames shows great ingenuity in the problem of combining lightness with strength, but it appears likely that in the future there will be still further improvement in this direction. Wood is probably the most promising material if properly used, and it is now possible to procure it ready made into convenient sections for light structures. For instance, in addition to hollow round almost entirely a question of weight; and there has been a very great deal of experimental work done, as there is plenty of competition, and no lack of money. The problems in the two cases are also very similar in the fact that the stresses on the structures are almost entirely produced by fluid pressures, except those caused by the vibrations of the motor. There must, of course, be many differences in construction, but there may be a good deal of information to be got as to the best materials for particular jobs. For instance, bamboo, which appears at first sight a most suitable material for light spars, has been largely superseded in boats by artificial, hollow, wooden rods. Single wires for shrouds,



AEROPLANE FRAMES, PLANS, AND ELEVATIONS.

planking over the backbone with this wood. This planking weighs under ½lb. per square foot, and it is probable that its weight can quite easily be saved out of the strutting, equal strength being assumed. It also forms a very smooth exterior, with little air resistance. The bamboo framing is very interesting, as it is employed on the lightest flier yet made; but it may be very much doubted whether the lightness of the machine is due to its system of framing. In the Demoiselle the usual seat is replaced by a couple of straps, while many of the usual attachments, such as a spring-mounted chassis to sections, which have long been familiar in small boat racing, it is now possible to get oval sections. The hollow sections are made by splitting the spars down the middle, hollowing them out, and fixing them together again, partitions being left at intervals to stiffen the sides. The sections are milled, and often have bits left solid to stiffen the flanges as shown.

It would probably repay anyone designing aeroplane frames to study carefully the methods of construction used in small racing-boats, both in sailing boats and motors. In these the difference between winning and losing races is etc., have also been found to be far less reliable than stranded wire, as the latter shows signs of weakness before breaking, while the former do not. The wager boat might also afford some lessons.

The hull of a sculling-boat 30ft. long only weighs about 20lb., and carries a load of some 160lb., concentrated entirely in the middle of it, and is therefore probably lighter in proportion to the load carried than the backbone of any aeroplane. Its design is the result of exhaustive trial and error, and therefore well worthy of study.

Concrete Conduit.

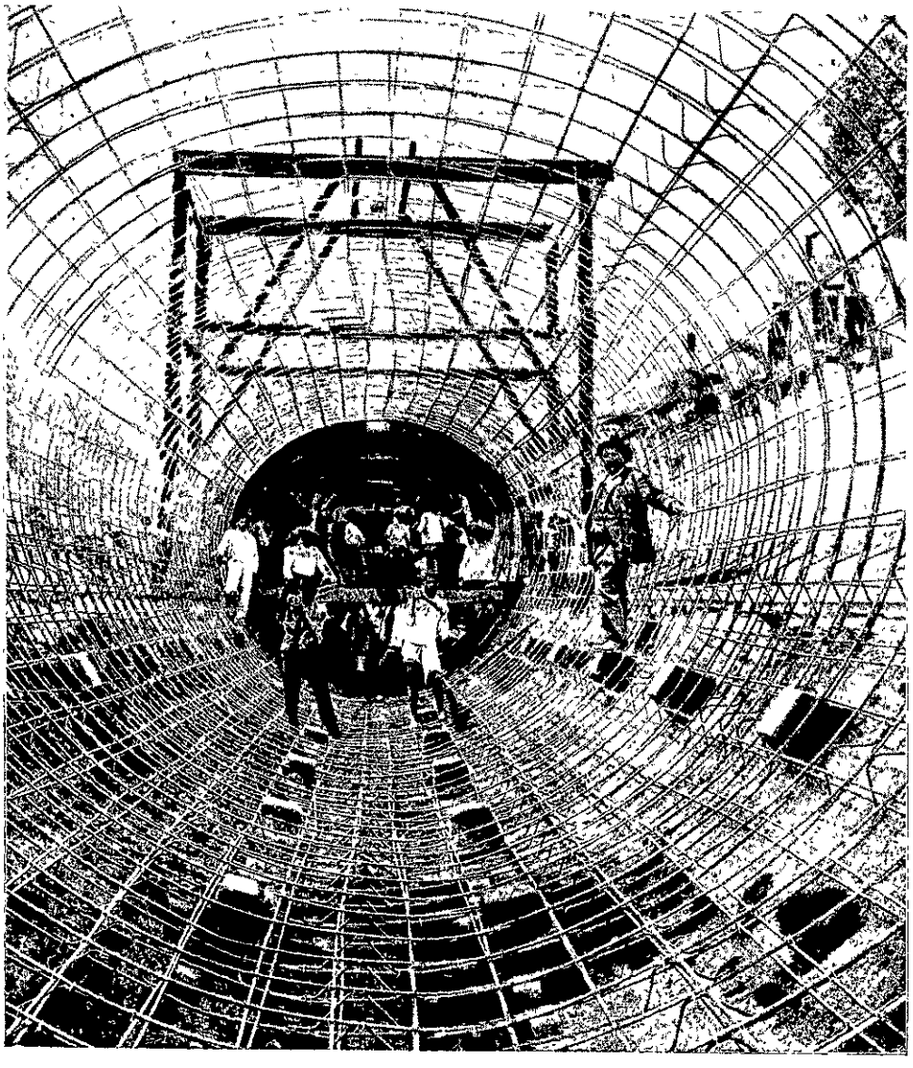
This Mexican concrete conduit is nearly a mile long, draining nearly 17,000 acres. It has a grade of four feet per thousand, and has a thickness of 10 inches of concrete, reinforced by double rings or round corrugated bars. These bars are placed one foot apart longitudinally, in two circles, the inner and outer bars alternately. The bars each measure half an inch in diameter.

The total concrete in the structure measures 13,000 cubic yards the steel used for reinforcing weighing 300,000 pounds. In the construction of this conduit 40 per cent of river sand was utilised and 60 per cent of sand made from crushed rock. Three parts of this sand was used with three of crushed rock and one of cement, the latter being of the Hidalgo brand made at Monterey, one of the very few factories producing Portland Cement in Mexico.

One of the illustrations shows a portion of the completed conduit and the moving of the high exterior forms by means of travelling gallows frames. This system of moulds and the apparatus for shifting them is simple and very efficient

There was a test made of the strength of the conduit about 25 feet in length when a week old, by passing a roller weighing 32 000 pounds over it, and also by allowing the roller to stand over the top of the conduit for 120 minutes. After this severe test it was found that no crack developed, the earth filling over the top of the conduit in the test being about three feet in depth.

THE CONDUIT PARTLY FINISHED



REINFORCED CONDUIT IN COURSE OF CONSTRUCTION.

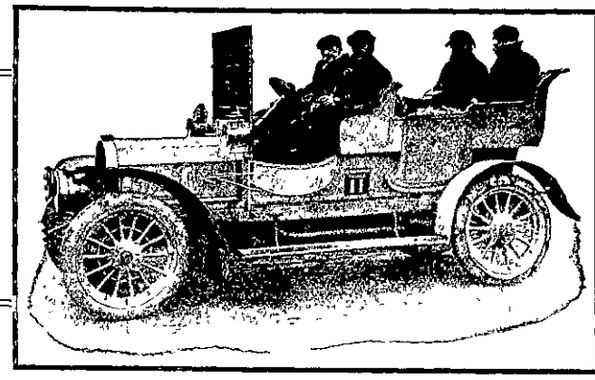
The Exhaust Steam Turbine.

A paper of great suggestiveness, and likely to be of the greatest use to engineers of the Dominion, pointing out not only the advantages, but also the limitations, of the exhaust-steam turbine, was read before the Manchester Association of Engineers in December last by Mr. J. N Bailey, who remarked that the value of the exhaust steam wasted in Great Britain, since the introduction of the non-condensing engine for providing individual power, was in all probability equal to the National Debt. Iron and steel works used to be special offenders in this way, and the waste of exhaust steam in many of these works was only paralleled by the recklessness with which unprotected pipes were used for the conveyance of live steam. Collieries have been equally extravagant. The extravagance in the matter of exhaust steam has, it must be admitttd, been largely involuntary. It is only of recent years that satisfactory condensing winding-engines have been built, and it is probable that their adoption would have gradually become general had it not been for the production of the exhaust-steam turbine. Where the latter is installed as an adjunct to an existing set of non-condensing engines it can abstract nearly as much useful work from the exhaust steam as the reciprocator does from its supply of live steam. An important field for the exhaust steam turbine is also to be found where, although the engines fitted are relatively efficient and modern, an increase of power is required. Mr. Bailey gave a useful table, showing, for instance, that in the case of a triple-expansion engine developing 1000 indicated horse-power for 13lb. of steam per indicated horse-power per hour, an alteration of the valves and the addition of a turbine will raise the output to 1721 horse-power, and, at the same time, reduce the consumption to 10.35 lb. per horse power. With a similar engine requiring 16 lb. per horse-power per hour the steam will be delivered to the turbine in a drier condition, and, consequently, Mr. Bailey states, the output will be increased to 1874 horse-power, and the consumption reduced to 11.2lb. per indicated horse-power per hour. On the other hand, he points out that if no increase of power is required there will be no net gain on merely interposing an exhaust turbine between a reasonably efficient condensing engine and the condenser.

* * * * *

The Trans-Andean Railway, it is now computed, offers an Atlantic-Pacific steam service the shortest route between London and Sydney.

Motors



Motoring

NOTES.

Owners of cars with expanding brakes should from time to time look at the drums to see to what extent they are worn, as it is by no means uncommon for such to be burst with a full application of the brakes. With expanding brakes the drums should of course be heavily ribbed Yet such reinforcement is often omitted, and the brake gear being enclosed misses the necessary scrutiny. Drums are essentially of light construction since they have to be able to cool rapidly, and one good season's work could easily thin them to a mere shell. The Paekakariki hill and a suddenly bursting brake drum is an undesirable combination.

* * *

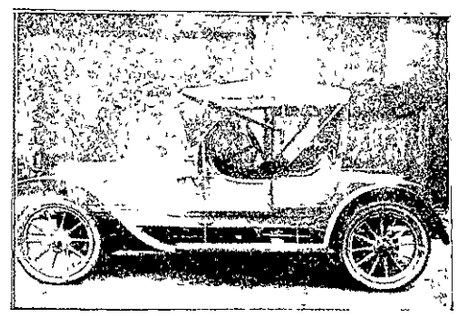
Selden rings have established their claim to the master patent for the car-engine; the Wrights are regarded as fairly certain to maintain their basic right for aeroplanes; the Palmer and Singer Manufacturing Company of New York, the makers of the P.S car, claim to own the master patent on multiple jet carburetters, as they have acquired the rights from Mr John MacMulkin.

* * *

The ear is powerful in motoring if only it is asked to attend to all the sounds that emanate from the machinery at work The machinery is very silent nowadays, but to the trained ear the noises it makes are very eloquent and most reliable. The engine still emits a wide range of sounds—one might almost say "whispers"—each of which has, to the trained ear, a distinct tone. The expert driver soon learns for instance, that the different speeds of the gear-box have each a different note, and he also quickly becomes familiar with the slight clicking of the valves, the puff of the exhaust, to mention only two or three out of a long list that he mentally and almost involuntarily makes during his close companionship with the car. The result is that, should a false note be sounded in what may be termed "the Automobile Concert," his trained ear instantly detects it. It may only be a "blow' in the inlet or exhaust-pipe, owing to a joint having worked loose, a plug that may have broken or short circuited; or it may even be a more pronounced noise, such as that made by a squeaky spring, the "floc" "floc" of a punctured tire, or the popping of the carburetter—it is sufficient to indicate that all is not well.

* * *

The eye, of course, plays a part of importance. In so doing it is apt to get put out of action in the easiest, the most painful, and the most troublesome manner. Dr. Foster, of London, has written a paper on the subject of the modern realm of accidents to the eye which is worth attention of all motorists who have suffered and are likely again to suffer from the various accidents of the road. Foreign substances, he says, such as particles of dust and minute particles of stone, striking the front of the eye at high velocity, are the causes of a great deal of trouble to motorists and chauffeurs, they being apt to set up what is known as "keratitis," or inflammation of the front of the eye, which is sometimes, when not properly treated, severe enough in the end to destroy the eye. Even the blowing away of the tears from the front of the eye by the wind and the consequent drying of the cornea may also produce keratitis. The constant or oft-repeated presence of dust at the edges of the upper and lower lids of the eye when there is a lack of the proper moisture as provided for by nature



The Delage Car

which competed in the recent Light Car Reliability Trial in France.

In this event a total distance of about 2000 miles was covered the vehicle illustrated above doing this without the loss of a single mark.

is apt to set up a chronic inflammation of the upper and lower lids and of the conjunctivae covering the eyeball. This is called chronic "conjunctivitis." More than this, the presence of harmful germs in the dust which gathers on the eyes may cause more serious trouble, such as pink eye, or trachoma, or even that dreaded disease—ophthalmia.

* * *

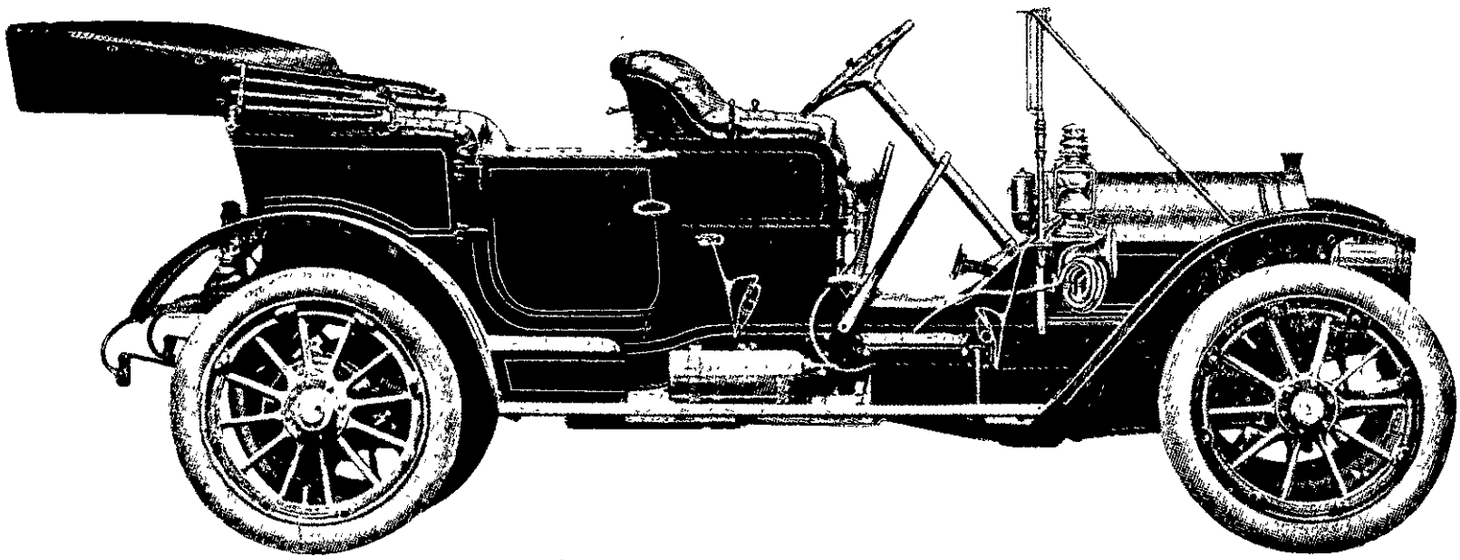
The use of cheap goggles not properly ventilated, and made of cheap glass, is, remarks Dr. Foster, to be avoided. Such goggles are very apt to produce inflammation of the eyes, and give rise to headache and nervous strain. It is much better to have the glasses of goggles fitted to the eyes by an oculist. If the motorist wears glasses ordinarily, care should be taken that the lenses in the goggles are the same as those in the glasses which he habitually uses. Frequent bathing of the eyes in ice cold water is strongly recommended, the bath being continued for five or ten minutes after every long trip. Another beneficial agent is a saturated solution of boric acid in distilled water; this solution should be dropped into the eyes, especially when there is any strain or pain after driving. The presence of foreign matter in the eye, such as particles or dust or stone, should receive immediate attention. If it is not possible to wash such particles out with boric acid solution they should be removed with a clean handkerchief, one corner of which has been dipped in the solution If the particle is too deeply embedded to be removed by ordinary means, the eye should be bound with a handkerchief and no time lost in consulting a physician.

* * *

Now, writes a well-known authority, that the car has become a commonplace means of travel, it may be interesting to notify the dates on which the keenest motorists took their last trip by train So far we believe that Mr. Leycester Barwell, of Ascot, who has never travelled on the railway since December, 1904, holds the record in this respect. During the five years that have elapsed he has, however, journeyed 85,448 miles by automobile. Such an experience is doubtless unique. It is eloquent testimony to the change that has come over our methods of travel; and also suggests the reason for the decline in the first-class passenger receipts of the railway companies. Those who could afford the luxury of the first-class carriage now favour the automobile—a fact which accounts for the restricted accommodation for such passengers on the main lines.

* * *

What is a corrupt practice and what is an illegal practice a good many people of the Dominion knew well enough last general election. The result of their enquiries was that they managed to get all the use they wanted out of all the motors offered to them without breaking the law. An echo of this sort of practice reaches us from the centre of the struggle which has just ended in Britain. It informs us that a circular was issued early in the election to many well-known people suggesting that they should purchase cars with an agreement that the seller would buy them back after the election, thus enabling the friends of the candidate to give help during the election. There was no note of warning as to what might be the fate of the car on a heavy day's polling. After the election pictures were shown of the car in three stages. Number one showed it spic and span and serene before the start of the polling, shining brilliantly before the eyes of its radiant owner. The second picture represented the car carrying voters on every coign of vantage, even to the mud guards, and a fine old-fashioned noise they were making.



THE NEW SERIES 15-30 STEARNS' CAR.

Picture number three showed a weeping owner standing before a car, dilapidated, burst, and torn out of all shape or possibility of recognition, cushions waving in the breeze, tires bellying like intoxicated sails, paint in blotches, springs groggy as the loads that broke them down the day before; a wreck and a disaster beyond description. Such was the consequence of following over ingenious political advice.

But there were people who were warned in time and escaped, to break the law in some way less disreputable and more safe. We read that the obvious subterfuge recommended by circular was soon exposed: nailed by Mr. R. T. Lang, the well-known motor advertising agent, who was also a Parliamentary candidate. He secured the opinion of the Attorney-General on the point, this being to the effect that such procedure was "an invitation to an illegal practice," and one that could not be justified either in the moral or legal sense. But after that some one pointed out that so long as an agreement was made to hire the car for twelve months without any reference to the election at all, and no money was paid on account of the election, there would be no illegal practice. No doubt a large number of persons discovered that they need pay nothing outside their agreements, which, without mentioning the election, were based on the fact that there was an election. Everybody knew that they were made for the purpose of the election, would never have been made but for the election, and yet that they were perfectly innocent before the law raging against corruption among the electors. It is easier to make these laws than to secure prevention of the things legislated against.

The New Series 15-30 Stearns.

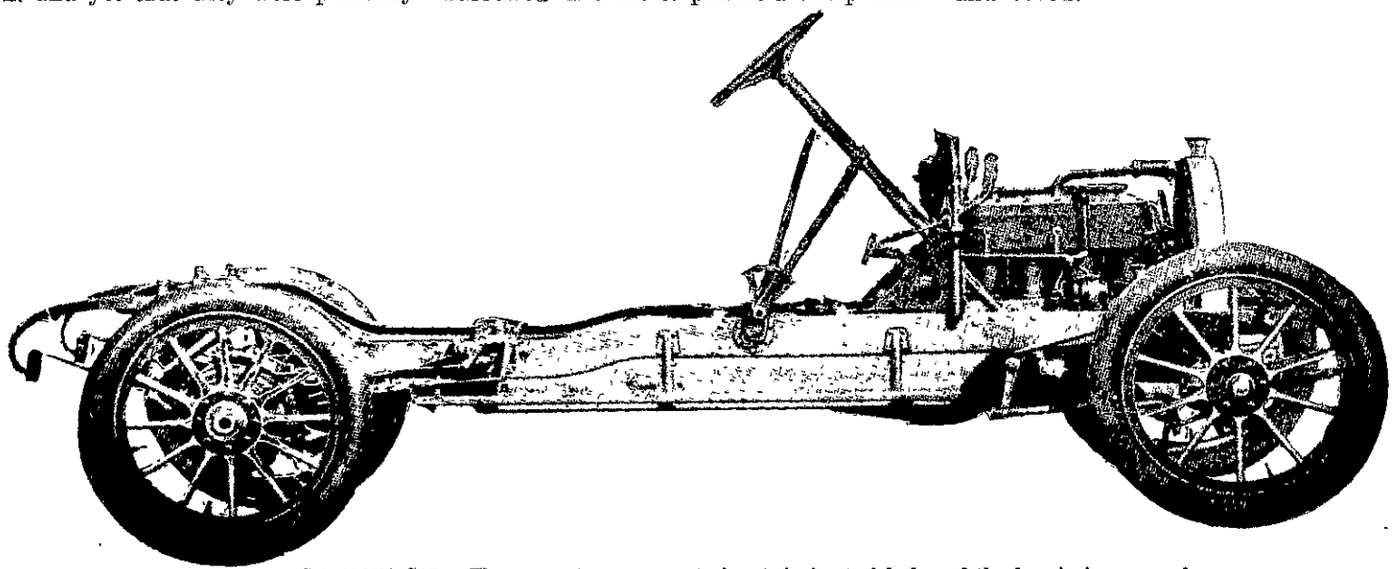
American Production.

F. B. Stearns Co., Cleveland, Ohio.

This company, which is here mentioned in order to illustrate the great development of the American manufacture of automobiles, has just announced its product for the season 1910, terming the new cars "New Series" rather than new models. This is a very logical and truthful way of putting it, since, in common with a great many other car manufacturers, the product for 1910 is in no sense composed of new models, but the same models as heretofore with added features and refinements as dictated by experience. The very term new model presupposes less sweeping alterations and changes of design, if not an entirely new car, and therefore is apt to be misleading to those who have not come to take the term in its "motor car" sense as dictated by usage in the past.

With no noticeable change in construction or design, with the exception of three-quarter elliptic rear spring suspension, the Stearns, whose debut was made last year, faces the present season with a most excellent record behind it. The frame is narrowed in front to permit a sharp turning angle: while maintaining the tread of the wheels this car will turn in a circle of 34 feet—a decided advantage in narrow streets. A double drop in the centre of the frame permits the mounting of a body of very graceful design with extremely low doors. The step from running board into the body is consequently very slight and in service where one gets in and out of the car frequently, as in shopping, this feature is particularly pleasing. A drop in the frame also lowers the centre of gravity of the car, increasing its stability, and one notices a greater sense of security when riding at high speeds. The spring suspension is of the semi-elliptic type in front and of the three-quarter elliptic type in the rear. It is extremely successful and makes the car ride easily and smoothly over rough roads.

The price is £620 at Cleveland. The body is the touring tonneau variety seating five; the wheel base is 116 inches; the front tires are 34 x 4; the steering is worm and sector; there are two sets of brakes on rear drums; the bore is 4½ inches, the stroke 4⅝; the four cylinders are cast *en bloc*; the valve arrangements are all on one side; the cooling is water with centrifugal pump; ignition, jump spark dual system; current supplied by Bosch-Magneto and storage; and the lubrication is self contained; the clutch is by multiple disk, the change gear is sliding, there are three speeds forward and one reverse; the change gear control selective side lever; and the drive is shaft and bevels.



STEARNS' CAR. The compact arrangement of parts in front of dash, and the drop in frame are shown.

The Care of Storage Batteries.

How to maintain Car Batteries in a High State of Efficiency.

(By Howard Greene.)

The storage battery, used as a means of accumulating and releasing energy for the propulsion of commercial vehicles, is very responsive to proper treatment and good care. It has the property, however, of endeavouring, with amazing persistence, to continue to do its work and furnish current to the motors when, through neglect, accident, or what not, it is in no condition to do so, and the effort is at the cost of its own integrity—and, later, of many of its owner's dollars.

There is nothing mysterious about a storage battery, but many intelligent men hold a contrary belief, and therefore hesitate to give it proper attention. If a man of reasonable intelligence and common sense will *stick closely to instructions,* and when he encounters conditions that he cannot account for or meet with the knowledge at hand, will notify the battery expert at once and observe how the trouble is overcome, he will soon learn to recognise symptoms and apply corrective measures without outside assistance except in extreme cases. What the battery manufacturer dreads more than anything else is ignorant or negligent handling of batteries.

A phase of lead battery handling that is much underestimated and frequently ignored by drivers who take charge of their own batteries is the watching of the specific gravity of the electrolyte (dilute sulphuric acid) with which the jaws are filled. The fact is that the condition of the electrolyte, taken in conjunction with other evidence, is the surest guide to follow. Drivers are often actually dismayed by the mere sound of the term "specific gravity" and the scientific appearance of the hydrometer! but this is extremely foolish, for the test of specific gravity is easily made, the hydrometer scale is as simple to read as a thermometer, and nothing further than this in the way of a scientific education is required.

The hydrometer is a little tube of glass, sealed up air-tight after the air has been exhausted, and weighted at one end so that it will float in liquids in a vertical position, with its upper end above the surface. The upper part of the tube is marked off with a scale that looks something like the marking of a thermometer. Now, probably every one knows that any object that will float at all will float higher in a heavy liquid than in a light one. For instance, salt water is heavier than fresh water, and it is therefore easier for a swimmer to keep afloat in salt than in fresh water. To cite an extreme case, a piece of iron, which will not float at all in an ordinary liquid, will rest lightly on the surface of mercury. Therefore we can compare the weights—that is, the specific gravities—of various liquids by noting how high the hydrometer floats in them, the readings being taken at the point where the tube emerges from the liquid; the higher the hydrometer floats the higher the reading will be, because the scale reads downward. A heavy liquid will therefore be of "high" specific gravity, and a light liquid of "low" specific gravity. The standard of comparison is distilled water, which is zero on the scale.

To get back to our battery, the liquid constituting the electrolyte is a mixture of sulphuric acid and water. The acid being of higher specific gravity than water, the gravity of the mixture is, of course, higher than that of water and lower than that of sulphuric acid alone, the exact figure depending upon the proportion of each. Now, it is this very point that interests us in battery work, for the following reasons: During the discharge of a battery—that is, while current is being taken from it—acid is absorbed by the active material in the plates, and *vice versa,* during the charging process acid is driven out of the plates into the electrolyte. As it is only acid, and not water, that is thus passed back and forth, it follows that the electrolyte becomes weaker in acid (of lower specific gravity) as discharging progresses, and richer in acid (of higher specific gravity) while being charged. When a battery in *normal condition* is fully charged, the electrolyte is at its highest specific gravity and "pounding" (forcing current into a battery already full) will neither raise the gravity nor the voltage. This establishes the important point that when the gravity ceases to rise the battery is fully charged; and the voltage will cease to rise at the same time, the battery being in good condition.

As a means for ascertaining the condition of a lead battery and for ferreting out the causes of unsatisfactory service, the hydrometer is absolutely indispensable. Every two weeks, without fail, the battery should be given an overcharge, at the finishing rate, of an hour or an hour and a half; that is, the charging should be continued for that length of time after the battery is apparently up to full voltage. Then the electrolyte should be tested in each individual cell, reading the scale as closely as possible, and making a record of each reading in such a way that the gravity of any particular cell can be picked out without difficulty. If the variation between the different cells is not more than ten points, the test may be considered satisfactory. Should some of the cells read lower than this, the overcharge should be continued at the same low rate and the low cells tested again at the end of an hour. Ordinarily it will be found that the gravity will have risen somewhat and the "equalising" process should be continued until the gravity of the low cells ceases to rise.

If the gravity of the low cells stops rising before they have come up to or very near the low limit, or if some cells read so low as to indicate something radically wrong in the first place, such cells should be treated individually. Bring the terminals of two wires from the charging board and connect them directly to the straps of the cell to be treated, taking care that the rate of current flow is cut down to the proper point for a single cell. Of course, if two or more adjoining cells are in equally, or almost equally, bad condition, they may be charged together.

It is of the greatest importance that the positive or + supply wire be connected to the positive battery strap, and the negative or — wire, to the negative strap. Failure to make these connections correctly will mean the ruin of the cells that are wrongly connected.

Continued charging will, in most cases, bring the gravity up slowly. When it reaches the proper point—that is, when the separately treated cells read about the same as the average of the rest of the cells in the battery—and the gravity ceases to rise, the treatment may be discontinued. If, however, any cell fails to respond, and the gravity of the electrolyte remains low, it may be due to some of the liquid having been lost in some way other than by evaporation, as, for instance, by slopping over, or through a crack in the hard rubber jar, and the loss replaced by water. In such a case there will be a legitimate need for more acid, which may be supplied by drawing out a syringe-full of electrolyte and replacing it with the same quantity of 1.300 gravity electrolyte supplied by a reliable manufacturer. If this does not bring the gravity up to the desired point after thorough mixing has occurred, add more until the desired effect is produced. If a jar is leaking, it should be replaced at once.

Acid should never be added unless it is certain that it is really needed, which is not often the case. The cell contained the proper amount of acid, in solution, in the first place; the acid does not evaporate with the water to any appreciable extent, and it must, therefore, be somewhere in the cell, unless lost through leakage or slopage. If it is in the cell and the hydrometer shows that it is not in the electrolyte, there is but one alternative: the plates must have absorbed it, and this is exactly what usually occurs. The formation of sulphate on the surface of the active material takes acid from the solution. Prolonged charging at a low rate breaks down the sulphate and drives the acid back into the electrolyte

During the process of bringing up the gravity of the electrolyte in a battery it is of importance that the temperature be carefully watched by means of a suitable thermometer. Under no circumstances—and this applies at all times, whether charging at high or low rate, or discharging—should the temperature exceed 100 degrees F. If it is not possible to keep the temperature below this point by lowering the charging rate, the battery expert should be called in to look for internal troubles, such as short circuits between plates.

It is real economy to call in an expert at any time when a trouble cannot be diagnosed, or when it is too serious to be handled by the simple methods here described. The expert will, of course, charge for his ounce of prevention, and it will be much better to pay for this man than to wait until it is necessary to pay for a pound or more of cure at a proportionately high figure. It is best, if possible, to obtain the advice of a man who makes a specialty of the particular make of battery needing attention. Nine times out of ten he will be glad to give advice and make helpful suggestions free, because they will assist in keeping in good condition a battery in whose success he is directly interested.

A new battery will sometimes be found to contain electrolyte which tests somewhat higher than the permissible maximum after a few days' use. In such a case, remove a little electrolyte from each jar and replace with water. It is not often, however, that this will have to be done. The normal strength of these batteries varies, the maximum of the specific gravities being between 1.300 and 1.270.

(To be continued.)

Leading Workers' Compensation Cases to 1st October, 1909, decided in United Kingdom.

Compiled by J. W. Macdonald.

Posthumous Illegitimate Child.

Orrell Colliery Co., Ltd. *v.* Schofield 26 T.L.R. 569.—A workman was about to marry a girl pregnant by him but was killed by accident. It was held that the child born subsequently was a dependant.

Section 4 sub-section 3 of our Act provides that if any child is born to a worker after his death that child shall be deemed to be a dependent of the worker in the same manner as it born in his father's lifetime.

On appeal to the House of Lords the judgment of the Court of Appeal upholding the County Court Judge's judgment was upheld. The principle upheld that an illegitimate child was made a member of the family in the same sense and to the same extent as a legitimate child. It followed that a posthumous illegitimate child was made a member of the family to the same extent as an illegitimate child actually born at the time of the death of the father.

Unexplained Accident.

Marshall *v.* Owners of Steamship Wild Roses 25 T.L.R. 452.—An engineer on board a steamship left his berth one night saying that he would go on deck for a breath of fresh air. He was not seen again alive and next day his dead body was found in the water close to the ship. It was held that from these facts the Court could not draw an inference in order to enable his widow to recover compensation.

The onus of proving the case rests upon the applicant, and if he leaves the case in doubt as to whether those conditions are fulfilled or not where the known facts are equally consistent with their having been fulfilled or not, he has not discharged such onus (Pomfret *v.* Lancashire & Yorkshire Rail Co. 1903), 2 K.B. 718). If the facts are not equally consistent the Court must apply its knowledge of what happens in ordinary life and consider the probabilities of the accident having happened in one way or other

The Court would not draw any inference from the fact and the applicant had not discharged the onus of proof resting on her. If a member of the watch on board a ship disappeared there might be no difficulty in drawing such an inference, but the case of a man who went on deck having no duty there was totally different.

The Court followed the decision in Bender *v.* Owners of s.s. Zent and s.s. Banana that the mere fact that a sailor was drowned was not enough, because it was necessary to show not merely that the man was properly there, but that the accident arose out of his employment. "Out of his employment" was not identical with "In the course of his employment."

Bender *v.* Owners of Steamship Zent, (1909), 2 K.B. 41.—On the high seas in fine weather and in daylight the ship being steady the chief cook and baker on board a steamship disappeared. It was unlikely that his duties would lead him into danger. The ship had a 4ft. rail and bulwarks and there are evidences to show how deceased had fallen overboard he having last been seen at 5.35 a.m. going aft.

It was held that on the facts the Court could not assume that the accident arose "out of" his employment, because it happened "in the course of" it and it was for applicant to prove both these essentials, which had not been done.

But if on a stormy night one of the watch was missing it must be inferred that he was washed overboard "in the course of" his employment, and that the accident arose "out of" his employment.

Incurring Danger for Own Purposes.

Reed *v.* Gt. Western Railway Co. 26 T.L.R. 36.—An engine driver whose engine was taking in water walked across a siding to get from a friend on another engine a book unconnected with his duties. While walking back he was killed by a truck which was being shunted.

It was held that the accident did not come out of and in the course of his employment.

In this case the deceased was about his own business, not about the business of his employers. For the moment he had put himself outside the area of protection which the Legislature has carefully marked out.

If a workman is injured when doing something for his own purposes and which is no part of his duty to do so, or at least is not necessary for the proper discharge of his duties he will not be entitled to compensation. But the workman is not deprived of his remedy by breaking off his work for a time for his own necessary conveniences, and accordingly when he stops work to get a drink of water or for some purpose of personal inconvenience he will not be deprived of compensation. In Smith *v.* Lancashire and Yorkshire Railway Co. (1899), 1 K.B 141) no action was held to lie where a ticket collector for his own pleasure got on to the footboard of a moving train to speak to a friend and was killed in jumping off; nor in Parkes *v.* Army and Navy Co-operative Society, Ltd., where one boy was injured sliding down the handrail of the stairs while taking a message to another part of the building; nor in Smith *v.* Normanton Colliery Co, Ltd. (1903), 1 K.B. 204 where a boy in a mine was dismissed from work and ordered to wait at the bottom of the pit until he could be taken up but instead loitered elsewhere and was injured.

Serious and Wilful Misconduct. Breach of Rules.

George *v.* Glasgow Coal Co. 25 T.L.R. 57.—The appellant who was a bottomer employed at a midworking in a mine gave the signal to raise the cage and the engineman in pursuance of a rule of the mine was entitled in the absence of a further signal to raise the cage to the pithead. Without ascertaining whether the cage had stopped or not opened the gate and fell down the shaft. His act in so opening the cage was a breach of a rule of the mines against which he had been warned some days before. In an application for compensation the Court of first instance found he had been guilty of serious and wilful misconduct and accordingly not entitled to compensation. On appeal it was held that the question was one of fact and there was evidence to support the finding which has been decided by the Court below and not be affected by artificial presumptions of fact.

Section 15 provides that no compensation shall be payable in respect of any accident which is attributable to the serious and wilful misconduct of the worker injured or killed.

This case deals with the rule only from the standpoint of breach of rules made for the general safety of the worker. In all cases it lies upon the employer to prove that the injury was attributable to the serious and wilful misconduct of the workman. No general rule can be laid down and each case must depend on its own peculiar facts. The breach of a rule may provide the opportunity for the happening of an injury yet at the same time it does not follow that the breach of the rules will as a matter of course necessitate an increase or certainty of risk, e.g., as where a factory hand is forbidden to cross a particular part of the factory and while doing so is injured. Such disobedience would not of necessity constitute "serious misconduct." The true rule is where there is a deliberate and unmistakable act of disobedience to an express order or where there is a deliberate breach of a law or rule which is framed in the interests of the workmen and for the express purpose of securing their safety. A breach of such a rule will amount to serious misconduct. Accordingly, where a fireman was killed while breaking a rule that forbade leaving the footplate of the engine when in motion no compensation was awarded—Best *v.* London & S.D. Railway Co. (1907) 23 T.L.R. 471. A workman would be guilty of such misconduct who being warned of an existing and on-coming danger risks life and limb by not heeding the warning, as in John *v.* Albion Coal Co., Ltd., (1901) 18 T.L.R. 27, where a miner being warned at the first manhole that a journey of trams was coming persisted in continuing his walk and was killed at the seventh manhole.

Burden of Proof.

McDonald *v.* Owners of s.s. Banana 24 T.L.R. 887.—A donkeyman while returning to his ship fell off the gangway and was killed. The only evidence as to how the accident happened was an entry in the log book stating that while he was returning on board ship from shore more or less the worse for liquor he refused the aid of the nightwatchman and policeman to assist him up the gangway and on reaching the top step suddenly overbalanced and fell over the gangway mainropes dropping and striking the iron girder.

It was held that his widow could not recover compensation as she had not discharged the onus upon her of proving the accident arose out of and in the course of the employment as the evidence was equally consistent with deceased having gone ashore either on ship's business or upon his own business or without leave.

The case failed as the applicant had failed to discharge the burden of proof as to the cause of the accident. If the applicant leaves the case in doubt as to whether the conditions essential to obtaining an award are fulfilled or not, where the known facts are equally consistent with their having been fulfilled or not he has not discharged the onus which lies upon him. In this case the evidence is quite consistent with the view that the accident happened in consequence of something which did not arise out of the employment. There was no presumption in favour of one view rather than another.

Accident Caused by Cockchafer.

Craske *v.* Wigan 25 T.L.R. 632.—An applicant must establish that the accident either arose out of something that he was doing in the course of his work or that his work placed him in a position of peculiar danger. It is not enough for him to say that he would not have met with the accident if he had not been at work.

A lady's maid and sewing maid was one night sewing by electric light near an open window. A cockchafer flew into the room and in throwing up her hand to prevent its flying in her face, struck her eye so violent a blow with the knuckles of her thumb as to cause ultimately permanent injury to her eye and the loss of her situation.

It was held that the accident the risks of which was in no way incidental to the employment did not arise "out of" the employment.

The Court would not depart from its invariable rule, namely, to hold that it was not enough for the applicant to say that the accident would not have happened if he had not been in that particular place. The applicant must say that the accident arose because of something he was doing in the course of his work or because his work placed him in a position of peculiar danger. The following cases were quoted by counsel in support of the application, but decided by the Court to be inapplicable. Andrew *v.* Failworth 20 T.L.R. 429 where a man was working on a high scaffold and so placed by his employment in a position of special danger, where he was more likely to be struck by lightning than an ordinary inhabitant. Challis *v.* London & S.W. Railway Co. 21 T.L.R. 386.—This case turned on the fact that it was well known to be an irresistible temptation to small boys to drop stones on to a train as it passed under a railway bridge. In this case a stone had passed through the glass at the top of the cab and struck the driver in the eye. It was held that the accident arose out of the employment as the risk of such an occurrence is one which may reasonably be looked upon as incidental to the employment of an engine driver, though it might not be incidental to other employments.

(To be continued.)

Meteorology.

The Ideal Weather Station.

Mount Egmont, Taranaki.

(Continued.)

(E. Barton, Brisbane.)

During the ascent on that part of the mountain known as "The Lizard," the effect of this method of disintegration is particularly visible, large blocks of lava being seen in every stage of detachment from the main mass The action of the frost is assisted by the presence of dust blown from the surface of the scoria, which gradually fills up the interstices as they become enlarged by the frost.

"Did you find much difficulty in attaining the summit of the mountain." I failed twice in attempts made from the Falls House, once owing to a fog and the second time owing to the piercing wind. My next attempt was from Egmont House, and my party, which included two ladies, had no difficulty in reaching the top. The only requisites for success are fine weather and determination. At the same time, I would advise those who are unaccustomed to great exertion to take the mountain gently. We started at 5 a.m., and after four rests of an hour each we reached the summit at 2.30 p.m. I carried provisions for the party of three, and some instruments (total weight 20lb.) in a knapsack. I mention these details because the ascent is usually made too hurriedly to allow of enjoyment by persons of mature years or by ladies.

"Is there no need of skill with the ice axe and the alpenstock?"

Not in the ascent from "Egmont House," which is made over scoria and rock, and calls for no such skill. A little knowledge of the use of the alpenstock and the ice axe certainly adds greatly to the interest and pleasure, because the steep slopes of virgin snow, which cover most of the scoria during the early summer, give an opportunity for many an exciting "glissade" during the descent if the tourist is possessed of a little nerve. On the occasion of my descent the party indulged in a few "glissades," which were very exhilarating, but would have been impossible without alpenstocks.

The first essential in "glissade" work is to realise that the sliding is done on ice, although apparently on snow. Pure snow does not lend itself readily to a glissade, unless snow shoes or "ski" are used to prevent the feet from penetrating the soft and yielding material; but on snow which has thawed on the surface and has then frozen again no such support is needed. The ice skin which is formed thereby is smooth and slippery, but easily pierced by the point of the "alpenstock," which is a light, strong stick about 6ft. in length, shod with a sharp iron ferrule and provided at its upper end with a leather wrist thong or an enlarged knob. In ascending a mountain, the alpenstock is of little value until the snow is encountered, but in descending the mountain it is in constant use, being used as a prop in advance of the body.

During a glissade the weight of the body is thrown back on the alpenstock while one slides in a standing or squatting position. It is important to maintain the upright position, because the loss of balance brings one into a sitting position, where the alpenstock loses its braking power, and then the speed of descent may become alarming.

"Would you not have enjoyed Mt Egmont better in autumn, with more settled weather?"

Certainly the ascent would have been easier, because Mt. Egmont can be climbed from either side with ease during the month of March, but, with the snow, half the beauty of the mountain has departed. The graceful curved slopes of frozen snow no longer set off the bareness of the lava and scoria, while the drier autumn atmosphere no longer supplies the material for the beautiful cloud effects The ideal time for ascending Mt Egmont is the Christmastide. Those who love the excitement of ice-axe work will then make the ascent on the southern side from the Falls House The high winds, generally prevalent near the summit, however, cause a sense of insecurity whilst passing from one ice step to another which is too alarming for the ordinary tourist, and he will do better from "Egmont House."

One of the most interesting features of the mountain is the regular decrease in the size of the trees and plants as the snow line is approached. On entering the forest reserve one is struck with the gigantic size of the flowering Rata, with its beautiful red blossom, and with the almost tropical appearance of the lianas and parasitic growths, which remind one of North Queensland. As the ascent is made the trees become more stunted in size, the tree fern disappears, while the moss on the tree stems turns from a deep green to a light grey colour. Presently the shrubs are left behind, and only grass tussocks and moss are to be seen. At a height of 5000 feet the moss and the lichens are the only signs of plant life.

After leaving the moss, long ridges of scoria are encountered, which consist of innumerable stones varying from boulders down to minute particles of black obsidian and crumbled pumice, which lie at an angle of 30 degrees, and therefore give way under the feet and lead to great weariness on the part of the climber. With patient toil he at last reaches the lava dyke known as the "Lizard." His progress is now much easier, because he gets a solid foothold on the rock, although the steepness has increased to 40 degrees. The track all the way from the Mountain House to the top lies on ridges, and nowhere passes through the valleys, which are deep gorges, terminating in abrupt faces of lava quite inaccessible to the ordinary climber. All the ridges gradually converge towards the top, so that it is scarcely possible to lose the way while ascending. In fact, on a clear day the danger of losing the road seems ridiculous; but on the descent, where every ridge forks out into several ridges, the way is readily lost, even during fine weather. The chief risk arises, however, from the liability to sudden envelopment in mountain mist. At any moment an ascending column of warm air may creep up the side of the mountain and form a cloud, which from the plain appears like a wisp of smoke, but to the person immersed in it, produces the effect of blotting out the whole world as though with the legendary "cap of invisibility." In such cases an inexpensive pocket compass is a great comfort to the climber who has a good map. The available maps of Mount Egmont are large and pretentious, but of a very poor type, the lava ridges, watercourses and mountain tracks being only approximately given.

The maps in Baedeker's handbook of Switzerland might well be taken as a standard for future editions.

Pursuing his way up the "Lizard," between two steep slopes of snow, the tourist comes at last to a point where the mass of rock forming the Lizard's head blocks his way. Now he has to leave the lava ridge and finish the journey on the gently sloping surface of the snow field forming the lip of the crater, which is filled with snow, so as to appear like a smooth white bowl. It is surrounded by a crown of jagged pinnacles, between which the inner and outer slopes of snow unite in beautiful sweeping curves of dazzling whiteness. From the centre of the crater the pinnacles can be ascended by scrambling up the hard frozen surface of snow, using the alpenstock or ice axe to form little steps. I shall never forget the glee of my party on observing that the interior of every hole made in the snow was blue, the depth of colour increasing with the depth of the hole.

We would gladly have stayed for hours at the top enjoying the wonderful view, but the piercing cold drove us down, although the temperature, according to a shaded thermometer, was eleven degrees above freezing point.

The frozen condition of the surface of the snow proved, however, that the effect of radiation was more important than the actual temperature of the air.

While ascending the mountain I had the pleasure of observing some very interesting weather phenomena. The wind was coming in from the south-west, from the Tasman Sea, over which scarcely a cloud was visible, but the land was hidden under a closely packed layer of clouds, which had the appearance of a white tesselated pavement, the individual tesserae being separate clouds, with narrow spaces between them. This white floor spread round each side of the mountain, and then extended inland and along the coast in two great streams, one stream sweeping down to Cook's Straits and following accurately the bend of the outline of the coast past Wanganui, and the other following the coast line to the North passed Kawhia, and it extended inland to the foot of Ruapehu, Tongariro and Ngauruhoe, but left in the wake of the mountain a narrow space almost devoid of cloud. Through this rift could be seen, at intervals, the towns of Stratford, Eltham and Inglewood, but they appeared very dark in contrast with the dazzling white cloud surface and indistinct of outline, owing to the existence of a heavy haze between the ground and the cloud level. Above the cloud no haze was visible.

On the mountain the velocity of the wind was about 20 miles per hour, but at the height of the clouds (about 2000ft.) the air was moving at barely 4 miles per hour. Wherever this moving mass of clouds met a considerable obstruction, such as a headland or small mountain, it behaved as a torrent would to a submerged rock; a stationary wave was formed. This was particularly noticeable over the headlands of Waitara and Kawhia, and over the ranges near Palmerston. The great mountains such as Ruapehu stood up 6000 or 8000 feet above

the clouds, which there resembled waves dashing against a coastline, the clouds breaking into spray as they slowly rose on the flanks of the mountains. The view was marvellously fine.

"What was the most striking feature at the summit?"

Three things struck me with astonishment. The first was the apparent height of the horizon.

Owing to the position of the mountain on a promontory, the sea is visible on three sides to a distance exceeding 100 miles On three sides, although the horizon was really 15 000ft below the plane of the mountain top it appeared to be on a level with us. Thus we appeared to be in the centre of a blue bowl 200 miles in diameter and 8000 feet deep.

The second was the colour of the sky overhead which was no longer "sky blue" as when viewed from the plain, but a deep violet colour.

The third was the presence of blowflies, which apparently find their habitat in such altitudes The supply seemed inexhaustible, because I killed all that I could see at one time, and in ten minutes their ranks were replenished.

"As a meteorologist, what do you think of the mountain"?

It seemed to me an ideal place for an observatory, being nine times the height of the Eiffel Towel, and almost as free to the movements of the air During most of the bad weather it must be above the clouds, and an observatory placed at the summit and connected, as in the case of the "Sonnblick" observatory, by telephone with the plain, would give information concerning temperature barometric pressure, and humidity, and concerning movements of cirrus clouds and winds valuable for daily forecast work, but indispensible for the future development of seasonal forecasts.

From the summit the weather workshop of nature seemed exposed to view. In the distance great columns of bush-fire smoke were seen. One of these arose from the Wanganui valley, and was particularly interesting. The smoke rose almost vertically to a height of 4000 feet. It then entered a stratum of air where a strong N.W. prevailed, and became deflected towards the south-east for a distance of about 40 miles, being extended into a long thin horizontal streamer, owing to the greater velocity of the wind at that level. On reaching a point some 20 or 30 miles southwest of Ruapehu, it became deflected towards the north-east, and when last observed, as the sun was setting, it disappeared behind Tongariro. During another ascent the top of the mountain presented a beautiful phenomenon which, for the want of a better name, I shall call the "Bridal Veil." It consisted of a thin cloud, and had the appearance of an enormous crystal bowl balanced like a hat on the top of the mountain. A curious feature of the Veil was that it was in two distinct layers separated from each other by space of 30 feet. It was evidently the result of an upward deflection of two moist layers of air passing over the summit of the mountain. As is well known, the chief cause of formation of cloud is the chilling effect of expansion. This effect is well known in the production of cold by refrigerating machinery of the type invented by Haslam, where the expansion of the air is utilised to produce cold, but where considerable trouble is met with in the shape of condensation in the valves and ducts through which the expanding air flows. In the case of our atmosphere, the expansion is brought about by an upward movement of the air, the resulting cold producing precipitation of moisture.

Although the sea wind, on striking an isolated mountain such as Egmont, is not raised bodily, and therefore does not give such an extraordinary precipitation as on the slopes of the New Zealand Alps which take all the moisture out of a N.W. wind and let it fall into Canterbury in a dessicated condition. Yet on the seaward slopes of Egmont the streams are larger than on the other side, and the "Falls House" on the southern side is surrounded by gushing streams, and has an abundant supply of water, while the "Egmont House" on the N.E. side has to rely on storage tanks.

If Egmont was beautiful during the daytime, it also had charms at night One calm moonlight night I saw it covered with a robe of vapour so complete and so well-fitting as to appear like a coating of snow from the summit down to the forest line. Observing the air to be descending from the summit I concluded that this effect was caused by the cooling effect of the snow on the layer of air which lay in contact with it This chilled skin of air, coming from aloft, would be too dry to permit of condensation of its own vapours, but, by contact with the next outer layer of ordinary moisture-carrying air, would cause condensation at the surface of contact between the two, and would account for this beautiful phenomenon.

It is to the meteorologist that Mount Egmont appeals most strongly, and months could be spent profitably in making observations on its flanks, especially with regard to the accumulation of data concerning the physical properties of our atmosphere in its upper strata, the line of investigation which in most countries is carried on by means of kites and small balloons.

For such purposes I am importing into Queensland a number of India-rubber balloons, such as are used at Trappes, in France, by M. Teisserenc de Bort, where they are released, and ascend to a height of 20,000 or 30,000 feet, carrying registering instruments to record the various conditions of the air in the layer traversed during the upward movement, until the balloon bursts, and then during its downward movement until it strikes the earth. Unfortunately many of these balloons are lost, and records never come to light.

At Blue Hill, near Boston, under a Mr. Lawrence Rotch, and in many observatories which have carried his methods, kites are used for the purpose of raising instruments, but in this case the height attained rarely exceeds that of Mount Egmont, and the records are necessarily disjointed, owing to the varying height at which the kite will fly at different times during the experiment.

If the earth were only girdled with a complete series of such observatories, we might expect in a very few years to obtain reliable seasonal forecasts. The enormous financial value to the primary industries, both pastoral and agricultural, of such foreknowledge is incalculable, but for Australia alone would probably exceed ten million yearly. But there is no industry or business which would not be effected by such knowledge. From the draper who, in fear and trembling, orders next summer's goods, to the Steamship Company, which organises excursions to the Sounds.

When we see the large expenditure incurred by the State for superfluous officials, one is filled with regret that some of these rivers of money could not be diverted into channels of important scientific investigation such as "weather law." At present Germany and Austria are the only countries which have made liberal provisions for this science, their annual expenditure exceeding that of all other nations put together.

MISCELLANEOUS.

Chemistry in 1909.

As might be expected, the radio-active elements still continue to engage the attention of chemists. Although during the year 1909 no very dramatic discovery was made, Ramsay, Soddy, and Debierne made important announcements. Sir William Ramsay sealed up some radium bromide in a bottle together with water, and observed the regular evolution of the gas (hydrogen and oxygen) at the rate of 30 cubic centimeters per week After nine months this evolution ceased almost entirely, from which Sir William Ramsay concluded that either the radium salt had lost its capacity for decomposing the water, or that the velocity of the reverse action (the re-combination of oxygen and hydrogen to water) predominated over that of decomposition. These results are questioned by Debierne, who decomposed water by the direct action of rays, keeping the radium salt and the water in separate glass vessels. Whichever chemist ultimately proves to be right, the investigation is interesting, because it is the first attempt to apply practically the enormous store of energy which is contained in radium and which may be ganged when it is stated that, during disintegration, radium emits two and one-half million times as much heat as an equal volume of hydrogen and oxygen combining explosively to form water The work of Soddy for 1909 has shown without question that helium is produced from uranium as well as from radium, the amount being two milligrammes of helium annually from over a million kilogrammes of uranium.

Photography in 1909.

In photography we find an interesting attempt to present moving pictures in colours by several inventors—Barricelli, Friese-Greene, and Urban and Smith. Curiously enough, all three inventions are based upon the same principle of so rapidly presenting images coloured red, yellow and blue that the eye has no time to notice the successive presentations, and therefore combines them into one picture. In the same field of chronophotography must be mentioned the important application of the moving-picture machine to the ultra-microscopic by Dr. Comandon, an application somewhat similar in principle to the combination of the ordinary microscope and kinetoscope made by Dr. Robt. E. Watkins of New York over ten years ago. Comandon's invention promises to be of considerable educational value in actually enabling us to see the struggles of our blood corpuscles with their microbic enemies.

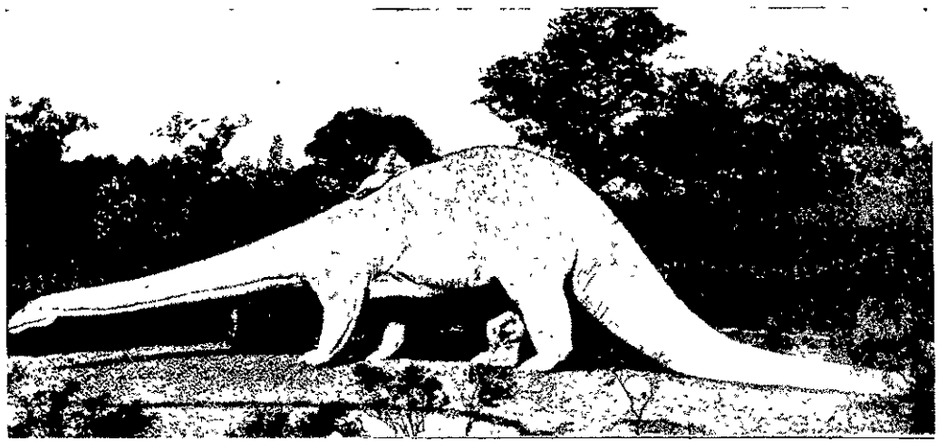
Prehistoric Remains.

The news of the discovery made by the Berlin University Paleontological expedition (of a huge prehistoric saurian) will be received in the United States with a certain amount of feeling, for hitherto the Americans have had most opportunities of finding Dinosaurs in any number. The name of the particular saurian discovered by the German authorities has not transpired. The name of the suarian nearest in size in America is Diplodocus, of which we publish a view herewith. This is the largest of Mr. Carnegie's collection, possessing a thighbone measuring 59 inches in length. The thighbone of the newly-discovered saurian measures 82 inches, and the difference represents an enormous difference in the complete anatomies.

Respecting the method of mounting the specimen we illustrate, there are two opinions in the scientific world. Dr. Tornier holds that the tail of Diplodocus was a far more important member than the mounters of the skeleton suspected. In the Berlin model only the end of the tail rests on the ground, the remaining portion rising at a fairly sharp angle to join the lumber vertebrae. He stated that in order to mount the tail in this manner, and to produce the pronounced curve of the reconstruction, it was necessary to spread the vertebrae of the tail. He states that the caudal vertebrae of lizards are never separated in this fashion, but that they are more or less locked together. He believes that the tail did not curve up sharply from the ground, but that it projected rearwardly in a slightly curved form as in all reptiles. In the restoration only one-half of the tail rests upon the ground, the other half rising free into the air. If this were correct the rear extremities of the animal would have been compelled to support an enormous load of bone, which served no useful purpose. In typical four-footed lizards it is the function of the tail to guide the animal. As soon as the animal begins to move the tail stiffens the spinal column, thereby enabling the animal to proceed rapidly along in a straight line. If the tails of such animals be cut away they seem to be no longer able to move properly. It was the purpose of the tail of the Diplodocus to stiffen the lower vertebrae, as in the case of all lizards, when the animal was in motion. Moreover, it served to counterbalance the head of the creature and to prevent it from tipping over forward, particularly when travelling down an incline.

Dr. Tornier further held that the animal did not hold its head horizontally, but that its neck was always curved in the form of an S. Holland likened the head and neck of Diplodocus to the head and neck of the ostrich, relying on the peculiar ball and socket connection of the neck vertebrae.

Such is the European view. Against it is held that the Americans, who have mounted thousands of the skeletons of saurians, could not be ignorant of reptilian skeletons. Professor Boule, of the Museem d'Histoire Naturelle of Paris, contends that Tornier is wrong in holding that mammals have one form of locomotion and reptiles another. The conclusion, he thinks, that because Diplodocus is a reptile it must crawl is not necessarily valid. Locomotion is dependent on external conditions. As a matter of fact, there was a time in the history of the earth when reptiles were lords of widely different elements. They dominated the water as Ichthyosaurs, Plesiosaurs, and Mosasaurs; they roamed the earth as Dinosaurs; and they navigated the air as Pterosaurs. If present reptiles are limited to a crawling movement, that is by no means conclusive proof that they always crawled.



The Hagenbeck Diplodocus.

Astronomy in 1909.

The year 1909 is astronomically memorable for the return of Halley's famous Comet. On September 11th last, Dr Max Wolf of Heidelberg discovered this historic wanderer upon one of his photographic plates in almost the exact position which the calculations of Cowell and Crommelin called for—a feat which may be regarded as a triumph of mathematical astronomy. The comet will pass herihelion on April 20th, and will be a conspicuous object in the western heavens after sunset about the middle of May, at which time the earth will pass through a portion of the comet's tail, and the comet itself will cross the sun's disk. The reappearance is therefore of exceptional interest, because it will give astronomers an opportunity of obtaining much valuable information as to the comet's structure.

The year was further signalised by the discovery of another comet by Mr. Daniel of the Princeton Observatory—the third he now has to his credit.

On September 24th, 1909, an opposition of Mars occurred—the most favourable which astronomers can possibly have for another fifteen years. On that date the planet was distant 35,500,000 miles. Naturally, the old question of Martian habitability was revived. Prof. Pickering, in order to settle it once and for all, proposed a method of signalling by mirrors, and Prof. Wood of Johns Hopkins University, suggested a method of "winking" by means of black cloths on reels. Neither astronomer probably believes in intelligent life on Mars, but was actuated solely by a desire to close a wearisome, perennial debate. The theory of habitability depends very largely upon the presence of water on Mars. Dr Campbell, director of the Lick Observatory, made a careful comparison last year of the spectra of the moon and Mars. He found that there was no appreciable difference between the two, from which he infers that Mars must be practically waterless, and therefore as dead as the Moon Mr. Very, of Prof. Lowell's staff, on the other hand, has arrived at a directly opposite conclusion. So far from being decided, the old question is therefore more alive than ever.

There were two eclipses of the Sun and two of the Moon. The lunar eclipses were both total and occurred on June 3rd and November 26th. The eclipses of the Sun, occurring on June 27th and December 12th, were respectively central and partial.

Electricity in 1909.

In view of the great advance in its efficiency, the tungsten lamp is entitled to be considered the most notable improvement of the year in the field of electricity. Mention should be made, however, of the important hydraulic-electric plant in Norway for reducing nitrogen from the air, which is being so successfully operated that its product is being sold in successful competition with the supply from Chili. Also the calcium cyanamide fertiliser process, hitherto in the experimental stage, has, during the year, been demonstrated to be commercially practicable. The Berlin telephotographic process has been further improved, and in January of last year the new apparatus was successfully used between Paris and Lyons. The process of transmission is based upon the fact that a photographic plate in bichromated gelatin presents a series of elevations and depressions, advantage of which is taken for producing, by a tracing point, oscillating movements, and fluctuations in the transmission current. De Forest has improved on his system of wireless telephony as used on the U.S. Fleet during the world cruise, and a number of stations have been put in operation on the Great Lakes for communication with steamships. Communication has been established over the ninety miles separating Chicago from Milwaukee, and steamers have been in touch with the shore from a distance of forty-five miles. Gabet in France has achieved some success in the steering of a 29-foot torpedo by the wireless method previously tested by Tesla in this country and Armstrong in England. The torpedo is driven by an internal-combustion motor, and immediately back of the explosive head is a compartment containing the wireless-controlled instruments. It is claimed that the control is effective up to five or six miles. In recent tests the motor was started and stopped at will, and the rudder was successfully operated from a small boat as a distance of a little over 100 yards. Mention should also be made of experimental wireless communications with a balloon, made by the United States Army Signal Corps by means of a 300-foot phosphor-bronze wire hung to a balloon.

Inventors' Page

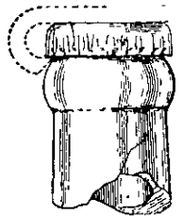
Patents as an Investment.

To a person having only a small measure of business instinct it is always a practical question as to whether or not the expenditure of money will bring compensation justifying the outlay. There are numberless instances to which we might refer, where even the most simple of patented inventions have yielded returns amounting to thousands of pounds upon an investment representing the cost of a patent. Take, for instance, the "See that Hump" hook, the barb-wire fence, or the simple pencil sharpener, so commonly used by school children, all of which have netted to the inventors absolutely enormous sums.

* * *

Painter Crimp Cap.

One of the most simple inventions, almost universally in use to-day, is the "Crimp Cap," patented by William Painter in 1892. Everyone has seen these caps, which are applied to thousands of bottles. Millions of crimp caps are manufactured every year, and the demonstrated value of this small invention is such that the rights under the patent could probably not be acquired for a cash price of £50,000. This patent illustrates furthermore the permanent value of patent protection, for, strange though it may seem, while the patent was issued in 1892, the protection was not realised from whatever until eight or ten years later.



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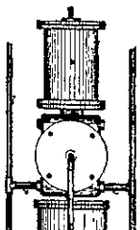
Westinghouse Brake.

That more complicated inventions are more valuable even than those of the simple type herein before enumerated is a fact well substantiated. Among these may be classified the air-brake. The cut is a view from the original patent of George Westinghouse, Jr., issued to him March 5, 1872. It has been said, and with much truth, that this invention was the most useful device patented in the nineteenth century, having in view the actual benefit derived by humanity. Enterprises capitalised in the aggregate at many millions of pounds have resulted directly from the exploitation of the air-brake, and its inventor, who was once only a machinist, is many times a millionaire to-day.



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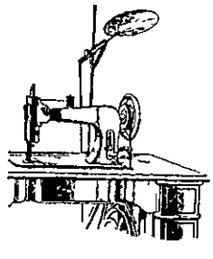
Morris Fan Attachment.

It is wonderful how little real difficulty is experienced during these days of up-to-date methods of promotion in successfully marketing inventions for which a real need exists. To monopolize such demand it is incumbent upon the inventor or manufacturer to protect himself by a patent. In 1907 Mr. W. W. Morris patented a fan attachment for sewing machines. Recognising that during hot weather, and even in a heated room, it is a warm task, for women folk especially, to run a sewing machine, Mr. Morris devised a simple appliance adapted to be connected with the treadle, and thus operated automatically to actuate a fan directing air towards the operator while using the machine. The Morris Patent Fan Company is now manufacturing these devices, and they are being sold all over the world. The inventor realised the desirability of a contrivance of this nature, and he is now reaping the benefit.



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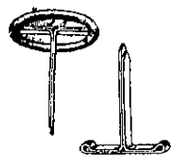
McGill's Paper Fastener.

Few persons employed in any way about an office have not used the McGill paper fastener. The St. Louis "Globe Democrat" some time ago published an interesting account of the origin of this valuable little contrivance, and following is an extract therefrom:—"There is a potential influence which surrounds some people, and inevitably brings them to wealth or celebrity, or both. As an instance, I can cite a personal experience in my early life while practising law. In the same city there lived a young man of the name of McGill, also a lawyer. One day I was fastening a lot of documents together with the rude appliances then in vogue, when Mr. McGill spoke up and said: 'I have an idea that I can produce a better fastener than that.' The next day he handed me a rough specimen of the present fastener, which is shaped like a letter T. McGill offered me a quarter interest to get it patented, but I laughed. He persevered, secured his patent, and to-day has an income of between £80,000 and £100,000. He resides in Paris, and the last time I was abroad tendered me a banquet there. It was his luck, or whatever it may be termed, to strike fortune through a simple device, and my luck to refuse to share it with him."



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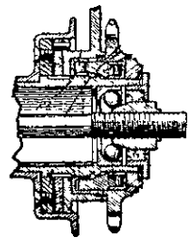
The Morrow Brake.

The wonderful success of A. P. Morrow with his back-pedalling brake, which was patented in 1900, is well known. His invention was one which meant an unlimited demand during the popularity of the bicycle, and few wheels to-day are not equipped with this brake. Morrow simply recognised at the psychological time the vast field for the promotion of his invention, and his small investment in a patent has more than repaid him handsomely.



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The United Shoe Manufacturing Company is another corporation which controls practically the trade of the world in boot machinery, on account of the acquisition of all patents which are reasonably meritorious. The erporation has a very large number of patents in New Zealand.

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Gillette Razor.

Taking up the current issues of nearly all our leading magazines you will be confronted with the picture of "a man with an idea." That man is King C. Gillette, the inventor of the Gillette Safety Razor. It is the same old story: a practical commercial invention, a man with consummate energy and perseverance, and a patent of great breadth and value. The company exploiting this razor claims to have sold three millions of them, a business of nearly, if not more, than £3,000,000 in two or three years, and with boundless possibilities, for the breadth of the patent has prevented nearly all competitors from entering the field. The Gillette razor is patented in 22 countries, and in some countries there are several patents in connection with the manufacture of the invention.

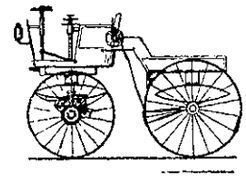
* * *

The business of the whole commercial world almost, at the present day, is derived from the promotion of patented inventions. Statistics show that from six to seven-eighths of the entire manufacturing capital of the world is based on patents, either directly or indirectly. The above may be fully appreciated when the large interests of the railroads, telegraph and telephone companies, steel and iron industries, and electrical and machine factories are brought to our attention. If patents for invention were not valuable the policy of the General Electric Company, perhaps the largest electric corporation in the United States, to acquire the patent rights to nearly all the patents issuing every week for commercially valuable electric inventions would be an inadvisable one to pursue. In like manner it is a notable fact that the Mergenthaler Company is the assignee of nearly every patent granted during recent years for improvements in linotype machines. Furthermore, the various type-writer companies, as well as the larger corporations manufacturing machinery of all kinds, vie with each other in their efforts to secure the patent rights to inventions which represent practical improvements in the manufactures which they are putting on the market.

* * *

Selden Automobile.

We could continue indefinitely giving instances of profitable inventions, which when protected properly by patents have brought fortunes to the inventors thereof. We can tell how Selden, a patent attorney, some thirteen years ago, and before automobiles were believed practical for commercial purposes, obtained a patent for his motor vehicle which was so protected that nearly all the automobile companies in the United States are compelled to be licensed to manufacture and sell under this patent; how Hugo Cook, of Dayton, Ohio, working for daily wages in that city, devised those improvements by which cash registers were practicalised; and Edison, a telegrapher at the time, sold his first invention. It was a small affair, though of important application, relating to telegraphy. He took it into the office of a telegraph company on Broadway and offered it for sale almost tremblingly. The president of the company examined it, and, when the youthful genius came back by appointment later, gruffly told him that the company would pay thirty-six thousand dollars for the contrivance. Edison had never dreamed of getting one-tenth of such a price, and, as he himself tells the story, he decided that the cheque was valueless when the cashier of the bank on which it was drawn refused to cash it until he was identified. But he got the money, and the capital thus furnished him gave him a start in the career which has proved so brilliant and so useful to humanity.



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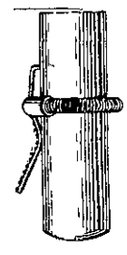
It is told that Singer was in such financial circumstances that he had to borrow £8 in order that he might perfect his first sewing machine. Winton, the automobile man, was a machinist twelve or fifteen years ago.

* * *

Duryea Clip.

The simplicity of an invention does not negative is patentability nor its value. The holder for attaching pens and pencils to the pocket, patented by Duryea, in 1905, is an invention which met a remarkable demand as soon as placed on the market, and which required comparatively little inventive skill in its conception. Sold at only three pence apiece, thousands of pounds were realised from the contrivance.



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Charles G. Biedinger patented a machine for making paper wrappers and exploited the same through a financial backer. His share of the proceeds up to a recent date was £18,600. This amount is not huge, it is true, but represents a very comfortable fortune.

* * *

Henry Berman, in a recent article upon Woman, The New Maker of New Ideas, dwells particularly upon the success which women have already attained in the inventive field. "Up to ten years ago, a search of the Patent Office reports would have attested to the customary claim of the male doer of things that woman was backward where great originality was required. But behold what a decade has done! Not a page of the official report of patents but that some woman's success is recorded. And not alone this; for each year there is to be found an increasing number of successful women inventors whose inventions are not patented in their own names, but bought outright by manufacturers and business firms who themselves secure the patents.

A woman clerk in a New York store invented some time ago a parcel-delivery system which netted her substantial returns. And one New England mill owner, herself an inventor, enjoys the right to several patents that represent the ingenuity of the women operators in her employment, one of the devices bringing in over four thousand pounds a year.

* * *

Simple improvements in devices of amusement, such as toys and puzzles, are extremely lucrative to inventors. Though ordinarily marketable only for a single season, or several seasons, perhaps, immediate and large returns are nearly always secured. Among the most prominent of such amusement devices may be mentioned Crandell's "Pigs in Clover," "The Return Ball," "Chamelen Top," "Dancing Jim Crow," and many others.

* * *

Those acquainted with the field say that fully three hundred of the patents taken out by women within the last ten years are yielding unusually large returns to the inventors, and that others not yet put on the market are destined to be equally successful. When a device can command within a few minutes after being patented several thousand pounds, the originator of the idea is quite beyond the masculine criticism; and such was the offer to the woman inventor of the satchel-bottomed paper bag. A simple glove buttoner is yielding the woman who thought out the scheme one thousand pounds a year. A patented adjustable waist-supporter has made the inventor independent. A device for opening letters has proved exceedingly profitable, and the young Georgia woman who originated a convenient travelling bag has made money enough to set herself up in business.

* * *

Berliner was a clerk previous to the evolution by him of those ideas whereby the long distance telephone was made practical.

* * *

Dr. Bell, who perfected the telephone was a school teacher.

* * *

The man who first thought of fixing a button on an umbrella made £50,000.

* * *

The foregoing would seem to be convincing to any one of a reasonable turn of mind that the investment of the comparatively small sum incidental to the procurement of the patent for a practical and meritorious invention is a safe and remunerative investment and one which would be advised by any business man of conservative principles.

Architecture and Building

The Hall in a House at Silverstream.

(By J. W. Chapman-Taylor, Architect.)

'Ithin a nail-bestudded door
An' passage an' a stwonen vloor,
There spread the hall where zanlight shone
In drough a window framed wi' stwone.

The window through which the "zanlight" shines in the hall here pictured is alas not framed in "stwone" like the one in the delightful passage from "William Barnes," but the hall does "spread" in broad and generous fashion, for this hall is not the lobby usually flatteringly called a hall. The hall is the centre, the focus from which all other parts should range in modest subservience. Here the guests are entertained; from the gallery the musicians play and sing, while the dancers circle on the broad, polished floor below. The logs crackle and blaze in the big, open fire in the good old-fashioned way.

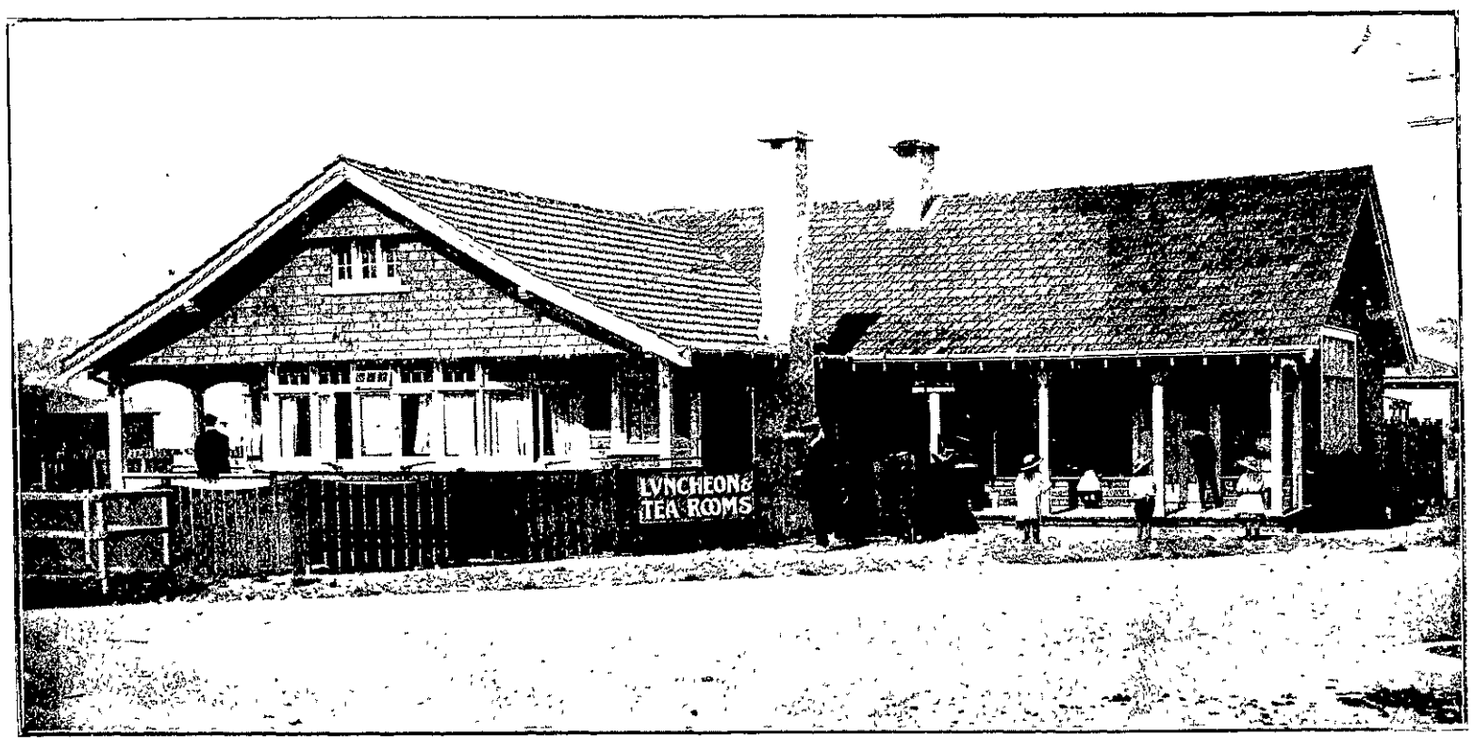
The walls are hung with soft green canvas for about 8ft., and above this the walls and ceiling are fine roughcast whitewashed.

The posts and beams are all structural necessities of the building, and instead of being covered up are made the means of beauty. These sturdy timbers, and the entire absence of patterns, give a feeling of peace and quiet solidity. It is essential to the successful entertainment of a large party that the room should have a somewhat irregular form, so that the guests can break up into small, informal groups. In this hall the gallery and the recess under it help greatly in attaining this end, besides which the gallery is an ideal place for music.

At one end of the hall the dining-room opens, having access to the kitchen through a servery. Through the door under the gallery is a lobby leading to the owner's study, bedroom and bathroom, etc., while at each end of the gallery are other bedrooms. The servants' quarters are in a separate wing, quite shut off from the rest of the house.

Luncheon Rooms at Seatoun.

We give this month views, interior and exterior, and plan of refreshment rooms and village shop recently erected at Seatoun from the designs of Mr. C. F. B. Livesay. The plan is interesting as showing what can be done with a limited site, and the matter of treatment of the various parts of the building is ingenious, convenience being the principal object aimed at. The entrance porch opens into a small vestibule, and thence through a pair of glass swing doors into the main dining-room, with ingle nook, fireplace, very large bay window and recess leading to two verandahs, and to sitting-room. To the right of the entrance is a small parlour or office, having a direct view of the electric car terminus and immediately connected with both dining-room, shop and kitchen. Other accommodation not already mentioned includes four bedrooms, bathroom, glass covered verandah, laundry, store, etc. The prevailing tone of the dining-room is white, obtained by the use of a white wall paper, with little colour, and white table cloths. All the rooms are light and airy. The site is at present comparatively bare, and it will need time to set off the building to full advantage. The contractor was Mr. A. Robertson.



Luncheon Kiosk, Seatoun. C. F. B. Livesay, Architect.

Simple Homes.

(Concluded.)

On aesthetic grounds it is necessary that the ceiling should enter into the picture as well as the floor, just as in nature we always see the sky as well as the earth. There is a gaiety about white roughcast and white distemper that does much to cheer the playgoing spirit, but

Interior of House at Silverstream Chapman Taylor, Architect

Dining Room, Kiosk, Seatoun. C. F. B. Livesay, Architect.

our white rooms must not be mere boxes. They must have something of the true romance, the spirit of reality, so that we feel at once that here people may live and die as they really are. The cosy ingle fireplace glows with comfort; the broad seat in the window is not too dainty to be sat upon.

In an article like this it is only possible to touch the merest fringe of this wide subject, but I hope enough has been said to show that our "Simple Home" will tolerate no shams, will be satisfied with no poverty of ideas, no "dry bones of antiquity." We may be very sure there is nothing expensive about good, sound materials such as wood, stone, or brick. It is the rubbish that is dear. We are much richer to-day than the old builders, yet their work still stands. It is not that we cannot afford the good, it is that we do not appreciate it.

We are sudents, not thinkers. The old craftsmen were not students. We should call them uneducated, but their work, thought out with loving care, is to us a counsel of perfection.

The good and beautiful are as necessary for the welfare of our minds as good plumbing is for our bodies, and we all demand good plumbing. The beautiful requires no more material than the ugly, but it does require the best and highest thought of which we are capable, that and nothing more.

NOTES.

(From Our Travelling Correspondent.)

TARANAKI.

Messrs. Sanderson & Griffiths report the completion of the new brick offices and printing house of the *Taranaki Herald* (evening paper) in Liardet Street replacing the wooden portion of the building destroyed by fire The recently finished part of the building measures 34 x 115ft. The structure, which is two story in front and one story at back, is modern in all respects, and thoroughly equipped. It has concrete floors, the iron roofing is lined with asbestos sheeting, and all doors and windows are protected by steel shutters. The front is completed in brick, with cement finish, and presents a handsome appearance. The total cost of the newly added part was £2000

The same firm of architects also report the completion in February of a two story brick and wood shop and dwelling in Devon street, 36 x 34 feet, at a cost of £1200, for Mr J. McNeill, grocer. The contractors were Messrs. Birr Brothers.

This handsome structure occupies a prominent position in Devon Street, and is the largest retail shop in New Plymouth. There are two very fine show windows and an extensive verandah spans the entire footpath, while above an ornate balcony occupies a central position.

For the New Plymouth High School Board a modern chemical laboratory has just been erected in wood in Elliott Street, at a cost of £500, from designs by Messrs. Sanderson & Griffiths.

A large warehouse is about to be erected for Mr. Newton King at the corner of Currie and Molesworth Streets, New Plymouth. It will be of 3, 2 and 1 stories in height, erected on concrete foundations and completed in wood, with Calmon slates, supplied by Messrs. Mainland & Barr, of Wellington. The structure will measure 76ft. to Currie Street, by 167ft. to Molesworth Street, the height will be 50ft., and the style of architecture Italian. It will be lighted by electricity, fitted with hydraulic lift, have a cart entrance and a railway siding within the building. The contractor is Mr. Coleman, the architects Messrs Sanderson & Griffiths, and the contract time expires in May next. The cost will be some £4000.

Mr. F. Messenger reports a number of private residences being erected in New Plymouth and suburbs, at a cost of from £600 to £800 each.

Tenders for a block of shops and offices, to be erected in Inglewood for Mr. H. B. Curtis, at the corner of Rata and Richmond Streets, were to close on March 8th. The building will be of two stories, in wood with brick party walls, will measure 95 x 80 feet, and is estimated to cost some £3000.

IN THE WAIKATO.

Mr. J. W. Warren, F.N.Z.I.A., reports the completion of a handsome new block of shops and offices in Hamilton West, to the order of Messrs. Gavin Wallace & Sons. This splendid addition to the architecture of this pretty town is in the renaissance style, and finished in pressed bricks. On the ground floor is the large shop, occupied by the owners, which measures 28 x 70 feet. There is also a smaller shop, 20 x 50 feet, with a general entrance to the suite of offices, which occupy the first floor Within the building are two strongrooms and a developing room for sun printing. The whole is finished as a modern structure should be, with latest appliances. The offices are occupied by Messrs. J. W. Warren, architect, Thomson & Ferrier, surveyors, and P. Watts, solicitor. The building was completed last December and cost, with the land on which it stands, £6700

Last year the same architect supervised the complete erection of a red brick block of shops and offices almost opposite the foregoing in Victoria Street, for Mr. Felix McGuire, late M.P. for Egmont. This block contains four shops on the ground floor, with offices above, and is finished in brick and stucco. It is in the Queen Anne style of architecture, and the cost was some £7000.

Mr. J. W. Warren, F.N.Z.I.A., also reports progress in modern buildings, in connection with the dairy industry in Waikato. What is admittedly the largest and most up-to-date factory has recently been completed for the Cambridge Dairy Co. at Hautapu. Built on the level floor system in brick, lined inside with white tiles, the structure contains separator room, cream and manufacturing rooms, and cool chamber. The stages are in solid concrete, and no wood, save window and door frames, has been used. The cost was £3000, exclusive of machinery, which absorbed another £1000. The same gentleman has also seen completed for the Eureka Dairy Company a new butter factory to replace that destroyed by fire. This is on the gravitation principle, and cost £1872, besides machinery, about £700.

In ecclesiastical architecture Mr. Warren is preparing plans for a new Anglican Church in Victoria Street, Hamilton West, which is to replace the existing building. The new Church, which will be cruciform in shape, and will accommodate a congregation of 550, will have a tower and spire rising to a height of 124ft. It will contain a morning chapel, chancel, sanctuary and 2 vestries, and will be built in red brick and stone, at a total cost of £10,000.

IN THE OHINEMURI.

There is not wanting some evidence that progress is being made in this centre for the branch railway to the celebrated Waihi gold mines. The most noticeable advance is manifested in the completion for the Thames Valley Co-operative Dairying Co., Ltd., of the very complete factory which was opened on December 6th last. The building is from the plans of Mr. E. E. Gillman, architect, of Paeroa. It is of brick, with tile roof, and stands on concrete foundations. The butter room is 60ft. x 36ft., the separator room 36ft. x 28ft., engine and boiler rooms respectively measure 28ft. x 18ft. & 20ft., and there are two insulated chambers, each 16ft. x 12ft 6in., on the coil and pass air systems. Nine subsidiary creameries act as feeders to this modern factory, which has been equipped with new machinery costing £1600, while the older plant transferred is of the value of £3400. The cost of the building, including machinery foundations only and concrete floors, was £2550. Twelve hands are employed during the season, and nine at the creameries, and the capacity of the factory is equal to six tons of butter daily, a substantial result, and decidedly less uncertain than mining. Tenders are being called for the erection of a six-roomed residence for the manager. Messrs. J. Lye & Sons, of Auckland, were the contractors who erected the factory.

Mr. E. E. Gillman, architect, of Paeroa, reports a number of cottages and private residences being erected in the Ohinemuri district, including Te Aroha, at a cost of £400 and under. At the latter place a printing office is in course of erection, and a block of shops and offices is being reinstated under his supervision. The Presbyterian manse at Paeroa, which is being erected by Mr. J. W. Forrest, is to be completed in April. It is from Mr. Gillman's plans. The contract price is £630.

Although it cannot be said that building operations are other than dead on this well-known goldfield, yet evidences of progress are not wanting in the borough. The civic authorities are to be congratulated on the evident improvements in the highways, and special mention should be made of the splendidly kept full-width asphalt footpaths and concrete water channels. The bare, tunnel-pierced, tip-besprinkled hillsides in the background of the town are pleasantly contrasted by the green parks and beauty spots along the foreshore, and the well-painted churches, schools, and other public buildings dotted here and there, among the shops and residences of the people. But the enquirer after progress was diverted on all hands to the proposed operations for mining development on a large scale at the 1000 feet level.

HAURAKI.

About the year 1896 the Hauraki Goldfields, Ltd., erected a magnificent pumping and winding plant at the head of what is known as the Queen of Beauty shaft. The plant, which is said originally to have cost £45,000 in England, was transported to New Zealand, housed in substantial iron buildings, with permanent foundations, and this work including the sinking of the shaft to a depth of 800ft. is said to have involved the company in a total outlay of £150,000. This splendid property fell into the hands of the Government about the year 1900 or later, and has latterly been operated by the Thames Drainage Board of which the Hon. E. Mitchelson is chairman, the other members being the Mayor of Thames (*ex officio*) an elected representative of the Thames County Council and representatives of various mining companies interested. Pumping is being carried on by this Board, and the May Queen Company, subsidised by the Government, and the Thames County and Borough Councils sank the shaft from the 800 to the 1000 feet level. This work, including the extension of the pumps to the bottom, was completed about June last. Since this time it has been recognised that something more should be done for the development of the field; much controversy has resulted and negotiations have so far progressed that it is now confidently expected that a vigorous scheme will soon be actively prosecuted. A Board, known as the Thames Deep Level Development Committee, has already been constituted, with Messrs. E. H. Taylor, M.P. (chairman), and A. Bruce as Government nominees, and representatives of the May Queen, Waiotahi, Saxon, Victoria, Moanatairi, and Caledonian Companies. This body will have power to arrange the basis of contributions from those interested companies, who will be benefitted by the suggested large cross-cut tunnel at the 1000 feet level from the Queen of Beauty shaft to the Caledonian shaft, which latter will have to be sunk to the same level. It will also be entitled to receive from the Government the subsidy towards the work to the amount of £5000, the entire cost being estimated at £17,000. The successful carrying out of this work should herald a new era for goldmining on the Thames, and all advocates of progress are anticipating the best results.

Before closing, I will add a brief description of this fine plant. The boiler-house contains 10 Lancashire boilers, in all 1000 horse power, and capable of working to a depth of 2000 feet. The large compound engine will work up to 400 h.p., and the air compressor plant is good for 100 h.p. A Tangye 2-cylinder first motion winding engine operates two cages, and is equal to a lift of four tons, while a powerful capstan engine will lift up to twenty tons from the bottom at once. The pumps can throw 1400 gallons per minute; besides this, there is an electric lighting plant which can be extended below if desired The management of this large plant has been under the control of Mr. A. C. MacDiarmid since July, 1809.

AUCKLAND.

(*From Our Own Correspondent.*)

The contract for the rebuilding of the Strand Arcade in Queen Street has been secured by Mr. J. D. Jones at £21,957. Architect, Mr. A. P. Wilson, Victoria Arcade.

Mr. Alex. Wiseman is preparing plans of a bungalow in wood for Mr. E. H. Mitchell, of Tonga. Cost, about £1000.

Mr. Morran, City Chambers, has in hand the erection of a brick shop premises at Devonport for Mr. Watkins. Contract, £1376.

Mr. Cecil Trevithick, Victoria Arcade, reports as follows:—The erection of a ferro-concrete warehouse at Tahiti for Messrs. Donald and Edenborough; contract, about £4000. A two-storey residence at Remuera for Mr. J. W. Shearer, to cost about £750; builder, Mr. W. Thompson. Bungalow at Remuera for Mr. G. B. Winkfield, to cost about £870; builders, Messrs F. Livock & Son. Butter factory at Opotiki for Messrs. Mason, Struthers & Co., Ltd.

Tenders are being called for shortly by the above architect for a bungalow at Mount Eden.

A new theatre is shortly to be erected here for Messrs. Fuller & Son, the successful tenderer being Mr. W. E. Hutchison, at £7777. Mr. E. Bartley is the architect.

Mr. John Routly is preparing plans of a villa at Remuera for Mrs. McElwain.

Mr. B. C. Chilwell is carrying out alterations, in brick and eternit, to Mr. W. Coleman's house in Princes Street. Contract, about £1600. Builder, Mr. James Webster.

McNeill's Buildings, New Plymouth. Sanderson & Griffiths, Architects

Residence in Roslyn, Dunedin.

This has been erected by the architect, Basil B Hooper, A.R.I.B.A., for himself, and in the design an attempt has been made to study simplicity of detail, with picturesqueness of grouping. No useless wood mouldings to deteriorate by the weather have been allowed, and a quiet restful solidity has been aimed at The house is of brick throughout, the exterior from the plinth upwards being roughcast white. Bands of chipped clinker bricks have been introduced in the plinth, which give a variety in tone. The roof is covered with green slates, with lead ridging The accommodation consists of seven rooms, exclusive of offices. The general contractor was Mr. W. Henderson

Dunedin Notes.

(Our Own Correspondent.)

Mr. Basil B. Hooper, A.R.I.B.A., has the following work on hand:—

Methodist Sunday School St. Kilda., which has seating accommodation for 250 people, including class and ante-rooms; building in brick; tiled roof. The external design is a modified Byzantine, and at attempt has been made to obtain a simple variety of design for the use of chipped clinker bricks used as a bands alternate Voussoirs. Contract price, £800. John Lunn, contractor.

Cottage at St. Kilda for Mr. S. Levy; five rooms, with all modern conveniences, and showing that builders' designs are not the only ones that can be cheaply erected. Contract price, £500. C. Bragg, contractor.

Stables and cart sheds in South Dunedin for Mr. T. Smith; £250. Holmes and Armstrong, contractors.

Additions to Dr. Barnett's House, Stafford Street, Dunedin. The whole of the front is being modernised by adding balcony, bay windows, porch, etc., transforming an old-fashioned house of the box type into an up-to-date residence. Contract price, £300. A. T. Anderson & Son, contractors.

Additions to Dr. Ritchie's house, George St., Dunedin. These consist of a new wing, which has been designed in the modern style, but by careful handling and painting does not clash with the old-portion of the building, which is in the old-fashioned, florid style. Contract price, £1000. Mr. J. Moir, contractor.

House in Heriot Road, Dunedin, for Mr W. Grindley. Contract price, £1000. A. Dempster, building contractor.

Shops, offices and hall, corner of George and Hanover Streets, for Mr. T. Smith. Contract price, £4700. Crawford and Watson, contractors.

Mr. Hooper has plans in preparation for residence in Bishop's Court for Mr. C. G White. Estimated cost, £1000.

Also alterations and additions to the Selwyn College University Students' Hostel. Estimated cost, £300.

Messrs. Salmond and Vanes report the following:

Tenders will shortly be called for a hotel at Suva for the Union Steamship Co., also for a laundry at Wellington for the same Company.

Also for additions and alterations to the "Otago Daily Times" Company's premises, Dunedin.

Also for additions to residence in High St., Dunedin.

Mr. J L. Salmond, of Dunedin, has now taken into partnership his former pupil, Mr. R. Newton Vanes, A.R.I.B.A. Mr. Vanes returned from London in January. He spent three years abroad, most of the time in London, where he obtained practical experience in several architects' offices, and also attended classes in design at the London University. On the way out he spent several weeks on the Continent sketching in France and Italy.

Mr Edmund Anscombe, architect, reports:—

That the new Otago Girls High School building is well under way. It appears to be a very fine example of school architecture. At present only a section of the school is being erected. The building, which is of red brick, with Oamaru stone trimmings, will be strictly modern in every respect The artificial heating will be by hot water, lighting by electricity, while a very complete ventilation plant is being installed. The contract price is £8568 11s 5d. Contractor, Mr. Orr Campbell. The lighting is being done by Turnbull and Jones, heating by John Chambers and Son, ventilation by Mr. H. J U. Ross

The building on the corner of Adam and Russell Streets a block of six two-storied houses Five of these have six rooms and one has seven When complete they will be a great improvement to this locality. The contract price is £3181 10s. 9d. Contractor, Mr. Robert Meikle, Junr.

The building of a large, up-to-date carriage factory in Cumberland St. for Mr. Thomas Scott. The building, which is of brick, two stories, is 95ft. x 53ft. Contract price, £1392 5s. The contractor is Mr. John Wood.

The approaching completion at the corner of George and Park streets of a large and very imposing brick structure. It is being erected for Mr. Thomas Fogg, dental surgeon. The building, which is flat iron in shape, has a basement, two stories, and a large attic. The dental rooms are situated in the north end on the ground floor, while the remainder is given over to residential apartments. Contract price is £2736 15s. The contractor is Mr. Orr-Campbell.

Brick offices are being erected for A. E. Usherwood and Co., soap manufacturers, Lower Rattray Street. Contractor, Mr. C. Bragg.

A contract for a brick residence in Cumberland Street for Mr. Ivory. Contract price, £1188. Contractor, Mr. C. Bragg.

Residence, Roslyn. B. B. Hooper, A.R.I.B.A., Architect.

The letting of a contract for a bungalow residence in Roslyn for the Rev. James Chisholm Contractor, Nicholson and O'Connell. Price, £540.

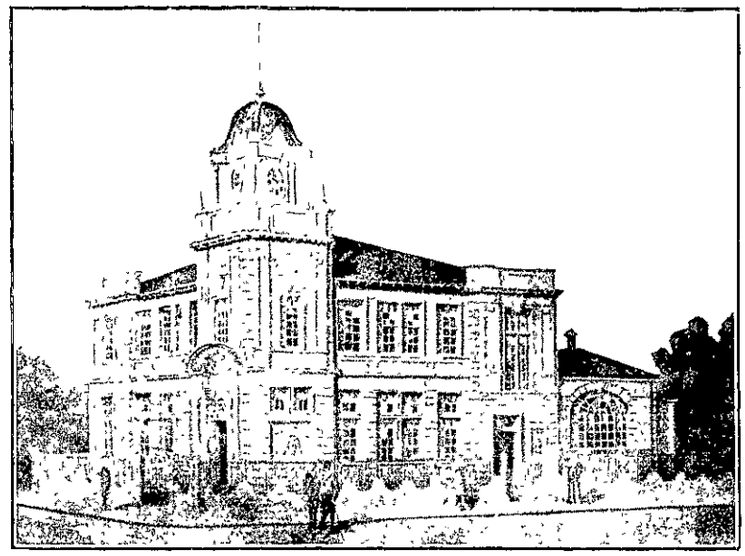
The erection of a very attractive brick bungalow residence at Newington for Professor Waters. Contract price, £1105. Contractor Mr. John Wood.

The partnership between Messrs. Walden and Barton architects, of Dunedin, has been dissolved, both members of the firm having started in separate businesses.

Mr. Anscombe began practising architecture in Dunedin nearly three years ago, after spending five years in the United States of America He has won the following competitions.—New Mining School building at the University of Otago. Otago Girls' High School building, and the new building for the Young Men's Christian Association, Dunedin Owing to increasing business he has extended his offices at 134 Princes Street, and with an increased staff of assistants is now in a position to better cope with his work.

tions are of concrete, superstructure of brickwork with reinforced concrete bands running round the building at the level of the joists on every floor.

Attractiveness is given to its appearance by a finishing on the two facades of red face brickwork and cement finished cornices, while the fact of the pilasters being carried up to the full height gives it a solid and bold appearance. The floors are carried on massive Jarra columns and Oregon beams with a steel flitch between the beams. The ceilings are panelled and the walls are finished plain, the wall space being required for fittings for the display of goods. The bond and packing rooms are on the basement floor and the offices on the ground floor with frontage to Stuart Street. The remainder of this floor and all the other floors will be fitted up as show rooms, and some idea of the size of the building may be obtained from the fact that the total floor space is equal to an acre and a quarter. Two electric lifts are being installed, one for goods and the other for passengers



Dawson, Engraver] PARNELL LIBRARY (Winning Design) A. B. Herrold, Architect.

Mr Anscombe informs us that as soon as plans can be completed he will call tenders for two brick residences, a large factory building in King Street, additions and alterations to a warehouse, and a combined shop and residential building.

Messrs. Mason and Wales have designed and are putting up a building for Messrs. P. Hayman and Co. in Stuart Street, which is fast becoming one of the city's busiest thoroughfares, and a great deal of activity has of late been shown there in the erection of buildings. The largest of these is the above mentioned building for Messrs. P Hayman and Co., and gives promise of being a very imposing structure. It has a frontage to Stuart Street of 132ft., and 88½ft to Moray Place, and is five storeys in height, the basement floor being 5ft. below the pavement, and the ceiling 6ft. above, thus giving ample light The founda

We have received information to the effect that Messrs. J. Barton and Son, architects, have commenced practice of their profession at 1 Lower High St., Dunedin.

Parnell Library, Auckland.

Competitive designs were called for the above Library a short time ago, and fourteen designs were submitted. The design chosen was that sent in by Mr. A. B. Herrold, architect, Auckland. The building was not to cost more than £3,500, and the architect must be prepared to erect same for that amount.

There are two entrances to the building, one from the main road and one at the side.

The librarian's room is on the right hand side of front entrance, and controls the hall, so that any one entering or leaving the building is immediately under the eye of whoever may be in charge.

The chief rooms are the lending department (37ft. x 26ft), newspaper room (27ft. x 21ft.), magazine room (20ft. x 16ft.), reference library (37ft x 26ft.), committee room (23ft. x 18ft.), and staff rooms. There are lavatories for ladies and gentlemen, with all conveniences.

The building is finished in brick and stucco, is well ventilated and lighted, and ought to prove a valuable asset to the Borough of Parnell.

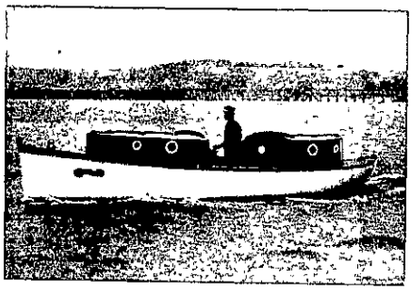
Motor Boats in Auckland.

Messrs Tyler and Harvey have on hand a 24ft. x 6ft 6in. launch for Mr. Robb, of Wellington.

Mr D Reid is building a 30ft. x 7ft launch which will be fitted with a 6 h.p Buffalo engine.

Mr W R Twigg has recently placed the following marine engines:—One 18 h.p Stirling for Mr A T Colman's launch "Redwing"; one 12 h.p Stirling and one 16 h.p Westman for Messrs Ford and Co.'s scow "Southern Isle"; one 10 h.p Lorizer for Mr. F. J. Roche; one 7½ h.p Holliday for Mr W Walker's yacht "Jack"; one 2½ h.p Holliday for Messrs Marshall, Ryan and Co., Taupo; one 2½ h.p Holliday for Mr Montague; one 2 h.p Holliday for Mr Remmers.

Messrs Ryan and Co report the following sales —One 10 h.p Corson for Mr A Foster, Picton; one 8 h.p Union for Mr. G A. Ward Tauranga, one 16 h.p Corson for Mr G Bennett Port Albert; one 16 h.p. Corson for Mr R Love, Picton; one 8 h.p. Union for Mr W Johnstone, Helensville; one 60 h.p Union for Captain Skinner; one 15 h.p. Union for Mr I Darby, of Russell



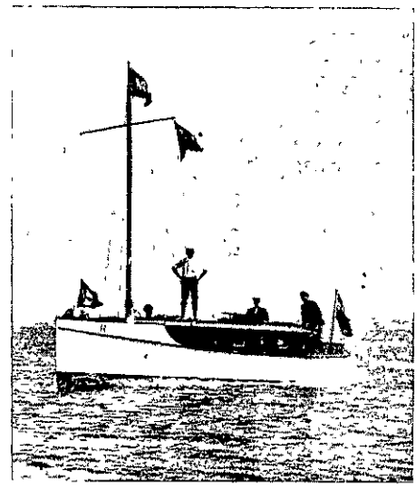
STEREENDIN VOR Length, 25ft , beam, 6ft 6in
Fitted with 6 h p "Kapai" Engine by Arthur & Dormer
Built by Logan Bros

Mr. Leo Walsh, agent for Kelvin engines, reports the sale of one 15 h.p. Heavy Duty Kelvin, through his Dunedin agent, Mr W. J. P. McCulloch.

Messrs. Arthur Dormer, makers of the Kapai engine, report:—One 3 h.p marine engine for Mr. C. J. Hobbs, Whangaparaoa, to the order of Mr. Shakespeare, Little Barrier. One 4 h.p. marine engine for Mr. Ross, Lake Taupo, to the order of Messrs. Logan Bros.

Messrs. Holland and Gillette, makers of the "Zealandia" engine, report the following sales and orders:—One 10 h.p engine for Mr. Laing ;one 12 h.p. engine for Mr. Hanken; one 12 h.p. engine for Mr. J. McLeod; three 9 h.p engines for Messrs Beamish, Bennett and Tattley; two 6 h.p. engines for Messrs. Paddison and Osborne; one 5 h.p. engine for Mr. Davidson; nine 4½ h.p. engines for Messrs. Dickson, Finey, Manning, Tanner, Tattley, Holland, Macartney, Naylor and Lomey; two 3 h.p. engines for Messrs. Bradley and Erickson

Messrs Wilkinson, Ross and Cox, makers of the "Nelson" engine, report sales.—One 10 h.p. marine engine for Mr S. Leyland, Auckland; one 10 h.p. do. for Mr T. N. Brocas, of Hokianga.

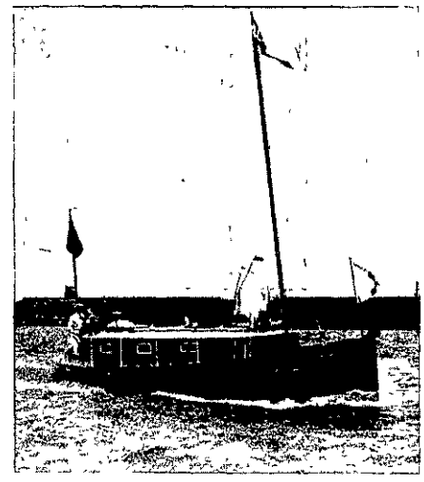


ROMA: Length, 35ft ; beam, 8ft
Fitted with 18 h p 4 cylinder "Zealandia" Engine by Holland & Gillette
Built by Mr Le Huquet Devonport to the order of J P Howden,
Boat Commodore of the N Z P B A

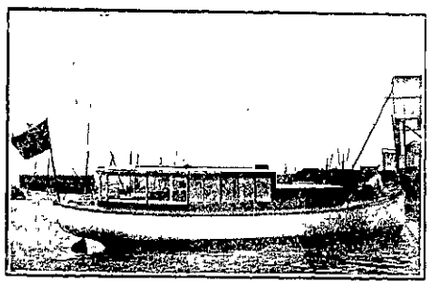
Messrs Bailey and Lowe have just built:—22ft. surf launch for Captain Skinner; 35ft x 7ft. 6in Tuck stern launch "Countess" for Mr. E. A Edgecombe, Parnell; 38ft. x 8ft Tuck stern launch "Tempest" for Mr. A. Sanford.

Messrs T. M Lane and Sons, Ltd. are building a 35ft x 8ft. cargo launch for Mr. McKay, of Mongonui, 22ft x 5ft. 3in launch, to be fitted with a 4 h p Scribbs engine.

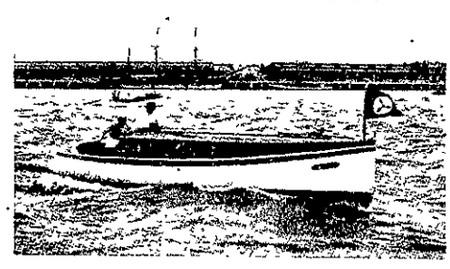
Messrs Collings and Bell have just completed the launch "Hazel" for Mr. E R. James, of Ponsonby This boat is 35ft. long by 8ft. beam and is fitted with a 20 h.p. Doman engine On the stocks are two launches one 28ft x 9ft. for Mr Stuart of Napier, to be fitted with a 10 h.p. Doman engine; the other a 16ft x 5ft 6in. for Mr. Smith, of New Plymouth, to be fitted with a 3 h p Perfection engine



ALLEYNE 42ft x 9ft
Winner of the Auckland Regatta 1909 Fitted with 20 h p "Lozier Engine by Mr W R Twigg Built by Tyler & Hattie for A Brett Commodore of the N Z P B A



ALOMA Length 35ft , beam, 9ft
Fitted with 15 h p Union Engine by Ryan & Co
Built by C Bailey Junr for Mr Darby of Russell



NELSON Length, 26ft , beam, 6ft.
Fitted with 5 h p "Nelson" Engine by Wilkinson Ross & Cox
Built by Collins & Bell for Mr J W Ross

Motor Boats in Otago.

Launch of the "Moturata."

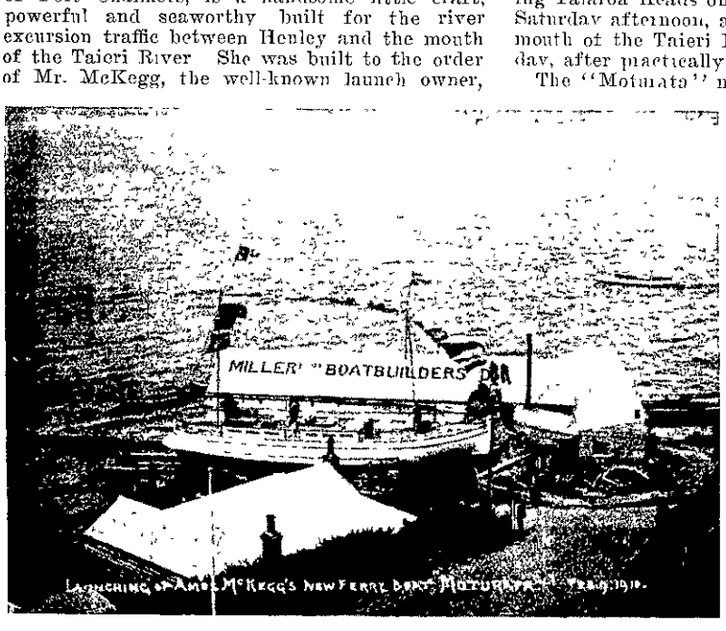
The "Moturata" (Rata Island), lately launched from the yard of Messrs. Miller Bros, of Port Chalmers, is a handsome little craft, powerful and seaworthy built for the river excursion traffic between Henley and the mouth of the Taieri River She was built to the order of Mr. McKegg, the well-known launch owner, who has made this picturesque resort so popular. The boat is 60ft. long x 13ft. 6in. beam, and 5ft. deep, with a maximum draught of 3ft. 9in. She is driven by a 30 h.p. Globe 4-cycle oil engine, she steams up to eight knots, and can carry 180 passengers, for whom there is both deck and cabin accommodation, and there is cargo space besides She was designed by Mr. W. Cutten, built by Messrs Miller Bros, and engined by Messrs S. Tonkinson and Co. of Dunedin. Her seagoing qualities have been fully tested, and she has given an excellent account of herself. She was taken to Henley by way of the open sea from Port Chalmers on her own power, passing Taiaroa Heads on a certain well-remembered Saturday afternoon, and reaching the bar at the mouth of the Taieri River at 6.30 p.m. the same day, after practically a non-stop run.

The "Moturata" made her first trip (Henley-Taieri mouth and back) recently, with sixty passengers, all of whom were hospitably entertained by Mr. McKegg, the journey each way taking an hour.

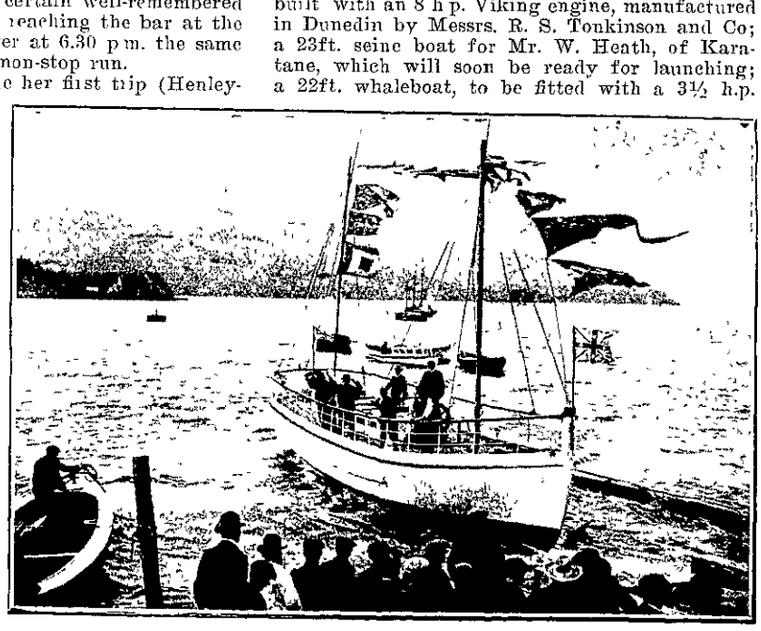
Messrs. Miller are the builders of the "Kelvin" (launched in December last) for Mr. McCulloch, whose win in Otago Harbour is described on page 190. Since then they have had many inquiries, and will probably during the year add a few more of this type to the Otago fleet which they have practically created.

They have at present on the stocks several boats, among the rest:—A launch for Messrs. Tonkinson and Speight, 33ft. x 7ft. beam, cavel built with an 8 h.p. Viking engine, manufactured in Dunedin by Messrs. R. S. Tonkinson and Co; a 23ft. seine boat for Mr. W. Heath, of Karatane, which will soon be ready for launching; a 22ft. whaleboat, to be fitted with a 3½ h.p. engine, also nearly ready.

To give some idea of the extent and activity of this boat trade, we may mention that within three years this firm has built to order on an average five boats every three months, for Kaikoura, Oamaru, Moeraki, Timaru, Karatane, Dunedin, Nuggets, Bluff, and Macquarie Island.



THE LAUNCH OF THE "MOTURATA"—BEFORE.



THE LAUNCH OF THE "MOTURATA"—AFTER.

LICENSED SURVEYORS OF THE DOMINION.

The Board.

Strauchon, J., Surveyor-Gen.
Humphries, T., Lower Hutt.
Gold Smith, E. C., Chief Surveyor, Auckland.
Bridge, C. Hastings, Christchurch.
Sladden, H., Wellington.

Licensed Surveyors.

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Adams, C. W., Editor, Hutt.
Adams, E. F., Thames.
Allan, R. S., Dunedin.
Allen, G. F., Mangamahu.
Allom, A. G., D.S., Chch.
Andrew, W., Kimbolton.
Annabell, J., Wanganui.
Annabell, J. R, Ngamatapouri.
Armstrong, W., Chief Draughtsman, Dunedin.
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Atkinson, W.M., Whangarei
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Baker, J. G. C., Dunedin.
Baker, S. E. W., Oamaru.
Balneavis, J. H., Gisborne.
Banks, C., Oamaru.
Banks, R. L., Fairlie.
Barlow, P. W. G., Opotiki.
Barnard, J. O., Auckland.
Barron, A., Wellington.
Barron, D., Dunedin.
Barron, D. A. I., D. S., Dunedin.
Bartley, F. P., Shanghai.
Barton, J., Whakataki.
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Baxter, R. G., Outram.
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Beere, W. O., Wellington.
Begg, W., Dunedin.
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Blaikie, J., Gore.
Blake, V. I., D.S., Tauranga
Bogle, A. H., Wellington.
Booker, Y., Wellington.
Boylan, J., Auckland.
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Bridges, G. A., Timaru.
Brodrick, T.N., C.S, Napier
Brook, T., A.S., Napier.
Buck, W. S., Lower Hutt.
Buckeridge, E. W., Kawhia
Bullard, G. H., Gisborne.
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Campbell, O. N., Wellington
Campbell, R., Whangaroa.
Campbell, R.E.M., Wanganui
Campion, E. J., Gisborne.
Carkeek, M., D.S., Blenheim
Carrington, F., N. Plymouth
Carroll, T., D.S., Auckland.
Chambers, P., Auckland.
Charlsworth, W. S, Te Karaka.
Cheal, A. W., Auckland.
Cheal, P. E., Auckland.
Christophers, R. G., U.S.A.
Clare, E.E.P., F. Malay St.
Clayton, C., Rotorua.
Climie, H. W., Hawera.
Climie, J. D., Inspector of Surveys, Wellington.
Collins, W. D. R., Sydney.
Combes, E., Blenheim.
Connal, H. Mc., Raratonga.
Cook, J., New Plymouth.
Cooke, C. E., Whangarei.
Cooper, B., Fd. Malay St.
Couston, B. B., Dunedin.
Crawford, D. A., Q'nsland.
Creagh, M. R., Auckland.
Creagh, O. M., Auckland.
Cumine, J., A.S., Nelson.
Cunningham, J., Hokitika.
Cuthbertson, G. L., Invercargill.
Dalziel, P. A., Nelson
D'Arcy Irvine, J. L. D'A., D.S., Nelson.
Davie, F. H., Christchurch.
Davies, C.B., Col. R.H., Wellington.
Davis, G. H., Wellington.
Davis, J. W., Cf. Draughtsman, Wellington.
Dawson, J. jr., Auckland.
Dennison, T. C.
Dewar, J., Fd. Malay St.
Dickie, J. L., Invercargill.
Dix, T. B. R., Wanganui.
Dobson, A. D., Christchurch
Dobson, E. D., Masterton.
Dowsett, C. F., Waitara.
Drew, F. W., Australia.
Drummond, T. McK., Greytown.
Drury, E. de C., A.S., Invercargill.
Dundas, H. R., Invercargill.
Dunnage, W. H., Tauranga.
Earle, P. R., Hunterville.
Edgecumbe, H. F., D.S., Te Awamutu.
Edie, J., Lawrence.
Fairburn, E., Auckland.
Fairburn, E. J., Hamilton.
Fairhall, S. L., A.S., Murchison.
Falkiner, N. L., Waikawa.
Farnie, E.H., D.S., Gisborne
Farquhar, H.A.L., Wel'gtn.
Farrer, O. R., Hamilton.
Finch, R. S., Whangarei.
Fitzgerald, G., Wellington.
Forster, W. L., Auckland.
Foster, A. L., Auckland.
Foster, E R., Auckland.
Fraser, De G., Gisborne.
Frasi, P. C, Masterton.
Freeman, F. W., Chch
Frith, J F., Nelson.
Fulton, J. E., M.Inst.C.E., Wellington.
Galbraith, R. S., D.S., Te Awamutu.
Galbraith, T. H. McK., D.S., E. African Protec.
Garrett, R., Wanganui.
Gillett, F., Palmerston N.
Gillett, G. N. C., Queensl'd.
Gillett, R., Fde. Malay St.
Gillies, D. W., C.D., Nelson.
Girdlestone, H. E., A.S., Wellington.
Goldsmith, O.G , Invercargill
Gold Smith, E. C , Auckland
Gordon, C. A., Wellington.
Gordon, H A., Auckland.
Goulding, R. R., Federated Malay States.
Goulter, R. F., Blenheim.
Graham, A.O.S.M., K.M., Tairua.
Graham, W.A., Hamilton.
Grant, G., Gisborne.
Greenfield, F. E., Blenheim
Greville, R. P., Wellington.
Grigor, R., Balclutha.
Halse, E. F.. N. Plymouth.
Hammond, H., Aratapu.
Hanify, H. P., Wellington.
Hanmer, G., Christchurch.
Hannah, J., A.S., Auckland
Harding, A. B., Te Papapa.
Harding, M.
Harding, S. J., A.E., Nelson
Hardy, E. H., Te Kuiti.
Harrison, J. W., Auckland.
Harrop, A. N., Hokitika.
Harrop, F. J., Napier.
Haskell, J. V., Greymouth.
Haszard, H. D. M., Chief Draughtsman, Chch.
Haszard, M. F., Waihi.
Haszard, N. F. J., Federated Malay States.
Hay, F. C., A.S., Wellington
Hay, R., M.Inst.C.E., D'ndn
Hay, W., Invercargill.
Hewitt, C.J.D.R., Palmerston North.
Hewson, F. M., Kawakawa.
Hodgkinson, A., A.S., Blenheim.
Holt, P. W. M., Auckland.
Hooper, H. C., Hamilton.
Hosking, F. J., Dargaville.
Houghton, A., Otaki.
Hoult, C. M., Nelson.
Houston, W.G.T., G'ym'th.
Hovell, H. K., Te Araroa.
Howorth, C. H., Wellington
Hughes, T. W., D.S. Napier.
Humphries, T., Hutt.
Hunt, L., A.S., Blenheim.
Hunt, L. G. R., Auckland.
Hursthouse, C. W., Wlgtn.
Jackson, G. A., Auckland.
Jackson, J. H., Lawrence.
Jackson, L., Cambridge.
Jennings, J. H., Karamea.
Johnston, J.W., F. Malay S.
Johnston, J. A , Te Kuiti.
Johnston, R. J., Johannesburg.
Johnston, T. A., Wellington.
Johnston, W. H., Waihi.
Jordan, F. H., Nairobi, E. Africa Protectorate.
Jordan, R. C., Te Kuiti.
Kain, C., Springfield.
Kelly, A. M., Auckland.
Kelly, F. V., Auckland.
Kennedy, A. A., Napier.
Kennedy, C. D., Napier.
Kenny, C., A.S., Thames.
Kenny, T. N. E., Paeroa.
Kenny, T. W., Paeroa.
Kensington, H. M., D. S., Auckland.
Kensington, N. C., D.S., Taumarunui.
Kensington, W. C., I.S.O., Wellington.
King, J., Masterton.
King, J. H. R., Melbourne.
Kirkcaldy, N. M.,
Krippner, H. P. Dungog.
Laing, W., D.S., N. Plym'th
Lambert, B., Frasertown.
Langmuir, J., I.S., Auckland
Laseron, E. W., Auckland.
Learmont, T., Greymouth.
Ledger, F. I., Nelson.
Lewis, C., East Takaka.
Lewis, H. J., Gisborne.
Lillecrona, T. G., Perth.
Lindsay, J. H., A.S., Wlgtn.
Littlejohn, J. G., Nelson.
Lord, E. I., Greymouth.
Louch, J. Da V., Ass.M.Inst. C.E , Wellington.
Loudon, W., Perth.
Lowe, H J., Wellington.
Luff, G. A. M., Domett.
Lusk, D. H., Te Kuiti.
Lysons, E. W. M., New Plymouth.
Maben, T., Christchurch.
Macdonald, P., Invercargill.
Macfarlane, J. C., Hokitika
Macgeorge, L. D., Timaru.
MacGibbon, J. G., Sydney.
Mackay, A. R., Wairoa.
Mackay, H., Wellington.
Mackay, J. R., Stratford.
Mackenzie, J., Wellington
MacKenzie, G. Queenstown.
Macmorran, R. G., Auckland
Macpherson, D., Invercargill
Maitland, H , Nelson.
Marchant, E. A., Wanganui
Marchant, F. W., Timaru.
Marchant, J.W., Wellington
Marchbanks, J., M.Inst. C.E., Wellington.
Marsh, W.F., Cf. Draughtsman, Wellington.
Martin, G. A., Ellerslie.
Martin, R. B., jr., Island B.
Mason, A. P., Wellington.
Mason, J. B., Dunedin.
Matthews, A. F., Gisborne.
McAlister, W. C., Federated Malay States.
McArthur, D. W., Waihi.
McCarthy, M.J.N., Sydney
McClure, G. H. M., C.S., Hokitika.
McCurdie, W.D.R., Dunedin
McFarland, C. W., Chch.
McFarlane, T., Auckland.
McGill, D., Milton.
McIntyre, G., Christchurch.
McKay, J., Barrytown.
McKellar, C. O., Dunedin.
McKellar, H. D., Auckland
McKenzie, P., Dunedin.
Meason, G. L., M.Inst.C.E., Wellington.
Meenan, J., A.S., Waimahaka.
Middleton, G. P., Wlgtn.
Miller, M. H., Auckland.
Miller, T. S., Invercargill.
Mirams, S. H., Dunedin.
Mitchell, H.T., A.S., Rotorua
Mitchell, H. W., Rotorua.
Montgomerie, J.A., Reefton
Morgan, J. R., Napier.
Morice, J.M., B.Sc., Wlgtn.
Morison, C. H., Hokitika.
Morpeth, W. T., Auckland.
Morrow, A. B., Auckland.
Mouat, J., Gisborne.
Mountain, T. J., Thames.
Mountfort, A. J., Kawhia.
Mountfort, C. A., Feilding.
Mountfort, C. W., Napier.
Muir, A. G., B.Sc. Wagnui.
Muir, R. H., Greymouth.
Murcott, W. H.
Murray, G. T., N. Plymouth
Murray, J., B.A., Timaru.
Murray, J. S., Hawera.
Murray, W. D. B., Wlgtn.
Nalder, W. A., Brightwater
Neill, W. T., D.S., Dunedin
Newton, A. D., Auckland.
Newton, A. W., Wellington
Norris, J., Otira.
O'Donahoo, A. O'N., Muswellbrook.
O'Neill, W. C., Mangonui.
O'Ryan, W., Waipiro Bay.
Orbell, S., Inglewood.
Otway, C.,D.S., Invercargill
Otway, C. C., Auckland.
Palmer, A. H., N. Plym'th.
Parkinson, S., Auckland.
Paterson, A. J., W'l'gt'n.
Paterson, N., Dunedin.
Pavitt, E. A., Jesselton.
Pavitt, F , Devonport.
Pavitt, H. H. Masterton.
Percival, A., Melbourne.
Pollen, C. R., Ch. Draughtsman, Auckland.
Porteous, J. S , Wellington.
Price, H. G., Ch. Draughtsman, Napier.
Purchas, G. H., Auckland.
Rawson, A. P., Masterton.
Reardon, C. W., Auckland.
Reay, R. C. L , Wairoa.
Reed, F., I.E., Wellington.
Reid, H. W., Dunedin.
Reilly, J., B.A., M.C.E Coromandel.
Reynolds, L., Wairoa.
Reynolds, L. H., Otira.
Rich, F. A., B.Sc., A'kland.
Richmond, R. R., N Pymth
Roberts, A. M., Wanganui.
Roberts, G. J., Hokitika.
Robertson, J.A., Dannev'ke
Robinson, E. C., Stratford.
Robinson, W. F., F.R.G.S., D.S., Hokitika.
Roche, H., Waihi.
Rochfort, N. G., Napier.
Rochfort, J., Napier.
Roddick, J., D.S., Gisborne.
Ross, D., Wellington.
Rutherford, W. G., Chief Draughtsman, Wellington
Sadd, R. T., C.S., Nelson.
Sanford, J. A., Auckland.
Sandison, G. G., Collingw'd
Saxby, A. G., Napier.
Saxon, J. B., Nelson.
Schadick, J.F.W., Westport.
Scott, G.L.R., Palm'ston N.
Seaton, A. A., Auckland.
Seaton, E. W., Wellington.
Sewell, F.B., Fd. Malay St.
Sewell, F. B. jr., Federated Malay States.
Seymour, A. P., Picton.
Shanks, C. B., England.
Sharp, W., Invercargill.
Sharpe, J. H., Fendalton.
Sheppard, A. M., Otahuhu.
Sherratt, P.S., Auckland.
Sicely, J. F., Marton.
Simms, J., Auckland.
Simpson, A., Seddon.
Simpson, F., Chief Surveyor, New Plymouth.
Simpson, L., Maketu.
Sims, S. B., Hamilton.
Sinclair, G. B., Westport.
Skeet, H. M., Invercargill.
Skinner, J., New Plymouth.
Skinner, T. K., N. Plym'th.
Skinner, W. H., N. Plym'th
Sladden, H., Wellington.
Sladden, L. C., N. Plym'th.
Slater, G., Christchurch.
Slater, L. A., Christchurch.
Smith, F. S., Blenheim.
Smith, H., Wellington.
Smith, H. M., Napier.
Smith, J. M., Wangaloa.
Smith, J. T., Timaru.
Smith, L., Wellington.
Smith, M. C., Cf. Draughtsman, Wellington.
Smith, S. P., F.R.G.S., New
Snodgrass, J., Westport.
Sole, T. C., New Plymouth.
Spence, J. W., Greymouth.
Spencer, W. C. C., A'kland.
Springall, S.S., A.S., Nelson
Stephens, I., Motukaraka.
Stevens, C., Maungatere.
Stevenson, J., Nelson.
Stevenson, J., Wellington.
Stewart, J., M.Inst.C.E., Auckland.
Stewart, J. R., Manaia.
Stewart, W., Wellington.
Strachan, J. R., Wellington.
Strauchon, J., Wellington.
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Stubbing, D., Cambridge.
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Thompson, J. B., Thames.
Thompson, S., Dunedin.
Thompson, T. K., Auckland
Thomson, J.D., D.S., Nelson
Thomson, J. E., Hamilton.
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Trent, H., Nelson.
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Turner, E. P., Inspector of Scenic Reserves, Wlgtn.
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Walshe, H. E., A.S., Napier
Ward, A. J. C., Blenheim.
Ward, L. W., Napier.
Ward, P., Auckland.
Ward, T., Ass.M.Inst.C.E., Wellington.
Ward, W.F., Waihao Downs
Ware, C. C., Newcastle.
Warner, H. A., Auckland.
Watson, R. W., Durban.
Watt, D., Porangahau.
Webb, L. F.. Christchurch.
Webster, G. J., Feilding.
Wedde, F. A., Fd. Malay S.
Weetman, S., Auckland.
Weir, E. O., Nelson.
Welch, J. S., Wellington.
Wheeler, W. J., Auckland.
Whitcombe, G., Kawhia.
Wicks, A.J., A.S., Blenheim
Wilkins, T.W., Duvauchelle
Wilkins, W. D., Akaroa.
Williams, F. J., Dunedin.
Wilmot, E. H., Dunedin.
Wilson, A., D.S., Auckland
Wilson, A. D., Homewood
Wilson, D. M., N. Plymouth
Wilson, H. M., Auckland.
Wilson, J. G., Blenheim.
Wilson, J. A., Auckland.
Wilson, W., D.S., Hokitika.
Winter, G. J., Gisborne.
Wood, J., Westport.
Wright, A. B., Wellington.
Wylde, H.J., Palmerston N.
Young, J. C., Christchurch.
Young, R. A., Westport.