PROGRESS

With which is Incorporated

THE SCIENTIFIC NEW ZEALANDER.

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Progress

The Scientific New Zealander.

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EDITORIAL COMMENT.

Acclimatisation.

The movement in the Waikato for a recognition of local management in acclimatisation and sporting matters has culminated in a petition to his Excellency the Governor for the registration of the Waikato Acclimatisation Society. The allegations of fact in the petition will probably be denied or explained by the Auckland Society. But that is not a question really germane to this matter. The governing principle is that local affairs are best managed by local people. They are on the spot, they know the local details best, they understand the local wants and requirements as no one else can understand them. This is shortly the theory on which the whole case for local government, political and Municipal, rests, and ought to be extended to all concerns. In the matter of finance, it is the practice for all licenses to extend over the whole Dominion—we speak of the pound shooting and gaming licenses. These may be taken out at any Post Office, and the Post Office transmits the money to the Acclimatisation Society in whose district it happens to be. The tourist, for example, who comes here for a season's sport, arriving at the Bluff takes out a license there, and though the money goes to the local society, the license covers the whole Dominion. In the same way licenses taken out in Wellington, Auckland, or any other centre, apply to the Dominion, the money going to the local society registered as such. This system will give the proposed society of the Waikato the whole of the revenue raised from licenses taken out in the district. But the revenue contributed by tourists and sportsmen in other parts of the Dominion will go to the society of the district in which the money is paid. As the petitioners have a membership of 700, the registration they ask for will give them an assured revenue for the work they are anxious to do and do well. The offer to meet the interests of the Auckland Society in the matter of the fish hatchery seems fair. But that is a question for the parties to settle among themselves. We subjoin the petition.

We, the undersigned shooters, license holders, residents and sportsmen of the Waikato, Thames, Raglan, Ohinemuri, Matamata, Piako, Waipa, Waitomo, Kawhia, Awakino and Ohura Counties, and northern part of West Taupo from Waihora Stream to opposite corner boundary, being members of the Waikato Acclimatisation Society, humbly pray your Excellency to grant us the registration of our Society, known as the Waikato Acclimatisation Society, with headquarters at Hamilton. We have been unable to indnce the Auckland Acclimatisation Society to aid us in eradicating hawks and other game destroyers, nor to help us in the acclimatisation and protection of game generally, and now feel that the time has arrived for us to look after our own district, and not be governed by the Auckland Society, which had at its last annual meeting in March only 25 members, including President, Vice-President, Council, Curator of Hatcheries, Rangers, etc., of whom practically all reside in Auckland or suburbs, and cannot, therefore, be in touch with the wants of our district, owing to the great distance we are from Auckland. The members of our Society residing within each county named elect one member for a seat on the Council annually, thus giving direct representation throughout the Society's district. For many years the Auckland Society has derived a large revenue from licenses in the Counties named, but this revenue has been fast decreasing, owing to want of protection to the birds, etc. The Auckland Society has never liberated any birds or animals in the Counties named, which are principally farming and agricultural districts, and we respectfully suggest should be governed by those who breed the game and allow it to feed on their farms. The Auckland Society has spent a few pounds in placing trout fry in a few of our rivers, but the cost thereof has been returned to them a thousandfold in fish and game licenses collected from our district. If your Excellency considers fit to grant our petition, we undertake to hand over to the Auckland Society all fishing licenses received for a term of three years from date of granting registration, and at the end of three years favourably consider the purchase of the Auckland Society's Fish hatchery near Okoroire, if they so desire, and thereafter arrange to give them gratis a quantity of rainbow trout fry or yearling annually. We are all members of the Waikato Acclimatisation Society and each hold a certificate signed by the Hon. Secretary to that effect, having paid our annual subscription to same for the Society's financial year ending March, 1911. Our Society embraces the finest country for game in New Zealand, and many kinds of English game birds would do well here, as the district is practically free from stoats and weasels, and with a regular income at our disposal we could keep down hawks and pay rangers to prevent illicit shooting, and import and acclimatise several kinds of game, birds and animals that would do well in New Zealand.

Correspondence.

Letters *re* first N.Z. telephone postponed.

Queries.

Violin.—I am intending making a violin. Can any of your readers tell me where I could obtain the drawings and patterns to make to?—Amateur.

SMOKY CHIMNEYS.

Can any of your readers tell me who is responsible for smoky chimneys in a new house? I have recently built a house in a hilly neighbourhood, and am very disgusted to find that the main chimneys smoke badly in almost any wind. In a high wind the fires are positively dangerous, owing to the way the wind blows down the chimneys, scattering sparks over the carpet. Is the architect who designed the house responsible in not considering local conditions? And is a man expected to accept the house as in good order with chimneys of this nature? There are no chimney pots on the chimneys at present.

W.H.

Cells (S.A.M.)—Take round piece of wood, size of cell, cut a strip of brown paper full length of sheet and wide enough for height of cell plus enough to turn over for the bottom. Roll paper round wood, fold in one end for bottom and stick bottom and edge of paper down with pitch. When all cells are finished this far, melt some pitch in a shallow dish and dip the top of each cell in, say, for ¾in. Don't spare the pitch on the side seam, as it forms in connection with the top ring of pitch a vertical stay to the cell when soaked with the liquid. Before using, pour enough plaster of Paris into each cell to keep it from floating. The writer used a set of these cells continuously for 2 years.—"Gell."

Stud Driver (F.M.L.)—Take round mild steel, twice diameter of stud and two diameters long, drill hole right through centre ½in. diameter of stud. Enlarge one end for depth of 1½ diameter and tap to suit stud; tap other end to suit ordinary bolt carrying jamb nut. Shape portion of outside of tool square or hexagon for spanner; case-harden. To use, screw stud into tool a full diameter, jamb with bolt and nut. After driving stud, slack back nut and bolt, and remove tool.—"Moto."

Wire-worker (A.B.)—With the help of assistant, or by yourself, take the coil of wire, get both ends clear; then take about half-a-dozen coils from one end and pass them clear through the remainder of the coil, and place on floor. Then lift the coil with the side from which the half-dozen coils were taken up, and, holding it loosely, the whole coil will fall circle by circle through itself to the floor, clear of all tangle.—"Practical."

The Mastery of the Air

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

Dr. Graham Bell and Mr. Baldwin in Auckland.

According to promise, we publish to-day the lectures Dr. Graham Bell and Mr. Baldwin gave at the New Zealand Aero Club's meeting in Auckland on the 10th of last month. The term "lecture" somewhat startled these gentlemen when our representative referred to the episode, and they protested good humouredly. For their sakes let us call their lectures talks.

Dr. Graham-Bell said:—

"Gentlemen, it gives me great pleasure to stand before this assembly, right in the far end of the world, and to talk to men who are devoting their time to the most interesting science, 'Aviation.' In looking about me I cannot fail to see the difference in the colour of your heads, your hair not yet turning white, in comparison to my own. (The speaker possesses long white hair.)

"I really don't know what to say to you in regard to aviation, but will strongly recommend you to ask Mr. Baldwin to speak to you, he being a practical flying man, as well as Vice-president of the Canadian Aero Club. However, if there is any question I can answer for you I will be only too glad to do so."

At this stage several questions were asked in regard to flying at a great altitude.

"The flying of the future," continued the doctor, "will invariably be at a great height, there being several good reasons for this. The density of the air being less, and the thrust of your engine the same, the obvious result is the propeller drives along with greater force, the mass it moved while on the earth, consequently when a good altitude is reached the engine may be throttled down or some compensating device be introduced to lessen your power. It certainly takes a big power to get your aerodrome to a great height, but less power to drive when the height is reached.

"The absence of air gusts and currents is also a distinct advantage, as these gusts present difficulties to aviators in the piloting of their machines.

"The rarity of the air is nothing to be afraid of, as the aviator is rushing through space at a great velocity, and would not suffer any inconvenience, which might occasion if he were stationary. By means of a funnel-shaped body with mouth towards the front machine, the rare air could be concentrated around the aviator and his engine.

"Extreme cold is another drawback to high flights, but this is simply solved by the introduction of a spiral of pipes carrying the warm water from the engine to the radiator, circulating around and in front of the aviator.

"Judging by your surrounding country," went on the doctor, "it would be an excellent thing for your club to consider well the facts of starting your aeroplane from the water. Your machine, if built upon a hydroplane, which, as speed is developed, would lift itself out of the water, instead of as in the ordinary way leaving the land. The possibility of starting off the water is indeed a most important item in aviation, and it is my opinion that the next move will be a big development in this direction, it being more convenient and much safer (especially for beginners)."

Dr. Bell also referred to a weak body, such as a strut losing much power by vibration, and the necessity for proper staying and guys.

Mr. Baldwin, on rising to speak, referred to the experiments made at Dr. Bell's home at Baddeck in Nova Scotia. He was very pleased to see the interest taken in aviation in this part of the world, and if he could be of any service to the club he would only be too happy to impart to others the benefit of his experiments.

The method of construction and radiation, together with the drive and position of your engine, are very important features in aerial construction. He strongly advised having the engine low down, concentrating the strain on the main parts of the machine. By means of a blackboard, the speaker showed the thrust strain on a machine (Fig. 1).

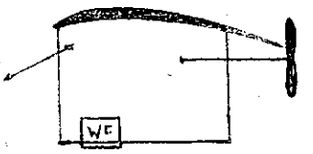


Fig 1.

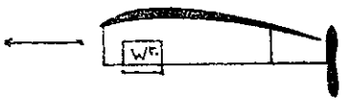


Fig 2.

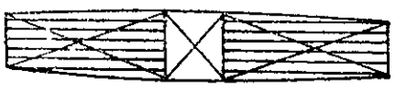


Fig 3.

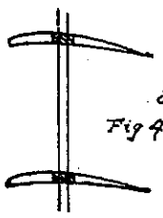


Fig 4.


Fig 5.

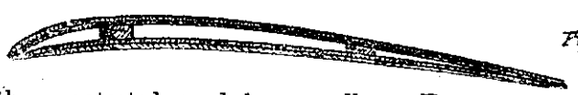


Fig 6

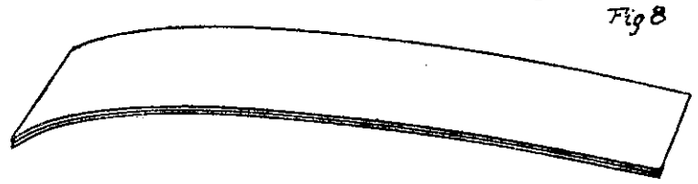


Fig 8

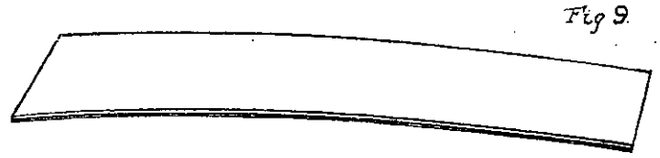


Fig 9.

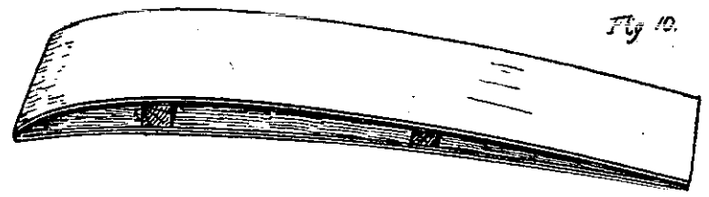


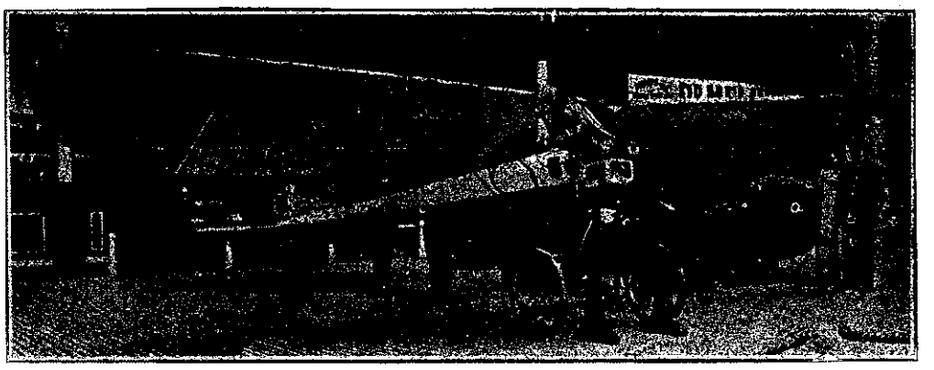
Fig 10.

Having the engine high up tends to throw the strain and thrust on the frame of the machine, and in the event of a sudden strain it is more than likely the engine will land on top of the aviator, but by means of having the engine low down, the strain is exerted on the body of the machine, which is more fit to stand it (Fig. 2).

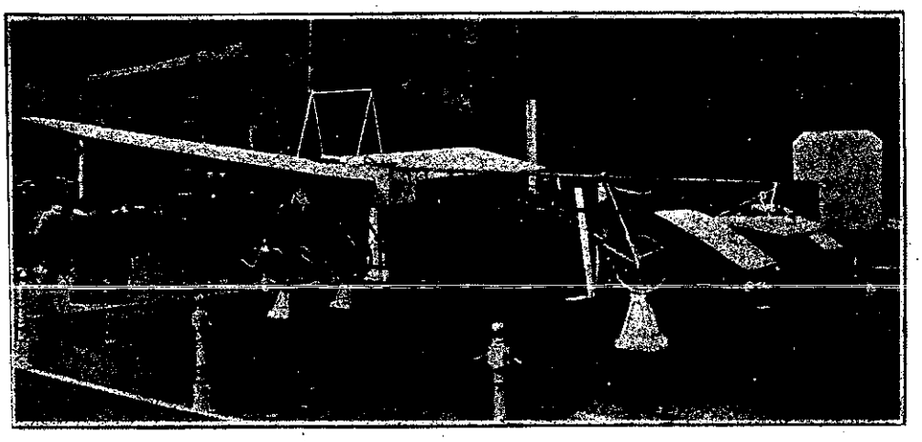
The weight of radiators and their cumbrance has made them difficult to use in aviation work. However, he had, by constant experiment, hit upon a design that would support more than its own weight. Taking advantage of the struts that lie between the decks of his machine, he had made thin copper 32-inch tubes in the shape of a plane running across his machine, at a distance of 3in. from one another. These tubes were braced by a section of brass running through the centre, and so sweated, they made water-tight compartments. This brass section was drilled, and the stays and struts passed through, making the whole stable and free from vibration. The seams and joints were bent over and sweated, the whole making a radiator of great cooling capacity at a minimum weight.

The blackboard again proved useful in illustrating the design of these radiator struts (Figs. 3 and 4).

The construction of tips is a very interesting study, but I find it best to have this a plane form rather than a curve, and when not in action to be level, rather than incline with the curve of the plans (Fig. 5).



LE BLON, DELAGRANGE, HUMBER. (Among newest at Olympia.)



HAVARD, WRIGHT, BLERIOT, WITH LANDING CHASSIS (OLYMPIA).

The simplest way to make these is to use wood of about 12 to 16 inches in width and about ⅜ in diameter. Place these two lengths, one on top of the other, in a mould the shape of top rib, glue well, and clamp tightly.

The lower rib is treated in the same way, this giving us two lengths of laminated wood, in the shape of the top and lower ribs.

Top rib glued and moulded to shape.

Bottom rib glued and moulded to shape.

These two ribs are now placed together with supports in between, the whole making a complete rib the thickness of the plank used, as here shown (Fig. 3), the whole being fastened with good glue. These planks are then easily sawn up into convenient widths.

The manufacture of ribs is a very tedious task, in making them uniform. A simple manner of construction is shown in the sketch (Fig. 6).

"I have been asked to give my opinion to men about to fly: Don't be too ambitious. It is a hard thing, I know, to keep from flying, but there is a lot to be done before you attempt to leave the ground.

"I advise a thorough examination of your machine and engine before each flight, to give it the most severe test possible. Have two friends to hold it by the tips and hold it up and jump into it. I cannot too strongly recommend using the machine without elevator till you get used to the feel of the machine and have confidence in it. Glen Curtis learned to use his machine in this way, and it is also used in most aero schools in France.

"When you at length start to fly, make a series of short hops; it is the landing that shows the skill of the aviator, and not across country flights."

After the discussion which followed the "talks," the Doctor and Mr. Baldwin were each elected honorary life members of the Aero Club. In returning their thanks, the visitors were appreciative of the honour done them, and cordially wished the club every success in their efforts. Mr. Baldwin added that at any time Dr. Bell or he could help them, they would be only too pleased.

One of the heartiest votes of thanks ever given brought these absolute unique proceedings to an end. Such was the first appearance of aviation in the Dominion.

An Interview.

Dr. Graham Bell and Mr. Baldwin.

(R.A.L.)

As representative of PROGRESS it was my good fortune to meet Dr. Graham Bell and Mr. Baldwin during the few hours they were in Wellington on their way back via Australia. They happened to be in when I called, and they were good enough to accord me an interview. The old gentleman and his young friend were alike in one respect: they were courtesy itself, and in their readiness to talk about the science of aviation, of which they are such distinguished students, and in which they are such high authorities, there was nothing to choose between them. In everything else there was a great contrast.

The Doctor, big, strong, ruddy, broad-shouldered, with a mass of picturesque white hair, talked fluently with the old Doric of his country unimpaired by the long absence, untouched by the strange speech of the people of his new home. Very careful in all his statements, he was, as becomes a man of science who has studied and practised accuracy of statement all his long life. For example, I asked him if the limit of long distance telephony has been reached yet on the American Continent, and he at once declined to admit that there is such a thing as a limit at all. We have not yet got beyond certain distances, but what the operating distances may be in time no one can possibly say. The upshot was that we arrived at the fact that the longest distance is still, as was stated in this journal two or three years ago, the distance between New York and Omaha. As to the telephone, the Doctor had a great deal to say, of course, and he said it in easy, picturesque fashion, making it very interesting, and the crisp accuracy of all his statements was an education. Here is a man who has learned to avoid waste of time through looseness of statement. He said much of his invention and of the struggle he had made to get it to the front, but did not add anything to the full details published in our last. Of course he remembered the service done him by the Don Pedro of Brazil at the Philadelphia International, and was duly grateful. It was the Emperor who, being a scientific man himself, was struck by the invention and insisted on proving to the Committee, who were inclined to ignore it, that it was really the most important thing by far among the many things waiting to be shown.

Mr. Baldwin, young, slim, fresh and vigorous, met the questions put to him with gravity and a self-possession very remarkable. One detects a constant vigilance in his attitude and expression, and a calm deliberation very notable. One realises the man accustomed to carry the responsibilities of aviation with a due sense of their great importance. He makes no gestures like the Doctor, who

swept space at times for illustration, and emphasised points between finger and thumb, after the manner of the argumentative expounding man. On the contrary, you could see that this man had no movement to waste. It was the manner of one accustomed to keep his strength exclusively for the steering of his machine. When the penalty is death for an instant's forgetfulness of the all important use of the hands on the levers, one gets, it is evident, into the habit of keeping very still, in readiness to act with the speed which has to make up for the want of the automatic. Mr. Baldwin turned out, by the way, not to be the Captain Baldwin who figured at St. Louis in his famous dirigible, and has been flying in various States from time to time in the interval. This one is a young man, well known in Canada, before he took to flying, as the son of the first Premier of Ontario, a famous man in his day.

The two talked aviation with great gusto for the best part of an hour, sometimes answering questions drawn from various episodes published in PROGRESS and other journals, and sometimes speaking out of the fullness of their experience without prompting or suggestion. Mr. Baldwin is one of the coming aviators of the American Continent, where he now holds the record, or did a few days ago, for the longest flight—120 miles. The Doctor is, on the contrary, more of the scientific pioneer than the flyer of to-day. But he has done more for the science than many fliers from the day when he made the world understand the achievement of Langley with his famous aerodrome, to the day when the association he started (at Baddeck) for the study and practice of flight closed its labours because it had accomplished its purpose of pioneering.

Speaking of Langley, he was very appreciative and sympathetic. It was the Doctor who took the photos of the aerodrome when it flew over the waters of the Potomace, one of which we reproduced in PROGRESS four years ago. Why did the finished machine not succeed like the model aerodrome? The Doctor was present on that lamentable occasion. Things were not quite ready, and the inventor had to start before he was quite easy in an unsuitable place. The machine caught in some part of the pontoon before it could rise, and got damaged, the U.S. Government lost faith, refused further supplies, and poor Langley died of a broken heart. Such is the story which has appeared in these pages. We merely talked about it, and the Doctor and his friend both sighed as they spoke of the pity of it.

Of Chanute and his scientific work on the subject of heavier than air they had much to say that was appreciative: the French engineer settled in Chicago they regard as the father of aviation as practised to-day. Of the Wrights, too, they had much admiration. But others had gone ahead with good work on similar lines, while the Wrights were keeping "dark" in their Ohio home. This explains the failure of the famous brothers to sustain their claim for an injunction.

The main work in which the two had been associated to the great profit of aviation was as members of the Aero. Association of Canada—not the Aero. Club of Canada, of which Mr. Baldwin is vice-president—but a private little company got together by the two friends for the work of getting into the air, as they put it. There were five, and each was to construct a flying machine, the convincing ground being at Baddeck, the home of Dr. Graham Bell, in Canada (Nova Scotia).

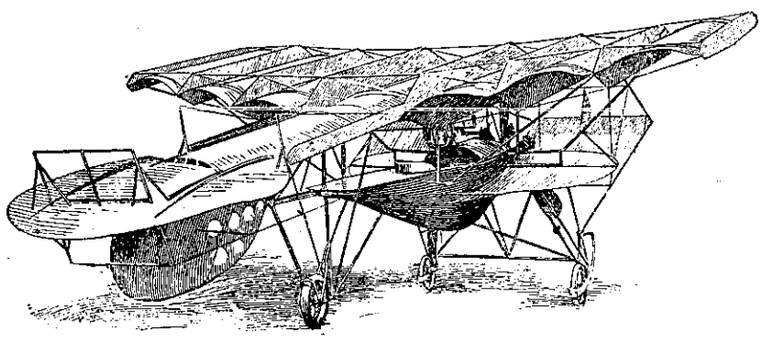
The first of the quintette party to construct a machine, a biplane—in fact, they all had a predilection for the biplane form—was Lieutenant Selfridge, of the U.S. Army. His machine was known as the "Kedar." Except the Wrights, he was the first American flier, performing some big trips. He was also the first American victim, for he was killed when Orville Wright came to grief in the act of handing the machine over to him on behalf of the American Government. The second machine constructed was Mr. Baldwin's "White Wings," a very successful flier—and Mr. Baldwin bowed as the old Doctor made the complimentary reference. Glen Curtis followed with the "June Bug," and that was the beginning of his meteoric career, quite the brightest in the States. This was before the high flights of Drexel (7100 feet) and Johnstone (7303 feet) at Long Island the other day, and Radley's 20 miles in 19min. 48 2-5sec. The fourth of the flyers was McCurdy, with the "Silver Dart," which also gave a good account of itself. The fifth was Dr. Bell's "Cygnet," which has not yet been in the air, but the Doctor hopes to get it going on his return.

These were the pioneers of aviation in the States, independent of the Wrights, whose merits they were, however, the first to recognise. Having done so much for the cause with these machines, they dissolved their association as having fulfilled its mission. When will you fly like the birds without a propeller? They look "ask us something easier."

After much chat with the distinguished aviators, the representative of PROGRESS took his leave with thanks and good wishes for the prosperity and success of his new friends, with whom he had been so long acquainted through the descriptions of their work, and had only just met. Not the least pleasant incident of many during the interview was one which may be called personal to PROGRESS. When the name of the paper was mentioned, as it had to be to justify the irruption on the privacy of the distinguished travellers, they declared, both of them, that they had frequently seen the paper during their travels through the country, and they were surprised at finding anything of such a character in the Dominion, so far away from the scientific centres of the world.

The Fall of Wellman.

For the third time has Mr. Wellman come to grief, and for the third time has he demonstrated the unsuitability of the dirigible type for any trustworthy work. The first time—two years ago, when he started for the North Pole—wind simply drove him off the line and threw him on to a friendly glacier. The next attempt was nipped at the outset by a gale, which smashed the airship at the garage. He gave up the Arctic after that, and was thought to have given up aeronautics, but he had made up his mind to make a record fly across the Atlantic. After much preparation he started from Atlantic City on Saturday, October 15th. A few days of intense excitement followed, with occasional wireless messages. Those from the airship kept a good countenance. But the task proved too great. Wellman and his party were blown away towards the West Indies and half way over abandoned their airship and were picked up by a passing steamer. It was a wonderful piece of luck. The moral of the story is like the morals of all the stories in the airship record: that the dirigible is not a craft to be depended upon. The America was probably as good as any airship that has ever been turned out by the builders. Yet she proved unable to keep a course. Wellman lays the blame on the equilibrator. This was a floating collection of gasoline cylinders attached by a rope to the airship. Some such arrangement was deemed necessary for the purpose of preventing loss of hydrogen by the necessary descents during the voyage and the disturbance of equilibrium from throwing out of weight for the purpose of rising. The weight of the gasoline attached to the rope, it was hoped, would maintain a steady level. Probably the hope was justified, but the cost was too great for the airship's safety, as the drag proved too much for the power of the propeller. Hence the ship became the plaything of the wind. The result was duly chronicled. When the mail files arrive, there will be an exciting narrative. The additional failure will not help the dirigible type to rehabilitate itself with the world. It may, indeed, be said without exaggeration, that the navies of the world are for the present quite safe from the much discussed dirigible. The Gordon Bennet race from St. Louis North has further demonstrated the utter unreliability of the dirigible. Still, Governments go on spending money on the type, as for example, Britain with the purchase of the big Clement-Bayard that has just sailed over from Paris to London.



THE LATEST (IN STEEL AND ALUMINIUM) MOISANT.

Steel-Aluminium Aeroplane.

An aeroplane made entirely of steel and aluminium, and provided with a surface under the driver's seat, which is expected to cause the machine to float if it falls into the water, has been built and successfully tested out by an American living in Paris. The builder is Mr. Moisant, who lately flew from Paris to London, and who has made a number of short flights in it.

The wings are made of thin aluminium, and the lower parts are of steel. The driver's seat and the motor are placed on a surface or car built to float on the water and provided with two flat stabilizers, one on each side.

Engineering and Electricity.

Water Powers of the Dominion.

On the 13th of October Sir Joseph Ward outlined the now famous and much discussed water power scheme of the Government. He did so in his speech, moving the second reading of the Water Powers Bill. There are roughly some 4,000,000 horse-power in the various parts of the Dominion, according to the report presented by Mr. Hay in 1904. The object of this Bill is not to attempt to grasp all this power at once. It is to make a beginning by tapping some seventy thousand, making them available in about four to five years from the present time.

Sir Joseph Ward said the intention is to develop the following powers:—Kaituna, the river draining Lakes Rotorua and Rotoiti: Wairoa, Northern: Hutt, Akatarawa (Southern Wellington); Makuri, Central Wellington: Waikaremoana or Te Reinga Falls, for Napier and Gisborne, particulars to be given in the Public Works Statement when the choice shall have been made between these two sources of supply: Lake Coleridge, Canterbury; Teviot, Clutha River, Otago; Lake Hauroto, Southland; Kumara, Westland.

The Northern Station.

"The Kaituna power would supply the Auckland district and the southern portions of Auckland, including the Bay of Plenty and Waikato. The horse-power would be 10,000, at a cost, including everything, of £320,000, the proposals extending over two years. The probable requirements of the north of Auckland would be supplied by developing the Wairoa Falls to the extent of 3000 horse-power, at an approximate cost of £100,000.

Power for Christchurch.

The Lake Coleridge scheme would serve Canterbury between Timaru and Hurunui. It was intended to develop 10,000 horse-power, which would be less costly than any of the others, running to £270,000. The lake itself, which had a fall of about 480 feet in a very short distance, and only about three-quarters of a mile to tunnel, would be utilised. The present flow from the lake would give 5000 horse-power, and that could be increased very largely by diverting the Acheron and Harper rivers into the lake, giving an additional 12,000 horse-power. By raising the lake by a dam a maximum of 38,000 horse-power would be obtained, and a further diversion of the Wilberforce would increase it to 75,000 horse-power. The present proposal was to develop 10,000 horse-power immediately, including headworks for a future scheme of 28,000 horse power. The distance that the current had to be transmitted was seventy miles. It was proposed to electrify the railway through the Lyttelton-Christchurch tunnel, which would facilitate the working of the train services.

The Wellington Scheme.

At Akatarawa, at the Hutt, it was proposed to establish a plant for the supply of current to Wellington and district, including Petone, Johnsonville, and all other suburbs. The plant would be of 10,000 horse-power, and the cost would be £300,000. The power available was 8500 horse-power for continuous operation, but if intermittent the power, of course, would be greater. The Government had already secured all the land necessary, including that for the reservoir. The length of the transmission was only twenty-four miles, and the line would pass through Lower Hutt and Petone. It would be carried along the railway or the road all the way.

For Otago and Southland.

The Otago power would be established on the Teviot, where 10,000 horse-power would be secured at a cost of £300,000. This would serve all the towns in the interior of Otago and also the city of Dunedin; and would meet, for many years to come, all the requirements of the province. In Southland it was proposed to establish a power from Lake Hauroto, where 10,000 horse-power would be secured at a cost of £350,000. This would supply the whole of the towns in Southland, including Invercargill.

Manawatu and Other Districts.

At the Makuri Gorge a station would be established which would give 6000 horse-power and cost £200,000. It would serve Palmerston North, Feilding, Dannevirke, Masterton, and a number of other places in those districts.

On the West Coast.

On the West Coast there would be a station to give 3000 horse-power. This would be built in conjunction with an extension of the Kumara water-rate. A transmission line would have to be provided to carry the current to the Otira tunnel and also to Greymouth and Hokitika. The total cost was estimated at only £75,000, owing to the work which was already done, and which would be utilised. Of the power generated 1000 horse-power would be devoted to the working of the trains through the Otira tunnel, and the balance of 2000 horse-power would be ample for the rest of the West Coast.

The horse powers estimated for these are with three exceptions 10,000 apiece, the exceptions being Kumara and Wairoa at 3000 each, and Makuri at 6000.

The Total Cost.

Provision would require to be made for surveys at a cost of about £60,000, and the total expenditure on the different proposals named would be £2,500,000.

Consumers to Benefit.

The cost to consumers, calculated on a basis of £10 per horse power per annum, would be very much cheaper than anything they could get at present, as manufacturing concerns had now to pay anything from £15 to £30. The Government contemplated the supply of current at twopence per unit for lighting, and a penny per unit for power, which was very much below the charges now ruling. As a matter of fact, working out the cost on a basis of £9 per horse power per annum would be equivalent to a charge of but a penny per unit for intermittent working and a halfpenny per unit for continuous working. His estimate, therefore, was well on the safe side.

To be done in Four Years.

The Government would be able to do all it proposed within the next four years quite easily, and he was confident that it would be found to be a very fine thing indeed for the country as a whole. The proposals sketched could be completed in the four years, including surveys. It was intended to start with the Lake Coleridge, the Kaituna, and the Hutt schemes practically simultaneously. The surveys for the whole of them would be put in hand without delay, and to carry out the scheme would mean an expenditure of £500,000 per annum for four years only. If necessary, some of the smaller powers could be put in hand later. At a maximum cost of £2,500,000 the country could have the full benefit of the great powers now running to waste. It was beyond all question that this would confer a very great benefit upon the country as a whole, especially in the industrial and domestic spheres.

The Probable Profit.

The value of the energy would be incalculable in the case of tunnels such as the Lyttelton-Christchurch tunnel, which would be electrified, although he could not promise the early electrification of sections of the ordinary line. Regarding finance, it was safe to assume that there would be a profit of £3 or £4 per horse-power per annum. There would be heavy depreciation funds, of course, and sinking funds. He was more and more convinced of the necessity for conserving the power to the State, as it became an immediately reproductive asset. He proposed to ask for half a million annually for four years, and at the end of two years some of the scheme would be reproductive."

It will be seen from this that a handsome balance-sheet is expected in the near future, as thus:—

Profit on 70,000 h.p. @ £3 as above	...	£210,000
Less		
Interest and Sinking fund @ 5%	125,000	
Depreciation say	... 25,000	
		150,000
Estimated profit	...	£60,000

The estimates are, of course, not sufficient for immediate work at any of the localities named. For the purpose, a sum of £60,000 is mentioned as necessary by the Premier. He said also that the scheme would be started with the Coleridge, Hutt, and Southern Auckland (Kaituna) proposals.

The Basic Information.

Up to 1906 several reports were made by competent engineers—Mr. Allo, of Swiss experience, Mr. Hay, engineer-in-chief of the Dominion, and Mr. Hancock, M.A.I.E.E. The latter came at the invitation of the Government from California. He is an electric engineer and general superintendent of the California Gas and Electric Corporation.

These reports were made in 1904, and Mr. Hay made a second report in 1906. Since then the Government engineers have been at work. What the additional details are that these have been supplying in the interval we do not know. Sir Joseph, on a date subsequent to that of his first announcement, said they were considerable. It was upon them, we presume, that the determination announced in Sir Joseph's first speech to begin in three places was based. He professed the utmost confidence in their capacity.

Mr. Hancock's report gives a comprehensive summary of the work done by him. It is shown in a table giving the details of 44 sites examined and reported upon, the headings of which indicate for each the drainage area, the run-off per square mile of the same, the area of the lakes, if any, in the watershed, the flow per second, the head power, and the horse power estimated. Supplementing the table is a series of notes on the various sites mentioned therein. By way of conclusion, there is a list of suggestions for further examination. The most interesting section of the report is that devoted to the description and history of a large electric power and lighting business entitled, "History and Results of the Bay Counties Power Company." As this was given for the purpose of showing what has been actually accomplished in the matter of the supply of electric energy over fairly long distances in America, we quote in its entirety:—

"In 1895 capitalists were interested in a plan to utilise the waters of the South Yuba River, in Nevada County, to drive electric generators, and transmit the power eight miles to Nevada City, Grass Valley, and the adjacent mining district. Nevada City had a population of three thousand, and Grass Valley six thousand. Each had gasworks, and each was supplied with electricity by means of small independent plants. Grass Valley was distant about eight miles and Nevada City about five miles from the generating station. Two 500-horse power generators were installed, to be driven by impact water-wheels, supplied with water under 85lb. pressure by means of a 48in. pipe and three miles and a half of flume, 6ft. wide and 5ft. deep. Water was diverted into the flume by means of a log-crib dam, rock-filled, 28ft. high by about 200ft. long.

Work was started in July, 1895, and the plant was put into commercial operation early in February, 1896. Lighting for the towns was the first business secured, and after that had been worked up pretty well efforts were made to secure business-furnishing power to the mines. This was very slow, however, and it was two years before the original installation was loaded. At that time plans were completed to double the capacity at the power house, and to instal a reserve water-supply. This was completed and put into service late in the year; ere this, however, both the little electric plants and one of the gas plants had been purchased. The other gasworks was purchased later.

While work was being pushed in Nevada County a scheme was floated in the adjacent county of Yuba to utilise the waters of the Brown's Valley irrigation system to drive generators near Brown's Valley and transmit the energy to Marysville, a distance of eighteen miles. Marysville was a very active business centre of five thousand inhabitants. The large flour-mill, cold-storage plant, woollen-mill, and other small industries, besides the town of Yuba City across the Feather River, with its county buildings, barley-mill, and packing-houses, made a very fine load when taking their energy from the plant mentioned. Marysville already had an electric plant, operated by steam in connection with a gasworks, both of which were purchased, and the lighting, gas, and power interests combined soon after the transmission system was gotten into operation, which occurred early in 1899.

"The year 1898 was very dry, and all water interests suffered terribly. Some of the water systems were out of service completely. It was this occurrence which emphasised the value of the Yuba River for power purposes, and measurements were at once taken and plans made to utilise it to its fullest extent. This valuable water-right was in the possession of the Yuba Power Company owning the Marysville transmission plant. Contracts were made with the Nevada County Electric Power Company, owning the Nevada County system, for 3000-horse power, and with the Sacramento Electric, Gas, and Railway Company for 5000-horse power. The distance to Nevada County was only seven miles and a half, but to Sacramento was over sixty-one miles. During 1899 work was prosecuted with vigour on the new and large plant, which was named 'Colgate.' Current was put into Sacramento in September, and a month or two later a thirty-mile line to Oroville went into service handling gold-dredgers.

"It was in the winter of 1899 that the plan was conceived of running a long line from 'Colgate' to the Bay of San Francisco. So the Nevada County and the Yuba County plants were consolidated, and work was at once started on this new plan. Surveys for the 140 miles of line were started in the spring of 1900, and current was put over the line to the bay on the 17th February, 1901. Contracts had been made for lighting the little towns *en route*, and for handling the street-cars in Oakland. Also, the Standard Electric Company, which had been working on its long-distance plant for some time, had trouble unexpectedly developed, and in order to hold their contracts, engaged to use all the power the Bay Counties Power Company could spare. It was during the summer of 1901 that the systems of the two companies were connected, and a distance of over two hundred miles handled commercially and continuously for a number of months.

"The machinery now operated by current from this system includes the following:—For mining purposes—air-compressors, pumps, hoists, stamp mills, rock-breakers, concentrators, gold-dredgers; for commercial service in towns and along the main arteries — machine-shops, foundries, planing-mills, ice machinery, laundry machinery, pumping for drainage, waterworks, flour-mills, feed-mills, woollen-mills, silk-mills, cement-works, fruit-canneries, creameries, agricultural-machinery factories, tanneries, smelters, boot and shoe factories, oil refineries, shipyards, jute-mills, street railway systems, irrigation, interurban railroads. Thus you will see that the uses to which electric power has been applied extend to almost every industry where power is needed, besides the ever-present electric light and fan motor. Cooking has not been done to any great extent, largely on account of the initial cost of the apparatus. This objection is now overcome to a great extent, prices having been established on the necessary articles so that they are in reach of every one; it only remains to educate people to use them.

"The record has been with the Bay Counties development that they were never able to furnish all the business that offered; even with the very large plants building they will not be able to keep the supply up to the demand. This has been the record of the majority of other plants also. You will find it the same with any development you may propose to instal."

It will be seen that the scheme of this company was gradually developed from a transmission of eight miles to 200 in a period of nine years, 1895 to 1905.

Mr. Hay, the late Engineer-in-chief of the Dominion, carried the work a good deal further than Mr. Hancock in his report of the same year—1904. A great deal of information is amassed in that report. It supplements the information in Mr. Hancock's, and carries on the record of the first census, as it may be called, of the water powers of the Dominion. But neither in this report nor in that of Mr. Hancock is there any pretence at finality. Mr. Hancock was satisfied that the power is there and could be profitably harnessed. Mr. Hay was still further satisfied, and for the year of writing left it at that. In 1906 he made a further report, which shows much evidence of the most extended surveys and the most careful observations. It is clear to any one reading the document with any pretence at closeness that the writer has reason to be still more satisfied with the state of things he has been investigating. Speaking with a due sense of responsibility, he has stated the result of his laborious investigation in figures. Approximate they admittedly are. But even at that they encourage the conclusion that we have before us here a strong possibility of commercial success. The sale prices, he states, all round for most of the schemes announced by the Prime Minister varies from £5 10s. per h.p. per annum to £7.

That the Prime Minister has had further information the result of further investigations is only another way of saying that there is an engineering department, and that this has been at work collecting, surveying, estimating, testing, and that after the Legislature had accepted the principle of State monopoly in this matter of the water powers. The State having announced its intention to make practical use of these powers, has been at work on the investigation of the problem of how to solve it. The first instalment of the user is now before the public in the scheme designed for taking the simplest offer that nature makes of the powers.

That none of the schemes of the series announced is ready for the contractor is evident from the way in which the Prime Minister referred to them. That he has placed the cost of further survey at £60,000, and that he has stated that only three of the schemes are in a fit state for immediate further preparation for the contractor and that he has taken the average sale price at £10, is a sufficient refutation of charges of recklessness and wild-catism.

The work is offered in a far more forward condition than the great Public Works Policy of Sir Julius Vogel was offered. On that famous and momentous occasion the Legislature sanctioned the principle that a certain sum of money

might be raised for railways and other works and immigration, without having before it the estimate or even the name of a single railway or road or batch of immigrants or contract with any shipowner or constructor. The Legislature trusted the Government to comply with all necessary technical requirements before proceeding to spend a farthing of the money. Detailed estimates came later, and were followed by appropriations.

Now in the recent instance, the works have been mentioned, together with their general cost and the necessity of further survey. There is moreover, a carefully prepared statement as to the monetary results to be reasonably expected. This should clear the public mind reassuringly of much misunderstanding.

The question has been raised of the economic limit of transmission of electric energy. Mr. Black, of Wellington, has declared that the length proposed of the carriage to Auckland from Kaituna is prohibitive, to the extent of six times the cost of the steam generated power at the terminus. The cost of the steam generated is £20 per h.p. per annum. The profitable sale price in bulk is set down by Mr. Hay in his report of 1908 at £5 10s., the Prime Minister bringing it up in his estimate to the House to £10. There is still a good margin. Mr. Black, confronted with this discrepancy between his statement and that of Mr. Hay, says that he knew Mr. Hay to be doubtful on the point. But the fact remains that Mr. Hay reported with a due sense of responsibility, evidently with the intention of guiding the Government in the matter.

In this connection we refer to the description of the Bays Counties Scheme given in Mr. Hancock's report as above quoted in full. It is the description of a going concern which has worked regularly at longer distance transmission than the Kaituna, and at a profit. The Kaituna distance is set down as having been in use for a long time. The greater distance of 200 miles is described as having lasted for months.

It remains to consider the market for the powers supplied. The right thing will be, of course, to sell every unit. These amount in the aggregate to 72,000 h.p. How much of these can be sold depends on the price of course.

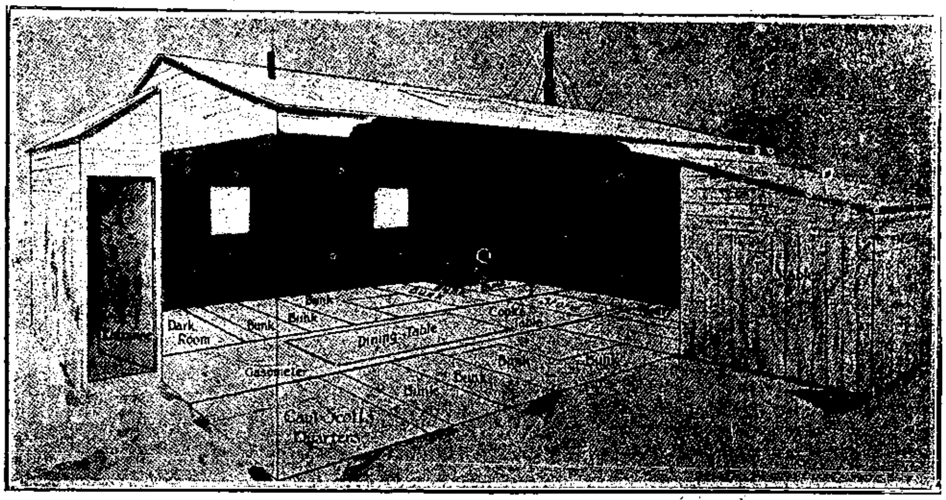
As we write, there is published in the "N.Z. Times" a letter from Mr. Neville, a distinguished electric engineer of much experience, who, after referring to the Ontario Company's work extending over a large area of that Province with a transmission extending to 161 miles, contrasts the price of the unit here in Wellington (steam generated) with the price or the same in Dunedin (water power from Waipori), and the costs stand thus in the comparison: one-third of a penny per unit., a sum on the faith of which companies have taken contracts extending over seven years, for Dunedin-Waipori water, against threepence (six times as much) for Wellington-cum steam. Mr. Black has spoken of the Waipori scheme as not a distinguished success. But these figures are clear enough to require an answer. At all events, whatever the Waipori may have lost in the earlier stages, it is clear that it can profitably sell power at a unit price one-sixth that of the Wellington Corporation. This is a reason for regarding the Government scheme as having been reasonably thought out in most of the important details.

Therefore, it is fair to conclude that a proportion of the power, when brought to market, will be absorbed by the market. In addition, there is the undoubted fact that the supply of cheap power makes always a demand for it. On the whole, it is a fair business risk. When a man starts a big business he does not require, and seldom gets any, promises from customers, let alone does he exact guarantees before opening his premises. He simply advertises in the paper that he is opening such and such a business, and that he hopes, by unremitting attention to business and the most liberal treatment, and the best possible selection of materials, sizes, fits, what not, to deserve that support which is always accorded to superior merit. His friends do not, in consequence, turn on him as a wild-species of lunatic.

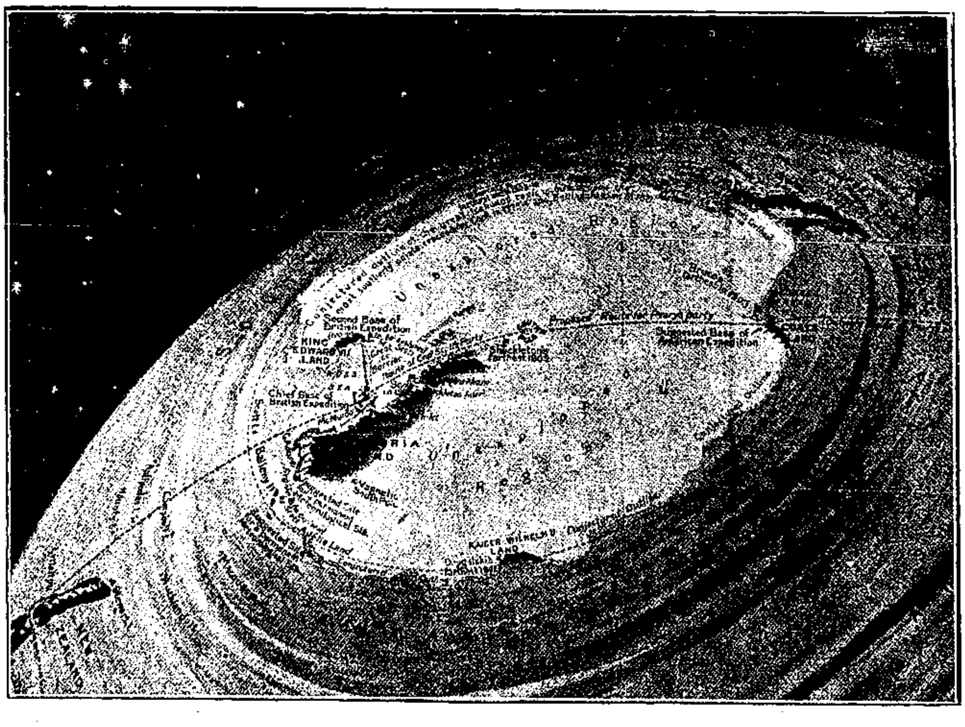
But there is a cry that lots of plants may be "scrapped." That cry has gone up in many places before now. But wherever it has gone up it has been a cry of jubilation based on the fact that the scrapping was the necessary step towards the salvation of the business threatened with disaster by new ideas. So it must be again. Whatever plant Municipal, joint stock or individual, has to be scrapped will be the better for taking power from the cheapest source. These plants, it must be remembered, are on foot for the purpose of dealing with power economically. It is their sole *raison d'etre.*

As to climatic influences which Mr. Black dealt with as drawbacks to long distance transmission, especially in this climate, the only categorical reply made to him is by Mr. Neville. Most of the criticism of Mr. Black, it must be admitted, particularly the criticism devoted by the southern papers, was more remarkable for energy than knowledge. For that reason we have not noticed it. The exceptions from this rule outside the Legislature of the criticism levelled at this gentleman are the remarks of Mr. Hay and Mr. Hancock, to which we have referred at some length, and now we wish to add Mr. Neville's testimony. "One of the very first lines, an experimental line established between Frankfort and Lauffeen, in 1891, which covered 118 miles, proved that atmospheric conditions were hardly worth considering. The perceptible loss from rain or fog was not apparent on the instrument. Even at that early date the efficiency of the line was 72 per cent. It should be remembered that snow and rain are fairly good insulators, and offer no difficulties to big voltage work. The trouble with high voltage work is generally due to dust, and perhaps railway smoke, and in my opinion, high voltage work should not run alongside a railway."

As to the others, there is tremendous piling up of prophecies and predictions, the summits of theory rising into the highest strata of the most ethereal romance. But standing on the earth steadily we may contemplate with serenity the scheme of the Government, as not likely to rush the country into any sudden depths of disaster, and if it is not full of romantic possibilities, it is, at any rate, likely to be regarded as a business concern subject to ordinary business risks, like any other concern which the Government of the Dominion has taken up within the last few years. The balance of expert evidence seems to incline in its favour.



The Hut in which the Expedition spends the Winter.



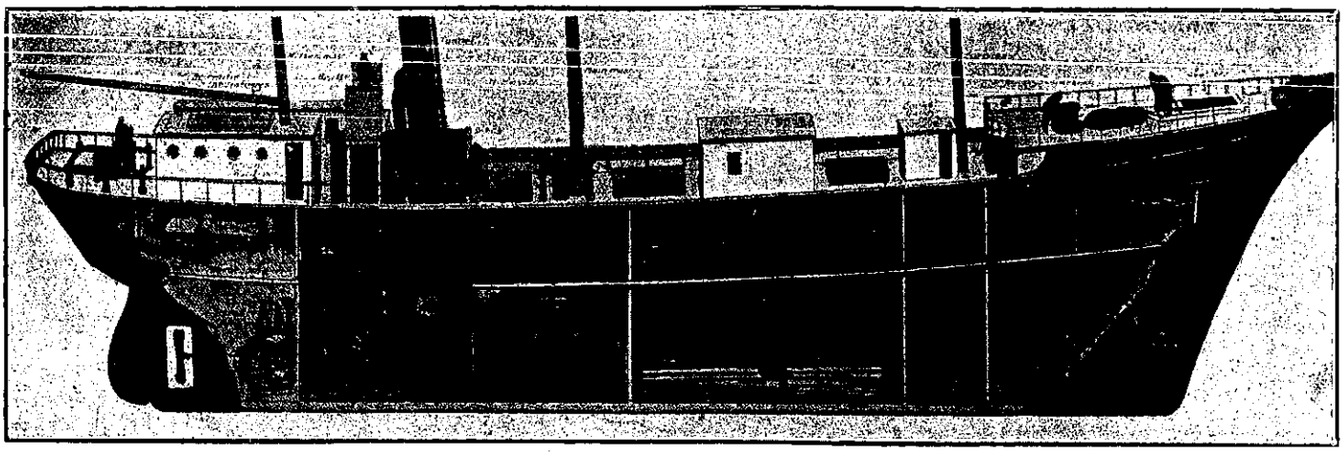
Pictorial View of the South Pole.

The Antarctic.

The Race for the South Pole.

The rival expeditions, Peary's and Scott's, are referred to by popular consent as a race as imaginative spirits speak of the event as a dash for the Pole. One pictures a runner, lightly clad, doing a sprint, or a light horse cavalier with a squadron mounted on thoroughbred horses making a raid into space at a gallop and coming back with the secrets of the unknown on the points of their spurs. But the records of Scott, Shackleton, and a hundred other explorers of the frozen parts of the world make us realise that the pace is often less than a mile a day, sometimes confined to the inside of a small tent for days together, and always laborious exceedingly and indescribably.

Of these "dashes," the most notable in all history was undoubtedly that of Shackleton, who holds the record for Antarctic travel. It was Scott who, by his labours, made Shackleton's achievement possible, and now it is going to be tried whether Shackleton's labours will not make Scott's final conquest of the Pole an accomplished fact.



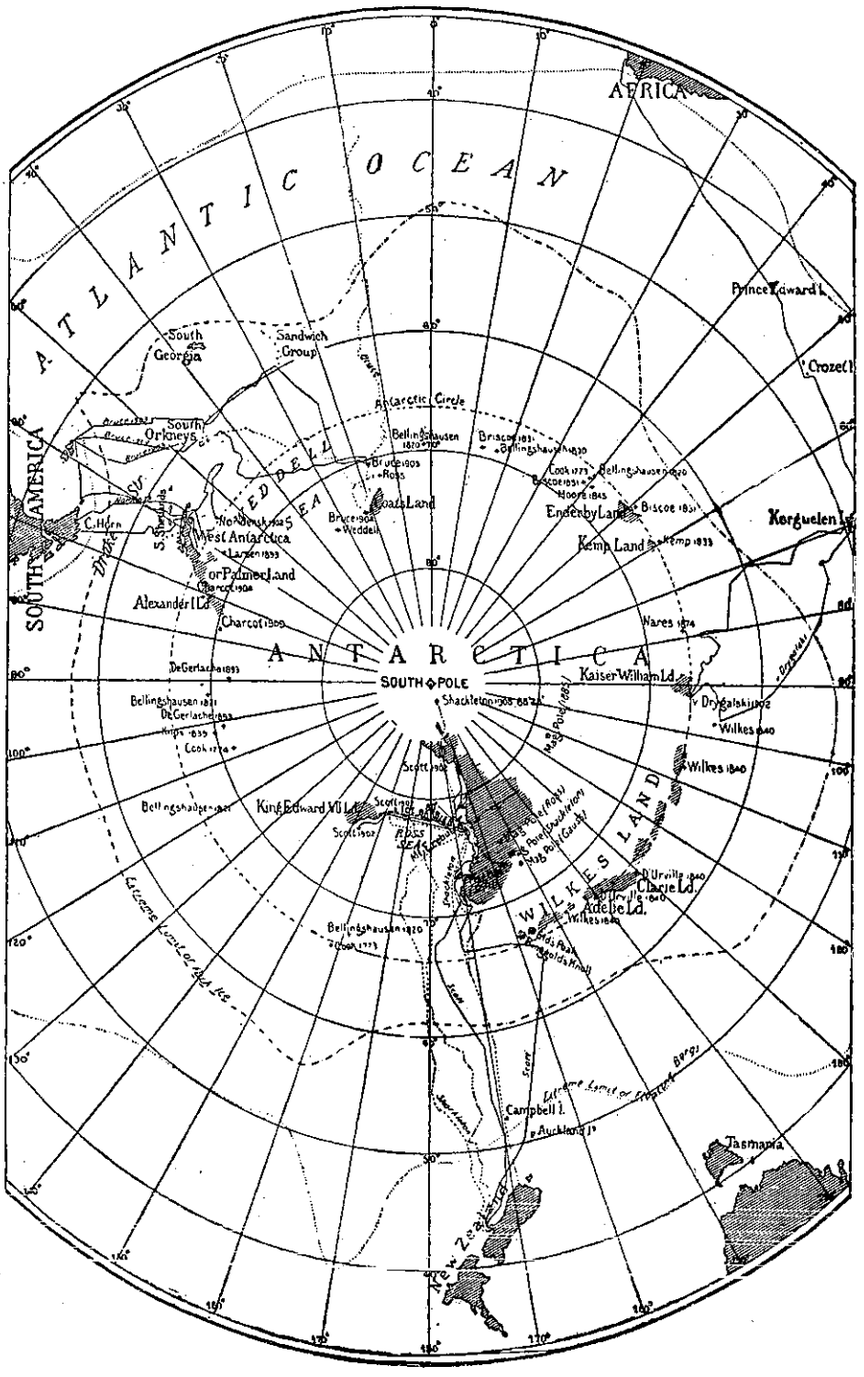
SHIP "TERRA NOVA." Sectional view showing internal arrangements—stoves, laboratories, quarters, &c.

Scott has already arrived in New Zealand, and his ship, of which we give a drawing showing the interior arrangements, is loaded at the present moment with food enough for several years, and which is now in southern waters. The dogs for the sledge work have arrived at Lyttelton, the Australian Government has granted a subsidy, and everything is in readiness. Presently the ship will sail with her crew and her men of science for McMurdo Sound, at the foot of Mt. Erebus, where Scott and Shackleton wintered during their previous expeditions. From there the science men will make trips right and left for various explorative and scientific purposes among the rest, the investigation of the question of the presence of radium in commercially practical form and quantity. While they are at work the commander will make his "dash" for the Pole. He has with him a motor on the "caterpillar" principle, illustrated and described twice in PROGRESS last year. In this type the wheels on each side revolve a tread, which makes the machine independent of all surface vicissitudes. The speed is estimated at a certain four miles an hour. The journey presents only one difficulty, if we are informed aright, to this type of motor. The sea ice is fairly good to the foot of the mountain platcau, and once on the plateau—the highest plateau land in the world, 12,000 to 14,000 feet in height—the going is easy enough for such a vehicle. But the ascent to this plateau is by glaciers. That which Shackleton negotiated is 100 miles long by several broad, and furnished with the usual complement of crevasses. Down one of these he lost one of his ponies, it will be remembered, and, indeed, but for that loss he might have reached the Pole. How the motor is to be taken up that glacier with safety is a problem one would rather leave to Captain Scott than face one's self.

The winter will be spent in a hut, of which we furnish an illustration. Those who have read the very complete narratives of Scott and Shackleton will be easily able to construct pictures for themselves of the line in that hut and on board the stout old "Terra Nova," whose interior we also give to-day.

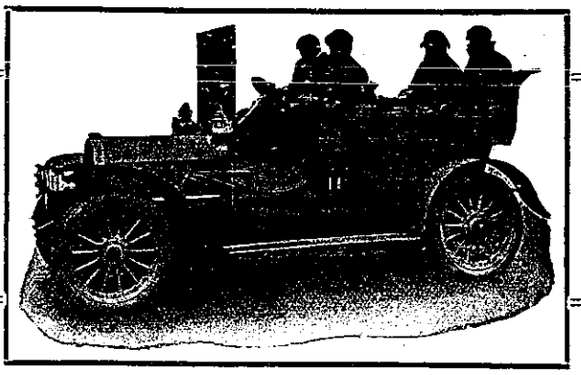
Peary, of the American Navy, has induced the club bearing his name and the National Geographic Society of America to finance an expedition for the attack on the Pole from the opposite quarter of the Antarctic. It is to go in the "Roosevelt," Peary's ship, described as the most powerful ice ship in the world, and has a year's stores Where it will call, what sort of base it is to have, along what route—these are questions which have all to be determined by the explorers on the spot. All we can do to throw light on the expedition is to print the geographical details of the Antarctic, with indications of the two rival expeditions.

There is talk of an American expedition going out under the orders of the Navy Department to locate and explore Wilks' Land. This was called by its discoverer an American Naval Officer, "the Antarctic Continent," half a century ago. Since then the existence of the American Continent has been proved beyond a doubt by the explorations of Scott and Shackleton. It follows, then, that Wilks was the discoverer of the Antarctic Continent. Hence it is right that the part he saw first should be named Wilks' Land, and also right that the expedition of his countrymen should make it their base for their dash on the Pole. The British, on their side, start from an equally appropriate site. This is the eastern corner of the great Ice Barrier, discovered by Cook in the second half of the eighteenth century, defined by Ross in the middle of the nineteenth, and fully explored and physically determined by Scott and Shackleton in the beginning of the twentieth.



MAP OF THE ANTARCTIC.

Motors



Motoring

Kashmir.

The Wonderland of India.

Gardens and Mountains.

Kashmir (North of India), has been called the Garden of the East, and those who have been fortunate enough to visit this delightful country describe the valley as heavenly. We publish in this issue four views of Srinagar, the capital of Kashmir.

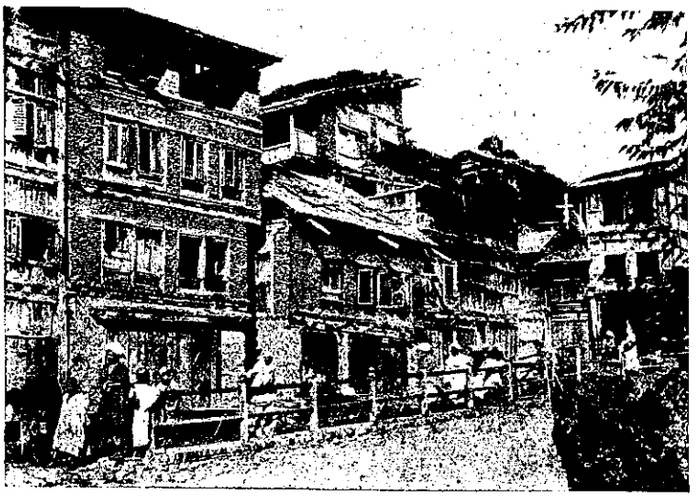
During the summer months Kashmir is visited by many thousands of Europeans from India, and, indeed, from all parts of the world. Up to quite recently the only way to get to Srinagar was by Tonga, or Ekka, but the journey of 200 miles by road from Rawal Pindi may now be accomplished by motor car.

The road from Rawal Pindi ascends up to 7400 feet, and then drops to 2500 feet (in 26 miles), again gradually ascending along the Jhelum Valley to 4200 feet.

Both H.H. the Maharajah of Kashmir and his brother, General Rajah Sir Amar Singh, are motorists, and journey regularly to India by car.

A "SHIKARA" ON DAL LAKE.

THE CHENAR BAGH.



THE BAZAAR, SRINAGAR.

THE MAHARAJAH'S PALACE.

The Petrol War in England.

The news that for several weeks, at all events, the prices for petrol will be lower than they have ever been previously will come as a most welcome piece of information to motorists all over the country. During the past few days the retail quotations have steadily dropped, until today it is pretty general to find that two-gallon tins can be obtained at 2s. inclusive of the excise tax. Deducting this, it will be seen that the actual cost of the petrol to the motorist is only 9d. per gallon, or a figure lower than has ever been recorded in the past. As a matter of fact, motor spirit is now being supplied to retailers at approximately 8½d. per gallon inclusive of the tax, so that when it leaves the hands of the importers it is commanding simply a price equal to that of illuminating oil. The recent reduction will come with all the more surprise, inasmuch as only a few weeks ago the retail price of spirit was advanced in order, so the distributers themselves stated, to make the trade a remunerative one.

The present situation has been created as the result of a disagreement between the Asiatic Petroleum Co. (who are the importers of the well-known Shell spirit)

and the Standard Oil Co., whose English branch—the Anglo-American Oil Co.—imports Pratt's motor spirit. An open war has been entered into, and both sides appear determined to outlast the other. So far as this country is concerned, motor spirit to-day has no real basis of value to the dealer; he gets the lowest terms he can from one company, and then the other company openly comes forward to supply him with as much spirit as he likes at ½d. per gallon less. The situation, therefore, is full of interest, even to the average motorist, who will naturally take advantage of the present opportunity to secure a good supply of motor spirit since, as must be well known, the reduced price is such as necessarily spells loss to the importers and distributers.

The retail price of motor spirit throughout the majority of countries in Europe has simultaneously been reduced, and this fact lends weight to the opinion that the present "war" in prices is almost world-wide in its effects.

The following are the current retail prices per gallon supplied to us by two leading firms, the prices including the 3d. per gallon duty:

Carless, Capel and Leonard.—London, heavy spirit, .735-.765, 10½d. Movril, .715-.720, 11½d.; country districts, 1d. to 2d. per gallon more. Standard petrol, .700, 1s. 0½d. in London.

Pratt's perfection.—London, 11½d.; Liverpool, Manchester, Newcastle, Hull, Birmingham, Bristol, 1s. 0½d.-1s. 1d.; Scotland, 1s. 0½d.-1s. 3½d.; Ireland, 1s. 1½d.-1s. 2½d.

Automobilism in the United States.

Some Observations by Mr. F. R. Simms.

For some five months past England has been the poorer by the absence from her shores of Mr. Fred. R. Simms, the introducer of the Simms-Bosch magneto into England, a founder member of the R.A.C., the founder of the Society of Motor Manufacturers and Traders, and the personal friend of the late Herr Gottlieb Daimler. Mr. Simms has been in the United States for the purpose of establishing a large works for the output of Simms magnetos, but in his intervals of leisure he has travelled very widely over the broad continent of North America, with a view of making himself acquainted with the present condition of the automobile industry under the Stars and Stripes. Hearing that he had returned, a journalist called, and in view of the American competition which has been prophesied for the British industry by more than one home-returning Britisher, he, after the usual salutations, plunged *in medias res* without delay. As thus:—

The Field Open.

"Come tell us, Mr. Simms," we asked, "is there really anything in this threat of cut-throat competition which is so frequently flourished over our heads? Are we likely, due to frightful over-production in the States, to find this country, so long as it is unprotected, swamped with American motor cars at scrap prices?"

Mr. Simms smiled. "No," he said. "I don't think there will be any competition in the English market, at least for a long time to come. The capacity, the ever-growing capacity, of America to take up her own production, huge though it be, is not understood here. Indeed, it is not conceivable by anyone who has not realised what America, and the wealth of America, is to-day. America is a country for large quantities. The Americans throughout are enthusiastic automobilists. The enthusiasm shown for automobilism over there is far greater than it ever was in Europe."

"Then it must be pretty intense," we interpolated.

"Yes, it is," was the reply. "It is the idea of every fairly well-to-do American — I had almost said every American — to possess and use an automobile. For instance, take the farmer class, which is very numerous. Every farmer possesses, or did possess, a buggy, and it is the ambition of almost every farmer to displace his buggy by a motor car. Now there are 1,400,000 buggies sold every year in America, and it will be clear to you that to overtake this market even in part will keep the American motor car manufacturer quite busy for some time to come."

Roads.

"But," we said, "what is the good of motor cars without roads? We have always been given to understand on this side of the Atlantic that there are practically no roads in the States. At least, not as we understand roads here."

"Oh, don't make any mistake about that," quickly returned Mr. Simms. There is an immense mileage of good roads; all round the big cities they radiate out for distances of from 100 to 150 miles, while in the Eastern States they are numerous, and afford very good going. During the last few years road construction has been taken up very seriously, and pushed forward with customary American vim. Many trunk roads are now in course of construction between great cities, and in three to five years motor touring will be one of the added delights of a visit to the States. The great use of cars will be ascribable to the great distances between towns and even habitations, so that the dwellers therein are driven to the motor car for social intercourse."

The Output.

"Then, in face of this, the stated outputs which have struck our business people with astonishment are not so astonishing after all."

"No, certainly not," replied Mr. Simms, "and the figures have not been overstated. I travelled about 6000 miles during my stay, and visited nearly every important motor factory in the States, like the Pierce-Arrow Works, the Locomobile Works, Packard, Chalmers, and so on. For instance, the United States Motor Co., which controls seven or eight of the biggest firms, will manipulate 52,700 cars next year. This company has a capital of 30,000,000 dollars. The E.M.F. Co., of Detroit, will put out 35,000 cars; Chalmers, of Detroit, 10,000; Hudson Motor Co., 8000; and General Motors, another embracing concern, over 30,000 cars. The F.I.A.T. Co. are starting a big works at Poughkeepsie, N.Y., and will presently be turning out one of the finest cars in the States."

Design and Workmanship.

"Now, with regard to design and workmanship, Mr. Simms, how do Yankee cars compare with the best European types?"

"Well," replied our subject, "the best cars in the States are quite equal in design, construction, and material, to our best, but there are very few of European design. The smaller cars are thoroughly Americanised, the design being always conceived with a view to huge production. Otherwise, it would be impossible to produce such cars as they do at the price. They give good value for money. Cars like the ———, for instance, could not be made here for the money. They will run for a certain time, and they are so simple that almost anyone can repair them."

"How does the heavy side of the movement progress?"

"Well, it is going ahead very strongly. In the coming year 25,000 motor waggons carrying up to 5 tons will be turned out and absorbed by various interests. The Packard people, Pierce-Arrow, and Gramam, who construct the American motor truck, are well in this business."

The Control of the Movement.

"Touching the control and government of the automobile movement, Mr. Simms," we asked, "who figures in this?"

"Well," replied Mr. Simms, "the Automobile Club of America is a very active body, and controls and directs the movement to a much greater extent than our own R.A.C. But it is not a social club. I should rather call it a big garage association. Then there is the American Automobile Association, which struck me as a mixture of our own club, the M.U., and the A.A., and this body controls the sport, and does a vast amount of work. Then nearly every town has its automobile club; indeed, no one here has any conception of the magnitude of the movement over there. You must go and mix in it to realise it."

"But to return to the invasion," we ventured.

"Oh, I don't think we need," said Mr. Simms. America has got her own row to hoe, and it looks to me a very long one."

Who Invented the Pneumatic?

A proposal to erect in Edinburgh a memorial to the inventor of the pneumatic tire has given rise to some dispute as to who was the real inventor. This is not the first time that a dispute has arisen as to the real author of an important invention or discovery. The fact is that a really distinct invention is not, in its earlier stages, a simple matter, however simple and commonplace it may appear to the general mind after its development and widespread use.

Such being the condition, it may be asserted that a really new article of utility is seldom developed by a single mind, but is the result of co-ordinated effort on the part of the inventor himself, of engineers and factory superintendents who assist in developing it, of his patent attorneys, the patent office examiners, of the manufacturers who ultimately undertake its production, and of an indefinite number of users of the article. Every man of a practical turn of mind, who takes up the use of a newly invented article is liable to make some suggestion bearing upon its possible improvement, or its better adaptation to its intended uses, to the end that as long as the article remains in demand,

each year's output of it may possibly be better than the preceding types. Many of the improvements so suggested are likely to be covered by patents—often in the name of the original inventor—but others, relating merely to details and not to new principles of invention, are utilised as part and parcel of the original patent.

To take the pneumatic tire, Robert William Thompson, while the first patentee of such an article, cannot be claimed to have produced a practical article of commerce. His aerial wheel was regarded simply as an interesting novelty, for the world was not ready yet for pneumatic tires, and Thomson and his patent were soon forgotten. Dunlop's pneumatic tire brought out at a time when the public mind was more receptive, led to more practical results, but his invention disclosed no principle not anticipated by Thomson, and hence patent protection could not be claimed for it. The patents under which the really successful pneumatic tires have been made did not relate primarily to the principle of an air cushioned wheel, but to details of attaching these cushions to the wheel rim, and holding them in place.

Credit is due both to Thomson and to Dunlop for their study and application to the subject of rendering vehicular traffic more comfortable, but there is not being made on earth to-day any tire, the shape or means of attaching of which can be traced to any suggestion made by either of the gentleman named. The Dunlop company early in its career dropped the Dunlop invention in favour of tires distinctly different, and to-day the tires made by that important concern are not even the same as were covered by various patents which the company acquired as development was made in the tire art.

The standard automobile tire to-day was protected in England by the patent granted to Bartlett. The tires made under this patent were developed year by year until they became the modern "clincher" tire, and it is informing to consider that the tire section of the present time has been a gradual outgrowth from Bartlett's specification. The purpose of this article is not to claim pre-eminence for any particular inventor in respect of the pneumatic tire, but to point out that the standard type of tire to-day is not the work of any one man, but of countless workers and students in the tire field.

American Motor Exports.

American Motor Exports.

From time to time it is necessary to examine the American export figures, and to learn from them the progress made by our rivals of the States in the international market. Their determination to be first in motor cars is well known, and it will require much attention to prevent their becoming the masters of our markets. On the other hand, there should be no difficulty in retaining our hold in motor cars, as we have done in cycles and other goods, always on condition that we do not relax our efforts. The most impressive argument is always based on figures, as it bases itself on facts which can be substantiated, and which are not a part of the journalistic imagination. We, therefore, give a few of the latest figures, which show not only the general progress realised by the U.S.A. motor car manufacturers, but also indicate the countries where their efforts have been crowned with success. The last seven months for which figures are officially available are from July of last year to the end of January of the present year.

July-Jan. Imports	1910 Dollars	1909 Dollars	1908 Dollars
From Other countries	1,931,712	1,725,252	1,785,528
From England ...	167,059	164,490	175,789
,, France ...	960,221	1,116,133	1,333,146
,, Germany ...	298,323	66,910	88,683
,, Italy	664,818	329,044	129,063
,, Other countries	131,291	48,675	58,847
Total for cars ...	1,931,712	1,725,252	1,785,528
,, ,, parts ...	575,963	460,310	271,979

Exports	1910 Dollars	1909 Dollars	1908 Dollars
To England	1,060,464	682,324	899,249
,, France	318,270	136,377	274,224
,, Germany	104,515	58,402	80,743
,, Italy	25,761	40,167	43,452
,, Canada	1,627,804	667,902	469,541
,, Mexico	293,013	186,478	273,906
,, West Indies ...	248,932	146,989	182,519
,, Australia	259,626	68,833	137,018
,, Africa	46,233	16,389	66,963
Total for cars ...	3,795,952	1,950,143	2,391,360
,, ,, parts ...	695,609	321,406	321,999

Flooding the Carburetter.

The process of flooding the carburetter is not one that on first thought would call for a warning or advisory note; but so many complaints are heard from time to time of leaking floats that it is well to remember that this trouble can very easily be brought about by carelessness or rough handling when flooding the float chamber to ensure a ready start. Many users of cars appear to possess the idea that the process referred to must necessarily have the effect of causing a fountain of petrol to issue from the jet; and, with this idea in view, the float, by the operation of the protruding end of the needle valve, is jerked violently up and down. This violence, which is quite unnecessary, must in time have the effect of damaging that fragile detail the float, followed by heavy consumption of petrol, loss of power, overheating, and other troubles. The violence, even to a slight extent, is unnecessary, because the same temporary excess of petrol, which is sometimes required to start an engine easily, can be obtained by merely lifting the needle valve, and so depressing the float when toggles are included in the design, or depressing the valve when float and valve are directly coupled.

There is no advantage under starting conditions in causing a spray or fountain of petrol to issue from the jet. All that is required is that the level of the spirit shall be such that it will overflow from the jet into the mixture chamber.

Some Magneto Timing Tips.

One of the most vital portions of a car, and one which is, unfortunately, the least understood, is the magneto. When the car is delivered the magneto firing point is supposed to be properly set, but occasionally it may require alteration if it be too far advanced or too much retarded. In which direction the fault lies may easily be detected; if it be too far advanced the engine will knock when suddenly called upon to do hard work; if it be too much retarded the engine will not develop enough power, and may not respond to the throttle lever. Theoretically, and in nine cases out of ten actually, the proper way to time a magneto is to select the most accessible cylinder, set the piston on the dead centre at the top of the compression stroke, retard the spark, and set the platinum points of the magneto contact breaker so that they are just about to separate. Should this be incorrect, and an alteration be imperative, the friction cone or clamp fastening on to the armature shaft and carrying one of the dog couplings should be loosened, and its position altered in relation to the armature. It may seem paradoxical at first, but to retard the firing point the coupling should be moved slightly (say, not more than 2 mm. at a time) "in the direction of rotation," and to advance it contrary to the direction of rotation. The reason for this is that when advanced the firing point is some way down the compression stroke, so that sufficient "lead" is given, by which is meant sufficient time for the explosion to reach its highest point of efficiency, as the piston reaches the dead centre. A good way of remembering this is to think of the alarum indicator on an alarm clock. To call one's self early the indicator is put back in a direction contrary to that in which the hands travel. The methods of driving magnetos are many, but we will deal with three of these only. First the chain drive—an awkward, much to be condemned system only adopted by out of date and conservative firms; secondly, by means of dog clutches and an Oldham joint, simply by two dog clutches. The last-named method is the most satisfactory and the most simple. Dealing with the first method, it is highly important to mark both chain links and sprocket teeth with a file, so that if the magneto be taken down and cleaned the chain may be easily and correctly placed. With the second method the driving shafts should be turned by means of the starting handle into a convenient position, and the three separate members should be marked separately with a punch, so that the three punch marks are all in line. With the third method the dogs are usually held on by cotters, so that it is only necessary to note that both ends of the cotters are uppermost and a mistake cannot occur. Great care should be taken to see that the distributer brush at the moment the break is about to take place is on the segment leading to the cylinder the position of the piston of which has been determined. This is done by removing the distributer cover, and following out the connections. If the position of the coupling has to be altered in relation to the armature, the special spanner provided with the magneto should be slipped over the central nut on the contact breaker and held firmly, when another person slightly shifts the coupling. These spanners are not always supplied, but every car owner should insist on being provided with one when the car is delivered. If the coupling be too firmly fixed to be moved in this way, a few light taps with a hammer in the required direction, the locknut in position loosely on the shaft-end being rested on the bench, may have the desired effect.

The change in motorcycle construction in Europe this year points to more radical changes in the coming years, and the final discarding of all types with pedals and saddle seats.

The Motor Cycle.

The Editor will be pleased to receive communications from Club Secretaries giving accounts of their Club's doings, or matter interesting to motor cyclists.

(Christchurch Correspondent.)

The North Canterbury Motor Cycling Club held its second run of the season on 2nd inst., the route being via Sumner, Lyttelton, Governor's Bay, Teddington, Gebbie's Valley, and home through Taitapu, a distance of about sixty miles, including some very stiff hill climbing.

Starting from Cathedral Square at 10 a.m., nothing eventful occurred during the run down to Sumner. On reaching the foot of the hill road leading to Lyttelton, many of the members stopped to lower their gears and take a piece out of their belts, as it is a fairly stiff climb to the top of the zig-zag. Just on the worst pinch of the whole road a quantity of fine loose metal had been laid on to a depth of several inches, and this proved the undoing of a few of the riders. The majority, however, reached the top without much trouble, where a halt was called to await stragglers. These latter came in one at a time, having in some cases been assisted by some of the first arrivals, who, after waiting at the summit for some time, got on their machines and rode down the hill again to give their assistance to those who were unable to get up alone. The steep drop down the zig-zag road on the harbour side was then essayed, and the grade was such as required all brakes to be in perfect working order to prevent the machines from taking charge of their riders, with possible disastrous results. The road is exceedingly rough also, large rocks projecting out of the surface at frequent intervals, making it necessary to use the greatest care in negotiating. The worst is soon over, however, and the rest of the road down to Lyttelton is a gentle downward grade, winding in and out along the hill side. The Port was run through without stopping, and the run was continued on to Governors Bay over a very fine road, with just sufficient undulations to give the necessary variety, through Raupaki Pah and Little Raupaki, until finally the last stretch down into Governor's Bay, where the luncheon halt was made. The majority patronised "Ellerslie" (late Tapley's Gardens), though some few members adjourned to the shade of the public gardens and enjoyed an "al fresco" meal. Leaving the Bay about 3 p.m. the ride was continued round the head of the harbour, up and down, past numerous orchards, with trees covered in blossom, until Teddington was reached. Then came the last climb of the day, being the hill road over the Pass to Gebbie's Valley on the other side. This hill, also, is a very fair test of a machine, and to make matters worse, the road was practically covered with loose metal from top to bottom, with only a very narrow track on the side of the road which was fairly free from large stones. This made it necessary to ascend in single file, with the result that when one of the machines in the middle of the bunch refused to go any further when about half-way up, all those behind were compelled to come to a standstill likewise. The steepness and roughness of the track prevented any chance of starting again, at any rate single-handed, but after a lot of pushing, the majority succeeded in again getting under weigh and eventually reaching the haven of rest at the top of the hill. One or two machines, however, had to be pushed up all the way after their unfortunate stoppage.

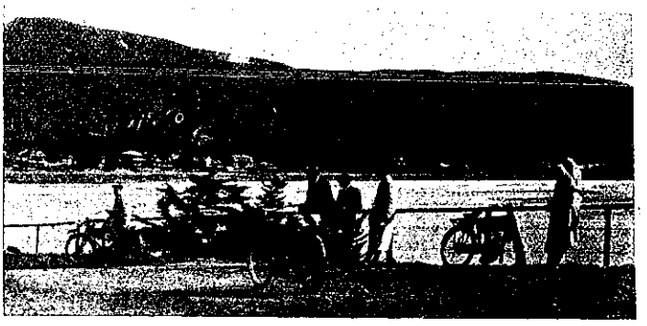
The roadway down into Gebbie's Valley was in very bad condition, through heavy winter traffic, but beyond this the road rapidly improved, and, with the exception of a few patches of broken metal, was in very good order for motoring.

From Gebbie's to Christchurch the route lay along the foot of the hills, a flat but very winding road leading past Motukarara, Taitapu, and Halswell, thence into town via the Lincoln Road, after a most enjoyable day's outing, including plenty of variety by way of hill climbing, etc.

The membership of this Club is increasing rapidly, seventeen new members being elected at one committee meeting, and fourteen at another, held on 14th inst., making a total membership of close on eighty. Motor cyclists and others interested and desirous of becoming members should communicate with the hon. secretary, Mr. P. G. Blanchette, P.O. Box 888, Christchurch, who will forward full particulars, together with enrolment forms.

The question of holding a three or four days' reliability trial at Christmas is now being considered by the Club, and a sub-committee has been appointed to go thoroughly into the matter. The run will probably be to Dunedin and return, making Timaru a half-way stopping place. It is quite possible that it will be held so as to coincide with the reliability trials of the Canterbury Automobile Association, which take place about that time.

HILL TOP LITTLE RIVER, AKAROA COACH ROAD.



SUMNER FROM SCARBOROUGH ROAD.

Motor Boats of the Dominion.

One of our illustrations shows the launch "Hauraki," built by Messrs. Tyler and Harvie, for Mr. H. Kirby, of the Thames. She is 38ft. long, with a beam of 9ft., and is fitted with an 18 h.p. 3-cylinder Zealandia engine. She will carry passengers and cargo between the Thames and River districts.

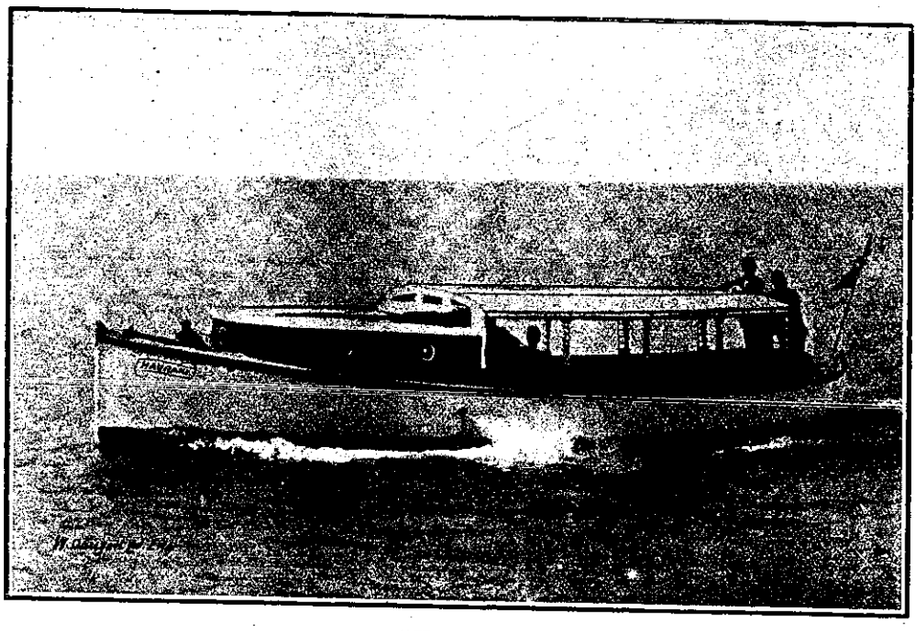
As promised in our last issue, we publish this month an illustration and description of the "Phyllis," built by Mr. Charles Bailey, Jr., for his own use. Of her type this boat is certainly one of the finest launched this season—35ft. long by 8ft. beam, drawing 2½ft. with hull painted a dead white, she is a striking picture, and her performance on her trial run proved her as good as she looks. Her cockpit is 9ft. in length, from which one enters the cabin, which is 8ft. long, with 5ft. head room. This is beautifully panelled and painted, well ventilated and lighted, and fitted with electric light. Forward of this again is the engine-room, which is also well catered for in the way of light and ventilation. The engine, the first of its kind in Auckland, is a 14 h.p. two-cylinder Anderson, fitted by Mr. Chas. Bailey, for which make he is the local agent. It is always a pleasure to record the success of a new engine, but when it is manu-

PICNIC PARTY, BARRY'S BAY, AKAROA.

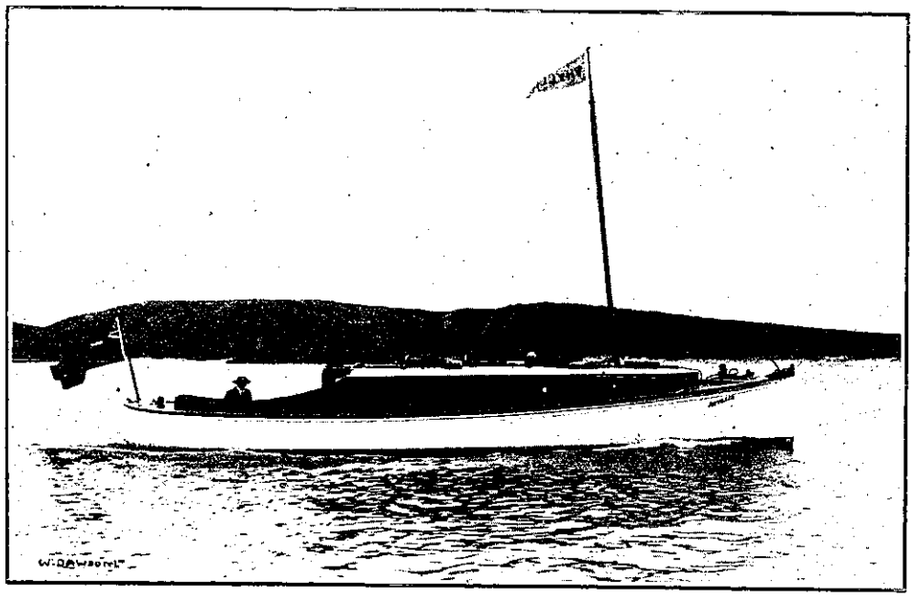
factured in New Zealand, by a New Zealand firm, it becomes doubly so. We have had occasion in former issues to point out to launch owners and those contemplating the fitting of marine engines, that in Auckland there are firms manufacturing engines equal to any imported make, and here we have another instance from Christchurch, where Messrs. Anderson, Ltd., are turning out the Anderson engines. At a future date we hope to illustrate this new engine and to publish a description. At present our space is limited; let it suffice that so successful were the trials that Mr. Charles Bailey had already nine orders in hand for Andersons.

* * *

Messrs. BAILEY & LOWE have in hand, to the order of Mr. W. R. Twigg, a 40ft. torpedo stern launch, bent frame carvel build, one skin; planking is now being fitted. A 20ft. clinker build tuck stern launch is being built for the same gentleman. A 35ft. diagonal launch was put into the water a fortnight ago, and after a trial spin was slung aboard the s.s. "Hauroto," to be forwarded to her owner, Mr. C. Pool, at Akaroa. The 32ft. tuck stern launch for Mr. J. Vigor Brown, of Napier, was launched on the 19th, and while on the ways attracted a great deal of attention. She is built on the same lines as the well-known "Sybil," and is fitted with a 15 h.p. Holliday, for which Mr. W. R. Twigg is agent. On her trial run she developed a speed of nine knots.



"HAURAKI."

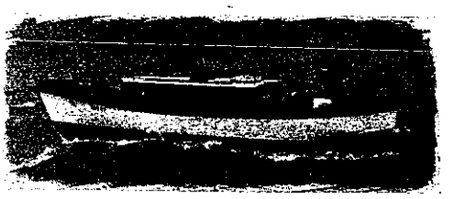


PHYLLIS."

Messrs. COLLINGS & BELL have in course of construction a number of launches and yachts. A 20-foot launch, fitted with a 3 h.p. Perfection engine, has just been completed for Mr. Pemberton, of Warkworth; this boat is of similar design to the one shown in the Winter Exhibition. A shipment of Perfection engines arrived a few weeks ago, and all but one are already disposed of. The firm hope to be able to supply again by the middle of this month.

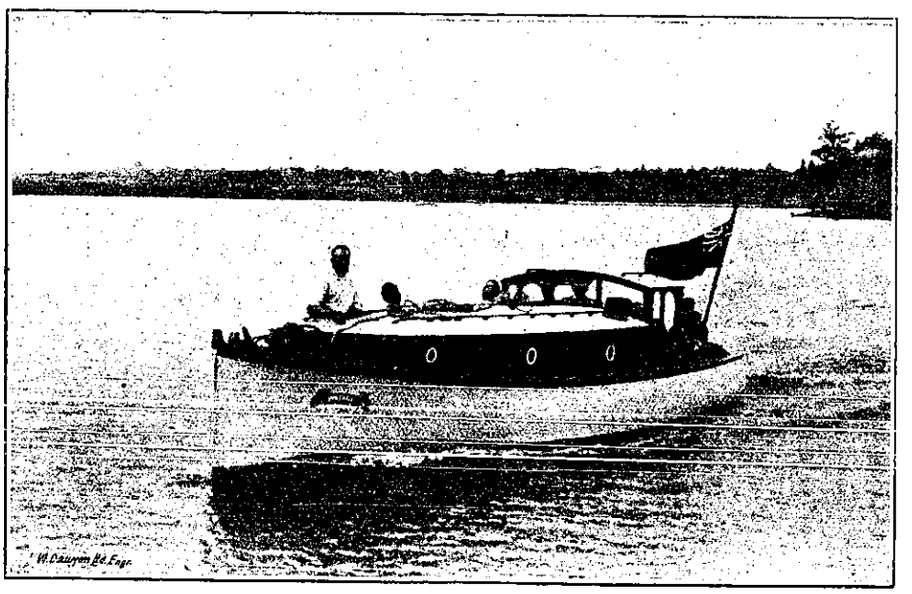
* * *

Messrs. ARTHUR & DORMER have been busily engaged during the month. A six horse power single cylinder Kapai engine is just being completed for Mr. Connell, of Waiheke. This engine is of the heavy duty type of 6-inch cylinder bore by 7½ inch stroke, and develops its rated power at 400 revolutions. The crankshaft is 2 inches diameter, and the whole job is of massive design, evidently fitted for severe and continuous service. A double cylinder engine of similar design, and developing 12 horse power, has been ordered by the Fijian Government for a launch for the Police Department. This order has to be filled at short notice. The firm has lately been engaged on some work of exceptional interest from an emergency point of view. They built, to the order of a Wanganui patentee, an entirely novel type of engine, in which the usual tappet valves are entirely done away with. A slotted rotor, located outside the water jacket, opens communication with ports in the side of the cylinder, the time of opening and closing of these ports being regulated by the length of the slots. The objects aimed at by the novel design are simplicity of construction, silence in springs and all small and intricate moving parts. The small engine, built for the patentee running, and reliability through absence of to demonstrate the practicability of the new idea, gave such good results that Messrs. Arthur & Dormer at once secured an option over the New Zealand rights, and are about to build for the local market. They are now getting out the designs for a 4 horse power engine of the stationary commercial type. This will be submitted to exhaustive tests, and should it pass these successfully, the engine will be at once placed on the market. The new engine has been taken up by a syndicate of Auckland and Wanganui residents, and the world patents have been applied for. Four or five engineers are shareholders in the syndicate, and as all expert opinions so far obtained have been favourable, there is reason to believe that more will be heard of this new engine in the immediate future.



"QUERY."

A neat, commodious motor-boat. The Query is "whence"? The answer is that she was built and engined by the owners, Messrs. Cartell Brothers, Ravensbourne. The whole fabric from keel to deckhouse top is the product of home industry. This represents a record for Australasia.



"WAIARI. (Collings and Bell.)

Hawkes Bay.

The Harbour Question.

Breakwater *v.* Inner Harbour.

II.

The Preliminary Question.

In our first article on this question we showed that the commitment of the district to the breakwater plan had been made without sufficient deliberation on the facts, and without the advice of any expert. We are aware that much has been said of the opinions of such men as Napier Bell, C. Y. O'Connor, Sir John Coode, and others.

Now, Sir John Coode never recommended the breakwater. He said, on the contrary, that in his opinion the travelling shingle would probably prove fatal. Here are his words:—

"The question must not, however, be decided upon the point of cost, nor upon the mode of construction proposed, but upon the broad principle as to whether the entrance to any harbour run out from the shore would not, in the absence of backwater (tidal scour) become so blocked by shingle after a time as to render the works practically useless. Having carefully considered this feature of the case, I am reluctantly compelled to express an opinion that such would be the result. The shingle travelling along the coast between Tukituki and Napier Bluff would gather against the back of the protecting pier, and turning round the curve or knuckle, would pass along the outer kant and be deposited in the entrance and under the lee of the westernmost works."

Mr. C. Y. O'Connor had very definite views on the subject. Captain Preece has lately quoted what he said in the early days of the breakwater undertaking.

"If you spend £500,000 you will never get a harbour; you will get a landing place, but never a safe harbour. You have the force of the Pacific Ocean on one side, and on the other you have eight to ten miles stretch of sea. It is impossible to get a good harbour."

What is most important to remember is that Mr. O'Connor added: "It should have been made inside the old works."

Mr. Napier Bell was still more emphatic on that point. Captain Preece has borne very important testimony to that effect. Said Mr. Bell to him:

"You will never have a harbour there (meaning the breakwater); you should have adopted Mr. Culcheth's plan."

To that Captain Preece answered that Mr. Culcheth's plan only provided for vessels drawing twenty feet, whereas the Board wanted thirty.

Mr. Bell said: "Yes, that is true; but if the Board had asked Mr. Culcheth to provide for thirty feet it could have been done. He prepared the plan on the data supplied to him of steamers then trading here. If it was necessary to obtain thirty feet of water it could have been done by extending the works further out and hiring the Dunedin Harbour Board's dredge and removing the boulder bank. You could then get any depth you required, and you have all the water of the inner harbour and the Tutaikuri water to keep it open, and, if necessary, you could bring the water of the Ngarururo into it too. Nature gave you a protection for this harbour in the Bluff you are blowing away. You are filling up the lagoon inside where the old mill was, which you should scoop out and make into a dry dock. Instead of that, you are filling it in with the stuff you are taking from the Bluff; the very thing you should leave alone."

Thereupon Captain Preece ventured to ask Mr. Bell whether he had not reported upon and approved Mr. Goodall's plan for a breakwater from the Bluff. To which he replied that the Board had adopted Mr. Goodall's plan and had only asked him to suggest any improvement.

This settles the preliminary question of how the breakwater came to be built.

The Inner Harbour.

Mr. Nelson's Proposal.

On the 5th March, 1909, after the breakwater had been proceeded with and all the long history had been gone through, Mr. Geo. Nelson sent a proposal to the Harbour Board for the construction of the Inner Harbour. As he explained subsequently, it was not a working proposal, so much as an engineering estimate, together with a review of all the financial and other considerations of the case, the whole to form a guide, inclusive of many details, for the guidance of expert examination and report.

He began by laying down the conditions which should be fulfilled by an adequate scheme of harbour construction. These were—

1. A central situation easy of access by land and sea.
2. An adequate area of water, of suitable depth, thoroughly protected from storms, capable of extension, having a soft bottom easily deepened.
3. Not costly to construct, maintain, extend, deepen.
4. Should have plenty of land adjacent on which to construct railways, sheds and warehouses, which feed or are fed by the Port. Should provide accommodation for shipbuilding and repairing yards and works incidental to the construction and repairing of ships and their machinery.

He claimed that the Inner Harbour he proposed fulfilled all these conditions.

He proceeded to give attention to all the various questions arising—giving the boundaries, considering the handling of the Tutaikuri River, measuring the area enclosed, giving the width of the channel between the piers, showing the soundings off the pier heads, the berthage accommodation, discussing the west shore beach, the machinery to be employed, the time of completion, the reclamations, and the sewage problem.

Of these points the most important were the machinery and their reclamations. The machinery involved the use of suction dredges of the new pattern which have made the construction of such harbours very much more simple than before their invention. We may add here that a description of the latest pattern of this class of machinery appeared in a late issue of PROGRESS.

In this respect Mr. Nelson was thoroughly up-to-date, showing a remarkable vigilance in all things pertaining to the honourable profession which gives him the right to the letters M.I.M.E. which he signs after his name. His recommendation is virtually an advice to the Board to give the benefit of the most modern machinery to the ratepayers of the district.

The reclamations he proposed to effect through the working of his harbour scheme were to be made by two agencies —the trapping of the silt brought down by the Tutaekuri River, and the working of dredges (suction, and bucket-and-ladder) to be employed on the work of deepening basins and channels. The former pattern of dredge required in certain localities which he specified at some length he recommended should be available for tug purposes, in the manner already in use in this country, and, of course all over the world. The extent of the reclamation he estimated would reach ultimately to 511 acres, and the ultimate value he stated at £405,800. This is a most important feature of the scheme.

Another important feature was the handling of the Tutaikuri, as mentioned in the preceding paragraph. For this purpose he proposed to build a weir of a height sufficient to check the flow, and so trap the silt, but low enough not to interfere with the well-being and comfort of the surrounding country. On the one hand, the check in the flow would deprive the river of its scouring power, which now keeps the entrance open, but on the other, the trapping of the silt would make the channel independent of scour. Any deposit from other sources could, he explained, be easily dealt with by the suction dredges advised.

The whole cost of the harbour works, with an area enclosed of 400 acres, 100 to be dredged to a depth immediately of 33 feet, a length of water measured from the eastern pier head of one mile 15 chains with a width of 1000 feet, he estimated at £216,000.

The cost of dredging the balance of 300 acres to a depth of 33 feet he estimated at £300 an acre by suction dredge. As to the nature of the bottom, he is of opinion that the borings taken some time previously disclose no difficulty in the way of suction dredging over the whole area with the exception of the boulder bank between the piers, which could be easily negotiated by a ladder-and-bucket dredge of the ordinary type, now in use.

The cost provides for £20,000 for the embanked roadway bridge and weir, but as he expected that the Hawke's Bay County Council would find £10,000 of the money, only £10,000 appeared on the list of items, making the total estimate of cost.

Interest to the extent of £14,709 was allowed during the time of construction, and £20,000 was the estimate for contingencies.

With reference to the time of completion he said: "It would take twelve months to get two electric dredges built and under weigh, and I estimate it would take two years to do the job. Allowing six months for contingencies, the harbour would be completed in three years, but there should be nothing to prevent the Union Co.'s vessels coming inside within two years, or two and a half at the latest, after authority is given to proceed with

the work. As the other portions of the harbour would go on simultaneously, there is no doubt that everything else would be finished by the time the electric dredges are through."

Summing up, he claimed the conditions fulfilled as (1) a central situation, (2) Complete protection from storms by Scinde Island, a natural breakwater, (3) Approach by land from all sides, (4) By sea in any weather but a "black north-easter," (5) Ample area of water so that the largest vessel can berth without the aid of tugs, (6) Capable of extension at moderate cost, (7) Ample depth but capable of deepening at a cost of 1½d. per cubic yard by reason of the soft bottom, (8) Ample area of land for all purposes necessary, (9) No harbour could possibly cost less to maintain.

Lastly, he mentioned that the existing breakwater is an essential feature of the scheme, as it will afford shelter to vessels entering the port, and stop the travelling shingle.

Such was the scheme proposed by Mr. Nelson. How that scheme fared we propose to tell in our next.

Economics.

The Course of Prices in New Zealand.

Jas. W. McIlraith, LL.B., Litt.D.

Much has been heard of late in New Zealand, and also in other countries, of the increase in the cost of living. The accurate measurement of the movement in the prices of commodities is of the highest importance to every country. To the merchant and the manufacturer it affords some reasonable opportunity of forecasting future movements in prices; to the historian or the social reformer it yields valuable data for comparing the material welfare of one age with another; to the statesman it serves as a guide in much of the social and humanistic legislation so characteristic of modern democracies. Without such data merchant, historian, and statesman must to a great extent be at the mercy of chance. The merchant is apt to find his best-laid plans upset by incomprehensible commercial crises; while the statesman may see with dismay the anticipated effects of his legislation wholly prevented by unforeseen changes in the general level of prices. The progress of industry and the development of government functions are rendering an increasing percentage of the population dependent on wages and salaries. In addition to this, we have a system of old-age pensions and various superannuation schemes, while before long we may have some scheme of universal superannuation. The State has also taken upon itself the functions of a landlord, and enters for long periods into contracts for the payment of rents; and we are making an honest endeavour to ensure industrial peace by the official adjustment of wages in many industries. Now, in fixing the rate of contribution to any pensions scheme, or in determining the amount of pension to be paid; in adjusting wages in the Civil Service or in industrial disputes; or in entering into contracts extending over long periods, an intimate knowledge of the changes in the purchasing power of money is indispensable. It is certain that we do not at persent possess this information; but if the industrial and social organisation of the country is to be put on a sound basis, it must be made available for reference by our industrial and political leaders.

The relative movement in the prices of commodities can be ascertained with a tolerable degree of accuracy by the method of index numbers. To apply this method, it is necessary to ascertain the annual average price of a commodity by taking its price at regular intervals during the year. Thus if it were found that butter was 10d., 10d., 12d., 9d., 9d., and 10d. per lb at intervals of two months within a certain calendar year, then it could be said that the average price of butter for that year was 10d. per lb. The average annual prices of the commodity for a number of years are then taken similarly and their average ascertained for the whole period. Thus, suppose that during the years from 1890 to 1899 butter averaged 10d., 10d., 11d., 12d., 14d., 8d., 8d., 9d., 8d., and 10d. per lb, then the average annual price of butter over that decade was 10d. per lb. This average annual price over a number of years is known as the standard price, and, for the sake of comparison, is called 100. This is the standard index number for butter. Reducing each annual price to the percentage of the standard price, we find the index numbers for butter during the decade to be 100, 100, 110, 120, 140, 80, 80, 90, 80, and 100. This enables us to see at a glance the movement in the price of butter.

All other commodities investigated are treated in the same way, and their standard prices and the index numbers of their prices are similarly determined. As the standard index number for each commodity is 100, the average of the standard index numbers of all commodities will be 100. Now suppose that over a period of five years we find the index numbers of certain agricultural products to be as follow:—

Commodity	Std.	1905	1906	1907	1908	1909
Wheat	100	100	105	113	120	90
Barley	100	90	108	80	105	115
Oats ..	100	106	110	114	83	85
Flour ..	100	100	102	120	155	95
Oatmeal	100	114	125	113	97	80

Then the average index number for 1905 would be $\frac{100+90+106+100+114}{5} = 102$

Similarly the index numbers for the remaining years would be 110, 108, 112 and 92 respectively. We could then say that so far as these agricultural products were concerned prices were 2 per cent. above the standard in 1905, 10 per cent. above in 1906, 8 per cent. above in 1907, 12 per cent. above in 1908, but 8 per cent. below the standard in 1909.

Such in brief outline is one of the most practical methods of ascertaining the fluctuations in the purchasing power of money. The articles which should be included will depend upon the purpose for which the table is to be used. If our object is to ascertain the material welfare of the unskilled labourer, then we should include chiefly those items which enter most largely into his expenditure, *e.g.*, food, clothing, rent, fuel, sundries, etc.

If we use this method to investigate the course of general prices in New Zealand we obtain some very interesting results. Suppose the general level of prices during the decade 1890-1899 to be 100. Half a century ago the price level stood at 185; in other words, it then took £185 to buy as much as £100 would buy on the average during the "nineties." Though the prices were then high, compared with those of the standard decade, they rose still higher and stood at 200 during 1866. Then began a fall which continued with slight interruptions till 1895—a fall which is one of the most remarkable in the records of commerce, and was, of course, world-wide. It was due to various causes, but probably the decline in the world's production of gold coincident with a sudden and enormous increase in the world's industrial output owing to the wonderful inventions in industrial and motive appliances, contributed most largely to the result.

In 1870 prices stood at 156, but by 1879 they had declined to 126. During 1873-4-5 prices suddenly rose, owing to a similar rise in England, and also, no doubt, partly to a large expenditure of money borrowed for public works by the Vogel Government. It was at this period that an extraordinary land boom occurred, bringing disaster to thousands, and a permanent burden of debt to as many more. New Zealanders rushed to buy land as though the opportunity would never recur. Land speculators reaped rich harvests. A few years later the boom collapsed, for prices resumed their downward course with a relentlessness which dragged hundreds yearly to bankruptcy. In 1880 prices stood at 130. Seven years later they had dropped to 103. These were dark days for New Zealand. Public soup kitchens were established in some of the principal centres of population, and a petition was actually sent to the President of the United States, asking the Government to aid emigration from New Zealand!

In 1889 prices rose abruptly to 111, but immediately declined again, till in 1895 they reached 93—New Zealand's year of record low prices. By the end of the century prices stood at 101; during the next five years they fluctuated about that level, if anything a little below it. In 1907, however, prices touched 107, but fell next year to 104. This rise in prices, which was synchronous with a rise in the English price level, has undoubtedly been caused by the enormous increase in the output of gold since 1890—an increase due to the discovery of new fields especially in South Africa and Western Australia, together with the invention of gold-saving methods. In particular, the cyanide of potassium process rendered profitable the working of mines of a lower grade than had hitherto been possible. It is interesting to note that investigations conducted in England by "The Economist," which uses the same method, show that prices fluctuated in England in almost exactly the same manner as they did in New Zealand.

During the last ten years New Zealand passed through the most prosperous period of her existence. Prices were gradually rising, and above all her foreign trade was increasing with remarkable rapidity. The refrigerating process opened to our farmers markets and prices that were hitherto undreamed of. If, however, we compare this period with the

dark days of the "eighties," we are surprised to find how much lower prices are now, compared with what they were twenty-five years ago. Yet those were the days of the public soup kitchen, while these are the days of the land boom; but it should be borne in mind, that the evil was not caused by the low level of prices; it was the continuous falling of the price level that brought in its train commercial and social disaster.

During such a period merchants are unable to forecast the future with confidence or accuracy; expectations are abundantly falsified and the arm of industry is paralysed. Farmers have bought farms while prices were at a relatively high level; a falling level of prices makes it more and more difficult for them to meet their obligations. Mortgages have been contracted, and while the interest thereon remains the same, falling prices render it necessary to produce an ever-increasing quantity of produce in order to satisfy the legal demands of the mortgagees.

On the other hand, mortgagees, pensioners, annuitants, and others in receipt of fixed incomes are proportionately better off, for, as prices fall, their incomes gain correspondingly in purchasing power. With a rising level of prices the case is reversed. Thus it will be seen that unmerited losses and undeserved gains are inevitable elements in the commercial and industrial world.

When we say prices are low or high, we mean they are low or high only by comparison with those of other periods. When prices have been long at or near one level the evil effects pass away. Industry becomes organised on a new basis, and the bitterness of commercial disaster is forgotten; the social organism has adapted itself to its new environment. The farmer and the merchant, the professional man or the unskilled labourer will not in such a case regard prices as either high or low; it is only the historian with his knowledge of the past, who can make this comparison.

* * *

German concerns are manufacturing substitutes for turpentine in rapidly increasing quantities. It is obtained by the distillation of heavy petroleum from Borneo and sells for nearly two-thirds less than American turpentine. Its greatest use is in the paint trade.

Naval Matters.

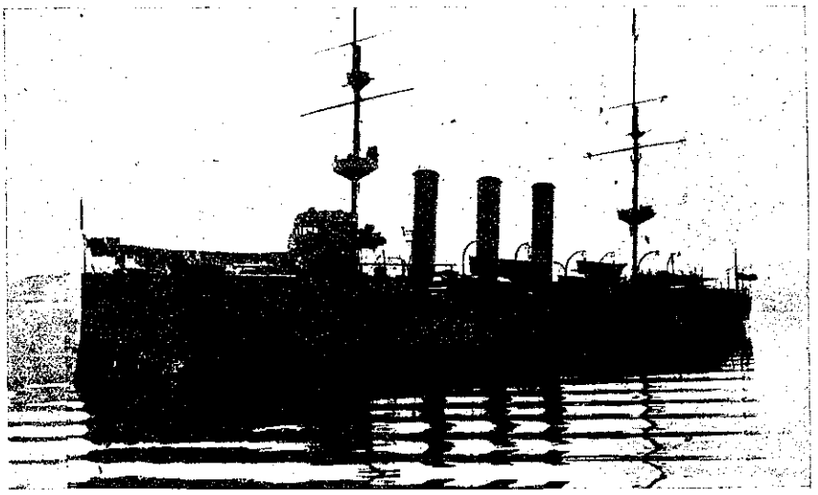
The Present Australian Squadron.

We are accustomed to hear the vessels of our squadron slightingly spoken of as having never been any use, and as certainly being now completely out of date. It is true that few of them are new, but some of them have points of considerable interest about them, and we propose to deal with them in this issue. The flagship, the "Powerful," is a remarkable vessel. She and her sister ship, the "Terrible," were laid down in 1894 as replies to the Russian "Rossia," which was really the first armoured cruiser ever built. The "Rossia" displaced 12,500 tons, and, with an armament of four 8-inch and sixteen 5.5-inch guns, was designed to steam 20 knots. The "Powerful," however, was not built as an armoured cruiser, but her protective deck being six inches thick, she very nearly approached the armoured cruiser in defensive power. She was designed to steam 22 knots and to carry two 9.2-inch, twelve 6-inch, and four 4.7-inch guns on a displacement of 14,100 tons. Six-inch guns were afterwards put in place of her 4.7-inch, bringing her nominal displacement up to 14,440 tons. As a matter of fact, both she and her sister have always carried more coal than they were designed to do, and we believe that their actual full-load displacement is 19,000 tons (considerable more than that of the "Dreadnought"), but, in spite of this, and in spite, too, of their sixteen years, they frequently exceed their designed speed in service, and are recognised as being good for 20 knots for any length of time. Although the "Powerful" is only a protected cruiser, she would probably be no easy prey for any small armoured cruiser. Her immense size (for many years she was the longest vessel in the Navy) gives her a great reserve of buoyancy, and she should be able to stand a great deal of fire without serious results. Besides her wonderful steaming qualities, she is an extremely reliable ship. As an example of what the class can do, it may be mentioned that in 1906 the "Terrible" steamed 60,000 knots without developing a single defect.

We have mentioned some points of interest about the "Powerful." If we were asked to do the same with reference to the "Challenger," and her sister, the "Encounter," we would say that they were obsolete when they were built. This sounds remarkable, but it is really very near the truth. The class were really the last second-class cruisers to be built. They displace 5880 tons, mount eleven 6-inch guns, and steam (nominally) 21 knots. Their great fault is their low speed; their gun power is good, but there is scarcely an armoured cruiser in the world that could not run them down and sink them. It is difficult to see what role they would play in war, as they are five or six knots too slow for scouting nowadays. Yet they are only five years old.

The less said about the "Cambrian" the better. She is smaller, slower, and more poorly armed than the "Challenger," but she has the excuse of being nearly twenty years old.

We now come to the one remaining class, that to which the "Pioneer" belongs. It is sometimes known as the "Pelorus" class, and sometimes simply as the "P" class, as the names of all the vessels belonging to it begin with that letter. It was in the "Pelorus" that Rudyard Kipling attended the naval manoeuvres, afterwards publishing his excellent work called "A Fleet in Being." The ships, of which there are eleven, mount eight 4-inch guns, and were designed for a speed of 20.5 knots. They are very light, however, and have all lost greatly in speed. We believe about sixteen knots may be expected of them, though doubtless their officers differ from us. We remember one of them who insisted that the "Pegasus" had steamed through the French Pass at a speed of 24 knots with the tide!



H.M.S. "CHALLENGER."

Good Shooting.

A remarkable demonstration of rapid and accurate firing by heavy naval guns at battle range has been made by the armoured cruiser "Natal," belonging to the second cruiser squadron of the Home fleet (says the "Naval and Military Record.") The first of two world's records set up by the "Natal was made from a 9.2-inch gun, which fired 6 rounds and made 5½ hits (the half being a ricochet) in 61 2-5 seconds. Another 9.2 inch gun fired six rounds and made six hits in 70 seconds. For the six 9.2-inch guns mounted in the "Natal," the average was 4.47 hits per gun per minute, compared with 3.67 last year. The second world's record was made from a 7.5 inch gun, with 6 rounds and 5½ hits in 40 seconds. The four 7.5-inch guns of the "Natal" averaged 5.31 hits per gun per minute, as against 5.43 last year.

H.M.S. Orion.

Features of the New Ship.

Each battleship laid down at Portsmouth since the "Dreadnought" has been a larger and improved type of the vessel which preceded her, says "The Times." The increase in size of each succeeding ship has been gradual, about 650 tons in each individual case, until, from the 17,900 tons' displacement of the "Dreadnought," the "Neptune" was reached with 19,900, the advance in weight having been uniformly progressive up to then. In the case of the "Orion," the fifth ship of the class, however, an enormous stride forward has been taken, as her displacement

when she is completed will, it is understood, be more than 2,000 tons over that of the "Neptune," and therefore her increased weight will be as much as, if not more than, all the increases of her predecessors combined.

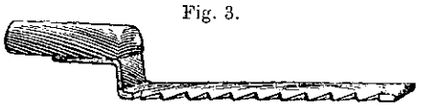
Apart from her size and guns of larger calibre, the marked characteristic of the "Orion," in distinguishing her from the ships launched before, will be in the disposition of the guns of the main armament. These guns will all be placed in the centre line of the vessel, whereby, with the exception of head and stern fire, the whole can be brought into action on any bearing from the bow to the quarter, thus making the angle of concentrated fire much greater than in that of any of her predecessors. In the "Neptune" and her sisters, the "Hercules" and the "Colossus," a larger angle of broadside fire over that of the earlier ships is obtained by the placing of the side turrets *en echelon*. This enables the fire from those turrets to be directed on the broadside and as far as 45 degrees before and abaft the beam, and brings all guns into action on those bearings; but in the manner of placing the guns in the new ship a still greater advantage will be gained.

It is understood that the "Orion" is 545ft. between the perpendiculars, 584ft. over all, and 87ft. beam. Her launching weight will approximate to 8,000 tons, and the displacement when completed will be 22,500 tons. She will be fitted with Parsons turbine engines of 27,000 horse-power working four shafts and four screws, each having an ahead and an astern turbine, and the speed will be 21 knots, the steam being furnished from 18 water-tube boilers. There will be a coal capacity of 2700 tons, and she will also carry 1000 tons of oil fuel. There will be three submerged torpedo tubes. The armoured belt will vary in thickness from 4in. to 12in.

The main armament will consist of ten 13.5 guns, disposed in five turrets (two guns in each), placed in the centre line of the ship. The second and fourth turrets will be raised so that their guns can fire over those of the first and fifth; thus four guns will be able to fire directly ahead and the same number astern, while all will bear through the angle from the bow to the quarter. The broadside fire will, therefore, be much superior to, and the weight of metal thrown much heavier than in the case of the "Neptune" class, though the direct head and stern fire will be less, as the "Neptune" can bring six of her 12in. guns into action ahead and eight astern. The "Orion" will only have one tripod mast. Her secondary armament will be composed of 4in. guns similar to those of the "Neptune."

The weak point is that the head and stern fire have been somewhat sacrificed to the broadside.

Fig. 3.



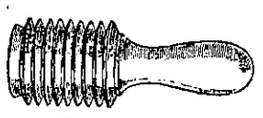
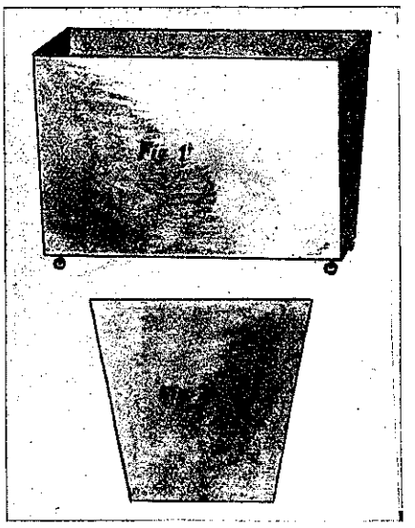


Fig. 4.

The Home Worker.

Child's Play Box.

The enclosed sketch (Fig. 1) will give an idea for a very useful child's play box. It was suggested by a tired mother, who considers it a great boon to anxious mothers. It can be readily moved about from room to room as the housework is being done, and the child inside cannot come to any harm, and is kept under continuous observation.



Take an ordinary packing case about 2ft. 6in. high and about 3ft. 6in. long. Separate sides from ends, and cut the two ends the shape of figure 2. Reduce the bottom to fit, then put back to sides. Four cheap castors can be screwed in the corners, and box lined with some soft material such as green baize.

A Garden Weeder.

A home-made hand weeder for use about the garden is shown in Fig. 3. Grass and weeds can be quickly and easily cut or combed from about small plants by means of the sharp saw teeth. The end can be used as an individual weeder, trowel, or transplanter. It is made of a piece of steel of about the thickness of a garden trowel and 1in. wide. Bend it and attach a handle, then file or grind in the sharp teeth as shown.—"Popular Mechanics."

Steak Beater.

To make a home-made steak beater (Fig. 4), get a piece of close-grained, well-seasoned wood, such as hickory or beech, large enough to get a length of 8¾in. and a diameter of 3in. The diameter at the depth of the grooves is 2⅜in. The width of each groove from point to point is ⅜in., with the end turned off rounding ½in. long. The handle is 1¼in. in diameter at the smallest place, and 1⅝in. near the end.

The beater should be turned from close-grained, well-seasoned wood. Hickory, pecan, osage orange and beech are good. Cut the grooves about the same angle as a V-thread. The end can be used as a potato masher.—"Popular Mechanics."

The Eyes: Take Care of Them.

1. When the eyes have to be rubbed frequently while reading, it is time to consult an oculist.

2. Don't read with the light in front. This ruins the eyesight quicker than anything else. Light should fall obliquely from behind over the left shoulder. Never read with the sun shining directly on your book.

3. Don't go to sleep or even take a nap in such a position that your eyes will open directly on the light when awakening.

4. When a book or magazine has to be held at arm's length in reading, it is a sign that glasses are needed. Don't delay in having your eyes tested.

5. Always hold your head erect when you read, and hold your book fourteen inches from your face.

6. Use a shade over every light, even a candle. Shades are cheap, or they can be easily made.

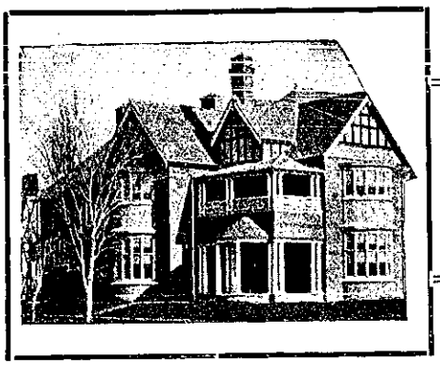
To the above may be added a few general rules, as for example:—Be sure when reading that the light is clear and good. Avoid small type. Rest the eyes when reading by looking away from the book. Wash the eyes night and morning in water.

To Colour Bristles and Black Hair.

Make a paste of 2 parts of slaked lime and 1 part litharge, with the aid of soap boiler's dye, with which the hair or bristles must be rubbed. After 24 hours the colouring is complete. The hair or bristles must then be washed until the paste is thoroughly removed from them.

To Cleanse Bath Sponges.

1. Unused sponges: Turning them repeatedly, they should be beaten with a little wooden stick, to remove any sand they may contain, then they are laid in 0.5 to 1 per cent. hydrochloric acid several times until no more lime is dissolved. Next they should be gently squeezed out and placed in a permanganate of potash solution (1 part to 2 parts per thousand), allow them to lie in it for 1 to ½ an hour, press them out again and then place them in an aqueous solution of sulphurous acid (the latter dissolved from acid sulphite of soda in water) and hydrochloric or sulphuric acid added (small quantities) sulphuric acid mixed with sulphurous acid (for large quantities). After 15 minutes, squeeze the sponges out and place them in 2.5 to 5 per cent. hydrochloric acid until the remains of the peroxide of manganese still adhering to them are removed. They are now of a straw yellow colour; if it is desired to have them still lighter, the entire process is repeated, the sponges are then rinsed, pressed out, and dried at a moderate temperature. Brown spots may be removed by laying the cleansed sponge in a 20 per cent. oxalic acid solution for a longer period. The sponge is now almost white or yellowish white, after drying in the air. If they should look somewhat brown, on account of their contact with alkalis, lay them for a time in weakly ammoniacal water, to which some peroxide of hydrogen has been added. 2. Used sponges: To be treated at certain intervals. First of all, the fatty substances are removed by repeated soaking of the sponges in 1 to 2 per cent. carbonate of soda solution, at about 120 deg. F. (no concentrated or boiling solutions); finally, also, in aqueous or alcoholic ammonia. Bleach as above.



Architecture and Building

Royal Institute of British Architects.

What is A.R.I.B.A.—what its aims are—what it does—and what it is trying to do.

Basil Hooper, A.R.I.B.A.

Read before the Otago Branch of N.Z. Institute of Architects, Sept. 19, 1910.

Before the Institute was founded, there had existed what was known as the Architectural Society, but it was felt that a more influencial institution was needed, and therefore a meeting of the founders of the Institute was held in the "Thatched House Tavern," in London, on 2nd July, 1834, and was attended by several notable architects, among whom were such well-known names as Barry, Gwilt, Parker, etc. An endeavour was made to induce architects of prominent position, and who were not connected with trade in any way (as was too often the case in those times) to give their support, and at subsequent meetings, members were enrolled, and the council elected, with Earl de Grey as President. The opening general meeting of the Institute was held on 15th June, 1835, almost a year after its inception.

In 1837, the Royal Charter was granted by King William IV., and in the same year Queen Victoria became patron, being associated later with the Prince Consort, who, as is well known, always evinced a great interest in architecture, showing it in one way by going so far as to take the chair at one of the general meetings.

A further mark of the Royal favour was the foundation of the "Royal Gold Medal," since annually conferred by the Sovereign on some distinguished architect, or man of science or letters, on the recommendation of the Institute. Also in 1866 the Royal command was issued that the Institute should thenceforth be styled the "Royal" Institute of British Architects.

The late King Edward VII. was patron during his reign, and no doubt our present King George will take up the office and interests of his father. It is interesting to notice, that not until 1887, did the Institute obtain powers, by a Supplemental Charter, to hold exams. and issue Certificates of Diplomas.

So much for the earlier history of the Institute, but what is also an important part of its history, although quite recent, is that, at the close of 1908, a new Supplemental Charter was granted, providing, among other matters, for a new class of members, termed Licentiates. This leads to a statement and definition of the different classes of members, viz.:—

1. **Fellows,** who must be architects of at least 30 years of age, and have been principals for at least 7 successive years. These are elected by the Council either from the body of associates, or the Council has power to elect as Fellow an architect (with the above qualifications) who has shown himself worthy, by doing notable and important architectural work.

2. **Associates,** who are persons engaged in the study or practice of architecture, who have attained the age of 21 years. All candidates for this class must pass a qualifying exam., or exams.

3. **Honorary Associates,** who are not engaged in architecture as a profession, but who by reason of their eminence in architecture, art, science, or literature, are likely to be of assistance in promoting the interests of the Institute.

4. **Honorary Fellows,** who shall be members of the Royal Family, or other illustrious or distinguished persons.

5. **Honorary Corresponding Members**—These must not be British subjects, nor residing within either the United Kingdom or any dependency, but who, by reason of their eminence as architects, scientists, etc., may appear to the Council to be of assistance to the Institute.

6. **Licentiates,** who are, as before mentioned, a new class. They must be architects of at least 30 years of age, and have either been in practise as principals for at least five successive years, or have been engaged for ten successive years in the practice or study of architecture. No person shall be elected a Licentiate after March, 1911. He is not to have any claim against the property of the Institute, nor to vote at any meetings, and various other small disabilities.

The object of the creation of this last class, is, as far as possible, to gather the majority of practising architects into the folds of the Institute, and that having been accomplished, it is felt that the Institute will be in a position to go to Parliament, and get a Bill passed, which will give the profession a defined legal standing, which at present, as we all know, we really do not possess. It was felt that it was impossible to gain the membership of most of the outside architects as associates or Fellows, as comparatively few men who have reached the age of 30 years, could find time to study for the examinations, even though they might wish to do so. Therefore this method of joining seemed the only way possible, and so far, it appears to have been most successful, as according to a recent copy of "The Builder," applications for membership as Licentiates were being received at the rate of 50 per day. By this means we hope in time to be in a position similar to the medical or legal professions, and gradually the public may become accustomed to the idea that it is not wise to consult a person about architectural work, unless he be legally qualified to style himself architect.

Concerning the different classes of members, it may interest some of you to know the amounts of the entrance fees and annual subscriptions, as possibly you may become members yourselves some day.

Fellows pay 5 guineas entrance fee, unless elected from the association class, when it is 2 guineas. The annual subscription is 4 guineas.

Associate entrance fee is 2 guineas, and annual subscription is 2 guineas.

Licentiates. 1 guinea entrance, and 1 guinea subscription.

The Royal Institute, besides being an architectural body, offers many advantages and interests to any of its members who are able to partake of them. At its head quarters in Conduit Street, Hanover Square, London, there is a magnificent library of books, both ancient and modern, and periodicals on all subjects connected with architecture, engineering, and all the allied arts, sciences, and trades. Most of these books are on loan to the probationers, students, and members. If the books, which are not allowed to be taken away, are wanted, there is a very comfortable and quiet reference room, where they may be studied at leisure. Any fit person is able to obtain the advantages of the Library, by filling in a form, and having it signed by a Fellow of the Institute. This privilege also applies to the attending the ordinary general meetings, which are held fortnightly and at which papers, often illustrated by limelight views, on interesting architectural subjects, are read by some of the leading men in the profession. One of the most interesting papers I heard was given by a young lady architect and A.R.I.B.A. herself, who pleaded the cause of "Architecture for Women." Needless to say, there was a very large audience, and some of the remarks during the discussion on the paper were distinctly amusing. Then there are the tea rooms, and smoking rooms, where current magazines and illustrated papers are also available, and where members may meet together in a sociable way. Altogether, to a London resident, there are many inducements to become a member, besides the benefit, which all members share, of the status which it certainly gives.

The above is the paper referred to in our last as having been delivered before the paper read by Mr. Newton Vanes, A.R.I.B.A., at the meeting of the Otago branch. Mr. Vane's paper reached us first, and Mr. Hooper's was shut out by press of matter.—Ed.P.

A Home for the "Simple Life."

(Rush & James, Architects, Hastings.)

We hear so much of the out-door life nowadays and many know the great benefits derived from it; but it is surprising that more people do not plan their homes more on these "Simple life" ideas.

With the various departments of the house placed to secure the correct aspect, think of the warm summer weather when

one could sleep and have meals out of doors for weeks on end. With this end in view we have planned the accompanying house, *i.e.* for the saving of labour and simple living.

The kitchen would be complete with every convenience, and a small servery would connect it to the living room or out-door dining recess. What could be more charming than partaking one's al-fresco meals in such delightful environments with the cool sweet smell of the vine-covered Pergola scenting the air!

Those who have tried sleeping out of doors find it hard to give up; so it speaks for itself and does not need enlarging upon. The novelty of a dressing-room and a bed on a screened verandah will prove most attractive to many.

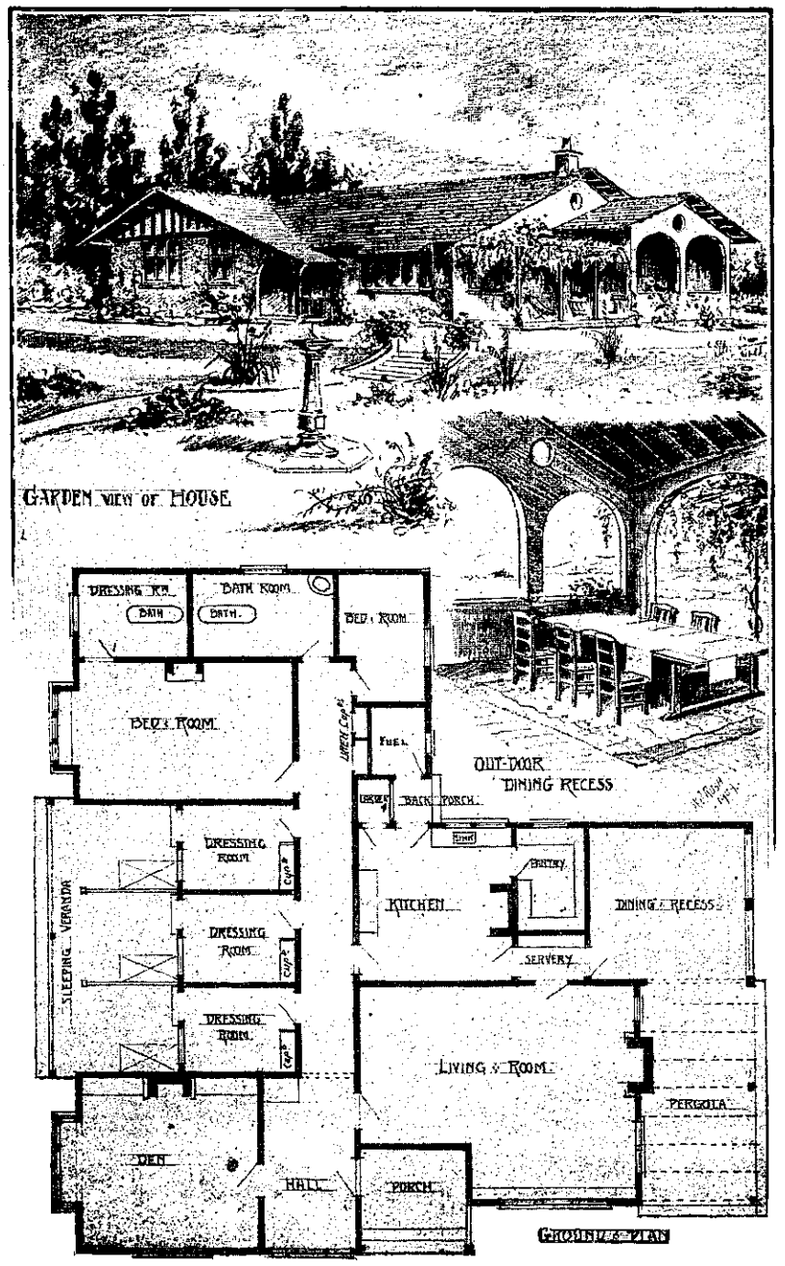
A Simple Cottage.

J. W. Chapman-Taylor.

"And he wandered away and away,
With Nature the dear old nurse;
And she sang to him night and day,
The rhymes of the universe.

And whenever the way grew long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more wonderful tale."

When we set out to build a cottage it is well that we should realise the responsibilities of our undertaking. We all know that man is the result of a chain of circumstances, which from his earliest moments gradually builds and moulds his character. Man is influenced by his environment for good or for evil.



With the revival of domestic architecture has come the revived interest in the garden, and yet how often the garden is entirely an afterthought. The architect is not given a chance to plan the "setting" for the house he has designed, and should not the garden be a continuation of the design with the house as the chief or central ornament. Even a small garden makes a beautiful setting when laid out in keeping to an artistically designed home.

Most of us are born in cottages. In them we receive our earliest and most lasting impressions. In them we live out our lives. Our cottages exercise an influence on our characters such as most of us little dream. Beauty in our homes will help to put beauty in our hearts.

We may take it as our axiom that beauty is "perfect fitness." To illustrate, let us take, for example, a tree. Its structure is so admirably designed that all its functions are performed to perfection. But besides its mechanical perfection it has spiritual beauty, which we all recognise and never doubt or question.

The cottage should be like the tree. Besides good ventilation, drainage and convenience generally, the cottage must have that kind of beauty that trees have. Now, when the Creator made the tree it was not with the idea of making a saleable article, but of making a "good tree."

And really the whole question is one of motive. If we set to work with the desire to serve God and our neighbour, we shall do good work. If we have a love and reverence for the beautiful materials with which nature supplies us, we shall not do them violence by reducing them to mechanical smoothness or monotony. Our work will be beautiful, inasmuch as we retain the inherent beauty of our materials.

It requires the quality of humility to do this nowadays, when we have so many tools with which to show our own cleverness.

Our aim in building a cottage is to provide a place to live in, a protection from the elements, cold, heat, wind, dust. We want a home, a retreat from the bustle and noise of life outside—somewhere to rest. Shall we then put a bay window where every passer-by can rudely gaze in upon our privacy? No, indeed. The old Roman house, with its central court open to sky, and arranged with its fountain and flowers, to which all the rooms opened, was like a little enchanted island. But its beauties were for its owner and his friends. It had no windows to the street. (The cheap vanity of modern suburbia has no parallel in history.)

As we do not walk about on the walls, and as we have only a limited sum of money, we shall buy floor space rather than high walls, and limit our ceilings to nine feet at most. There are aesthetic reasons for this, as well as practical.

When you stand outside, the sky, as well as the earth, can be seen. So inside the ceiling, as well as the floor, should come into the picture. Ceilings should be white and reflect the light downwards. There is cheerfulness in fresh white walls and joyousness is bright colours. Nature uses bright colours, but with discretion. She has plenty of plain wall between her pictures.

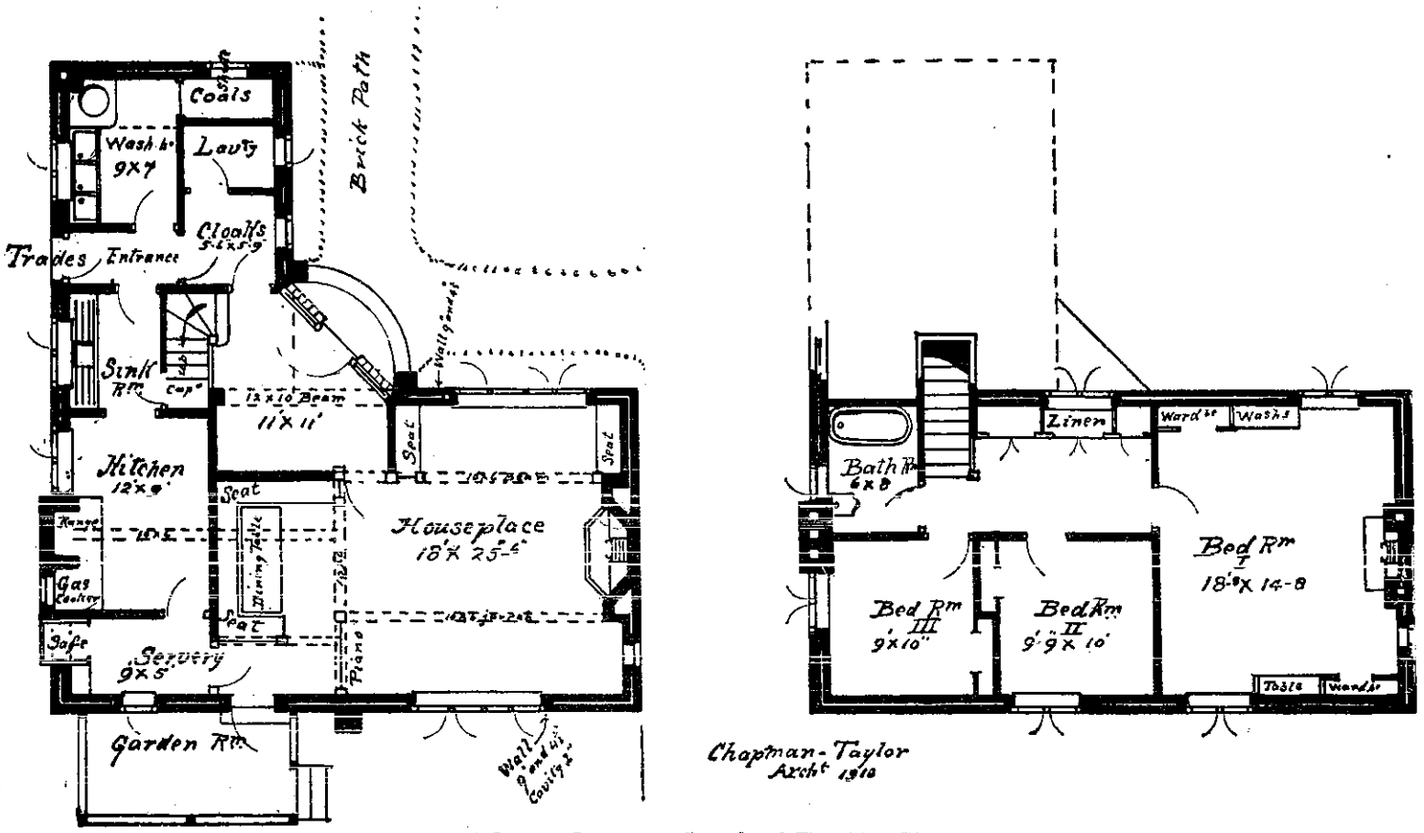
Another thing that will help us much is to observe the softness of line which nature adopts. Everything has a "texture," a gentle unevenness. The leaves and bark of trees, the surface of the rocks, even the water is never smooth, never quite straight. There is always a play of light and shade. The contour of the hills is soft and rounded.

That is why thatched roofs are so beautiful. That is why creepers growing up the walls make even an ugly building pleasant. Half the beauty of English villages is due to the creepers everywhere growing up the walls. They blend and soothe the work of man into harmony with nature. I want to ask my readers to imagine the cottage with which this article is illustrated, when in a few years' time the creepers have grown over it. Fancy the Virginia Creeper climbing to the top of the chimneys. Roses clustering round the windows, honeysuckle all over porch and garden room.

A SIMPLE COTTAGE. General View. (J. W. Chapman-Taylor, Architect.)

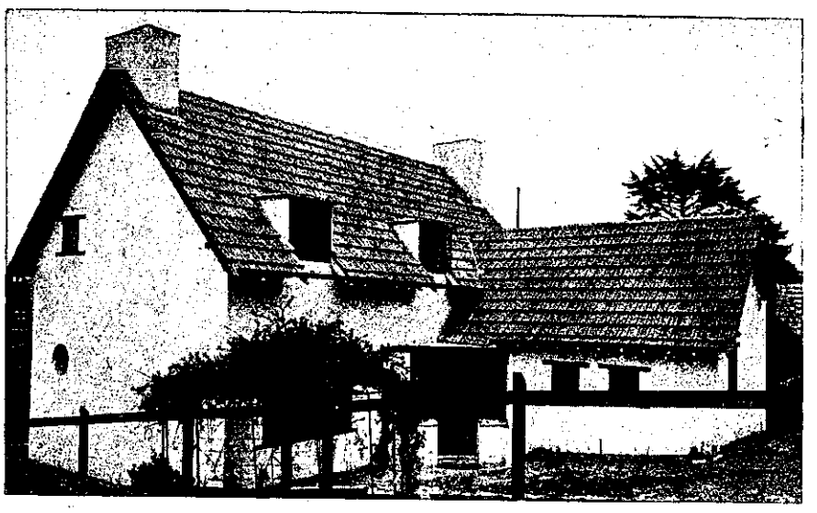
Who would have mouldings and brackets in place of such as these? Who would exchange them for paint and fretwork? With all our modern machinery we cannot create such beauty as that.

Inside, as the photos show, the walls are light. One's spirits seem to rise at sight of the fresh whiteness. But through the distemper one sees in a shadowy way the soiled brick of the actual building. No need for assurances as to the reality; one's own senses can see there is no fraud here. The good jarrah wood is big and solid, not planed smooth, but chamfered with bold slices of the draw-knife, and planed with diagonal strokes of the roughing plane, the simplest and easiest way of taking off the saw marks. This method also retains the woody texture and character of the jarrah, though it would not do for all woods. The hinges of the doors and the iron casements were made by a local blacksmith. His hammer marks are still there, showing how the glowing metal was beaten out by human hands. Machinery destroys both the interest of nature and the interest of human handicraft.



A SIMPLE COTTAGE. Ground and First Floor Plans.

A word as to cost will be of interest. It will be seen that while everything is solid and substantial, there are no moulding to split and shrink—no superfluities. Nothing but walls, floor, and roof, nothing but pure building. The cost was about £750, inclusive of everything, fencing, etc. The same plan could hardly be built in wood for less than £700. In England, where the climate is more severe, there are many brick houses 300 years old still standing. We know that few wood houses will last forty years. In addition, the brick house is warmer in winter, cooler in summer, and is fire, draught and dust proof. This is enough to show that temporary building is the wildest extravagance. Indeed, until we in this country learn to do things once and do them well, we shall remain comparatively poor.



A SIMPLE COTTAGE—BURNELL AVENUE FRON

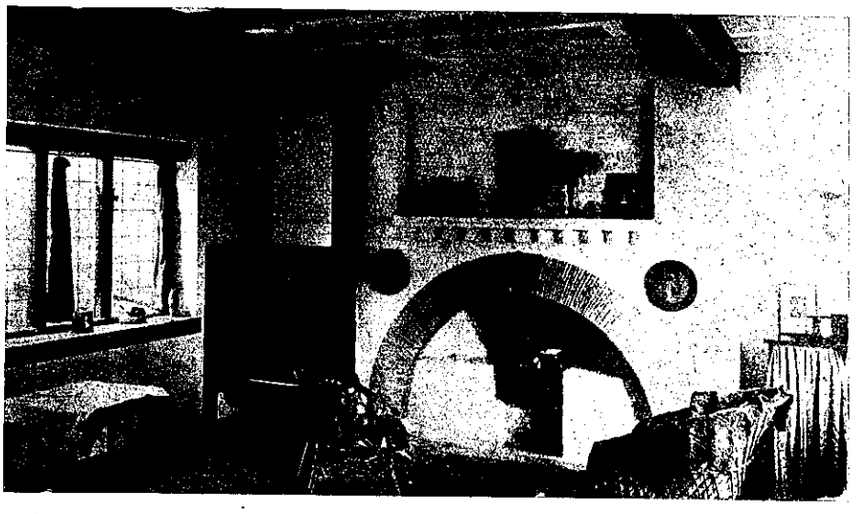
LIVING ROOM, SHOWING DINING RECESS.

However, before we go in for permanent building, let us "wander away" once more with Nature and learn her lessons of beauty, so plentiful to those humble enough to see them.

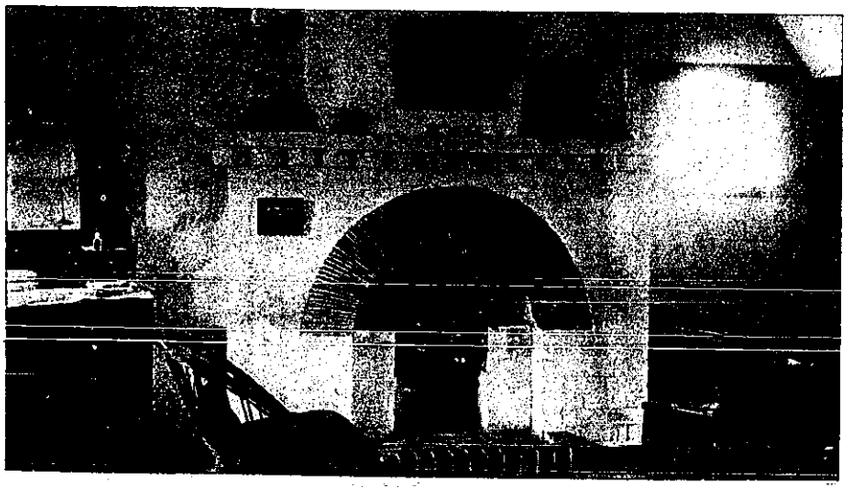
A Chat about French Polishing.

(By W. J. Mosley.)

There is an indefinable something about the finish of most of our household furniture, interior fitments of the larger houses, and furnishings of public buildings which, so long as it is clean and reflects through a bright, transparent film the beauties of the figure or markings of the woods, prompt most people to say, "It is French polished." The term, though a common one, does not imply that the finish we so much admire has been brought about by workmen hailing from France. On the contrary, it simply means that we are merely copyists—copying, as far as we know how, a process of finishing woodwork that had its origin in France.



LIVING ROOM WITH FIREPLACE.



BEDROOM.

The process was originally known as "Vernis Martin," which means "Martin's Varnish." For the use of this and the method of its application a monopoly was granted to the Brothers Martin in 1730 for a period of four years, which is equivalent to saying that they secured for that length of time a patent right for their process. After this it apparently became public property, or at least as much of it as its inventors cared to reveal. At this time the varnish or polish, lay on the surface of the wood, without any successful attempt at filling up the open grain, and was mostly of a yellowish or golden colour. But as the process became more universally adopted efforts were made to build up a more solid surface by working it well into the grain—efforts which were crowned with success about 1823, as described in "The Mechanics' Magazine" for November 22, 1823, where it says:—

"The Parisians have now introduced an entirely new mode of polishing, which is called plaque, and is to wood precisely what plating is to metal. The wood by some process is made to resemble marble, and has all the beauty of that article with much of its solidity. It is even asserted by persons who have made trial of the new mode, that water may be spilled upon it without staining it."

As already explained, the finish up to this time was mostly of a golden hue, owing no doubt to the fact that the oldest known recipe of its chief ingredients, "shellac, the yellow the better." As time went on, and perfection in building up a solid surface was assured, this golden hue on everything thus treated was objected to, and a finish free from colouring matter was sought after. In 1827 the French Society of Arts offered a prize "for a polish or varnish made from shellac or seedlac, equally hard, and as fit for use in the arts as that prepared from the above substance, but deprived of its colouring matter."

The result of this was the production of what is now commonly called white shellac, which is used mainly on light coloured woods that are

INTERIOR VIEW OF DINING ROOM.

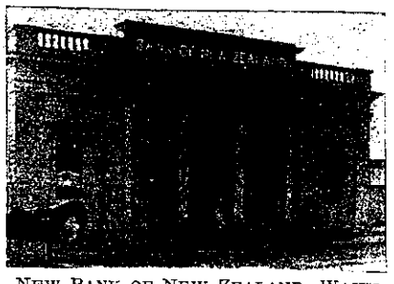
The residence designed and carried out by the architect, Mr. B. Hooper, A.R.I.B.A., for himself at Roslyn Dunedin. The joists and beams are all solid and genuine parts of the construction of the building. Oregon timber, stained and oiled, has been used for interior finish, while the walls have been treated with two shades of Hall's "Distemper." We illustrate the dining-room.

desired in their original colour, and on work that contains marqueterie or inlaid woods. I can find no record as to who actually secured the prize thus offered, but the general principle of refining shellac as now used was that propounded by Elgar Andes, of Vienna.

(To be continued.)

Brick Arches.

It is usual in so-called "straight," "flat," or "camber" gauged arches (the terms are applied indifferently) to cut and rub the intrados or soffit ends of the bricks to a slight curve to counteract the appearance of sagging, or bending down that all horizontal lines over voids appear to have. This is called, for convenience, an optical illusion, but is in reality merely due to the association of ideas. Persons familiar with building are so accustomed to see upturned curves or arches over voids, and have come to associate this in the mind with strength, that the absence of it appears to convey weakness. A perfectly straight beam always appears to say so to me, but I have asked various people not accustomed to them, and they have all replied "No"; so I



NEW BANK OF NEW ZEALAND, WAIHI.
Hutchinson & Ludwig, Architects, Waihi.

take it that it is not an optical illusion, but, as I say, merely the association of an idea we are familiar with. It is not advisable to camber the extrados or top part of the arch, because the bed joints of the course immediately over it would appear crippled, if it were so. A true arch should, of course, have its edges parallel curves, otherwise increased stresses result. A gauged straight arch is merely an ornamental feature in a building, and should not carry any great weight, that is, anything greater than can be resisted by the cement joints, because such an arch is really a lintel or brick beam and has no constructive strength apart from the adhesive properties of the joints; therefore there is, or should be, no settlement to provide against.

Town Planning and Modern House and Cottage Exhibition.

In connection with the Town Planning and Modern House and Cottage Exhibition, to be held at Gidea Park, Squirrels Heath, in the Romford Garden Suburb, in the summer of 1911, Mr. H. H. Raphael, M.P., will give prizes amounting to £1050, for the best designed houses and cottages erected in the exhibition, for a town plan, and other designs.

NOTES (Auckland).

Mr. B. C. CHILWELL has the following work in hand:—

A house in Owens Road, Epsom, for Mr. L. L. Berry. Contract price, £1100. Contractor, Mr. J. W. Bambury.

Plans are being prepared and tenders will shortly be called for a house at Remuera for Mrs. Bailey; to cost about £1600.

A residence has just been completed at Otahuhu for Mr. Longuet, and a cottage at Mt. Roskill for Mrs. Hull.

Messrs. WADE & WADE have let a contract to Mr. J. J. Holland for the erection of a two-storey brick building in Queen Street. The owner is Mr. Hannah. Contract price, £4000.

A private residence is in course of construction at Remuera, at a cost of £1500, and Mr. Brownlie has secured the contract for a house at Epsom, to cost £1000.

Tenders will shortly be called for a two-storey brick bakery in Dominion Road, and plans are being prepared for a two-storey residence in Remuera, and alterations to premises in Karangahape Road.

Mr. W. A. HOLMAN has let a contract to Mr. Julian for the erection of five-storey brick premises in Queen Street for Mr. Smeeton. Four two-storey brick shops are in course of construction in Great North Road for Mr. Dawson. Messrs. Jas. Lye & Sons secured the contract at £3029.

Messrs. HERRON BROS. were the successful tenderers, at £1334, for the construction of a two-storey residence in Arney Road for Mr. Hills.

Alterations are in progress to Nurse Lever's private hospital in Grafton Road. Mr. J. A. Penman secured the contract at £1634.

Messrs. Jas. Lye & Sons' tender was accepted for the erection of a two-storey brick shop in Symonds Street for Mrs. Robertson, at £1784. The same contractors are remodelling the adjoining shops at £1298.

Tenders are being called for a two-storey house in Grafton Road for Mr. Barclay, and for a house at Papatoetoe for Mr. Carruth.

Messrs. E. MAHONEY & SON.—

Tenders are being called for a five-storey brick warehouse, to be erected at the corner of Durham Street for Mr. J. R. Self.

The contract for the erection of two brick shops in Karangahape Road for Mr. M. Brown, of Ponsonby, has been let to Mr. J. H. Keat at £1600.

A block of buildings is under construction at Ngaruawahia for Mr. E. Fitzpatrick. The contractor is Mr. W. Massey, and the contract price is £2200.

Several private residences are in course of construction in the suburbs, each costing about £2000.

Mr. A. L. FERNEYHOUGH has let a contract for the erection of office premises in Wyndham Street for Messrs. Hill and Morpeth. The foundations are designed to carry a four-storey building. The contractor is Mr. O. E. Farrow. Contract price. £1500.

Plans are being prepared for a two-storey villa residence, to be erected at Vincent Road, Remuera, for Mr. George Peace.

Dunedin.

Mr. B. HOOPER, A.R.I.B.A., reports:—

Contracts settled recently include:—Stone and rough-cast residence in Oamaru, for Dr. Douglas; £1505; contractors, Allan & Lindsay. Brick and stone two-storey shop in South Dunedin for Mr. T. Smith, butcher; £950; contractors, Holmes & Armstrong. Residence in Mornington, Dunedin, for Mr. T. Wren; contractors, Brundell & Watkins. Additions to residence in George Street, Dunedin, for Mr. N. Smith; contractor, W. J. Anderson.

Patents.

The following list of applications for Patents, filed in New Zealand during the month ending October 15th, 1910, has been specially prepared for PROGRESS.

28363—Moore, A. E., New Brighton: Laundry drainer.
28364—Littleton, J., Wellington: Fluid pressure engine.
28365—Wynyard, M. H., Auckland: Flax-drying process.
28366—McRae, W., Hedgehope: Plough.
28367—Cooledge, W. D., Schenectady, U.S.A.: Tungsten manufacture.
28368—Oldman, C. A., Waiau: Oil can.
28369—Goodwin, A., Pigeon Bay: Milk bucket.
28370—Denton, W. H., Christchurch: Hobble.
28371—Agnew, A. R., Auckland: Spouting machine.
28372—Allott, H., Te Akatea: Fencing post ventilator.
28373—Beamish, W., Hastings: Flush.
28374—McMurray, F., Athol: Shears.
28375—Balfour, J. W., and Balfour Patents, of Victoria, Canada: Railway spike.
28376—De Montalk, R. W., Auckland: Surveying peg.
28377—Haverland, L. F. C., and Thomas, J. H., both of Adelaide, S.A.: Saddle.
28378—Pees, C. S., Palmerston North: Latch.
28379—Batey, J F, Stratford: Pasteurizer and cooler.
28380—Friar, M., and Richards, V. C., both of Auckland: Belting for sewing machine.
28381—Shaw. A. J., Dunedin: Gold, obtaining from river-beds.
28382—Burgess. J., Cheltenham, and Muir, J. F., Melbourne, Vic.: Filter.
28383—Johnston, C., Christchurch: Meat safe.
28384—Collins, S. J., Albert Park, Vic.: Butter box.
28385—Downham, J., Bury, Eng.: Fibre decorticator.
28386—United Shoe Machinery Company, Paterson, U.S.A.: Heel breasting machine.
28387—Martin, P., and Humphries, F., both of Granity: Axle lubricator.
28388—Ewell, H. P., Detroit, U.S.A.: Sodium-amalgam.
28389—Deister, E., Fort Wayne, U.S.A.: Ore-concentrator.
28390—Suckling, J. H., Christchurch: Motor engine.
28391—Ewing, D. A., Marton: Sheaf band cutter.
28392—Oliver, W. T., Christchurch: Gas burner control valve.
28393—Filsell, W., Thebarton, S. Aust.: Railway safety apparatus.
28394—Monro, C. G., Masterton: Railway coupling.
28395—N.Z. Hemp Process and By-products Company, Limited, Foxton: Flax drier.
28396—N.Z. Hemp Process and By-products Company, Limited, Foxton: Flax stripper.
28397—N.Z. Hemp Process and By-products Company, Limited, Foxton: Flax catcher.
28398—The Stromeyer Brake-shoe Company, Camden, U.S.A.: Brake shoe.
28399—Simon, H. I., Myross Bush, and McIntyre, J. E., Longbush: Ear-mark.
28400—Wilkinson, M., Auckland: Playing card.
28401—Clegg, A., and Ritchie, G. B., both of Christchurch: Kettle.
28402—Langman, H. W., Thorpe: Wire strainer.
28403—Browne, M. T., Armadale, Vic.: Cash receiver.
28404—Floyd, F. J. R., and Floyd, I. S. B., both of Carisbrook, Vic.: Slimes, etc., removing apparatus.
28405—Lowe, C., Umukuri: Cultivator.
28406—McKellar, C. G., Christchurch: Closet flush.
28407—Smith, J. C., Dunedin: Heating apparatus.
28408—Booth, C. S., Christchurch: Flax stripper.
28409—Le Roy, E., Auckland: Hook and eye.
28410—Evelyn, E. S., Auckland: Throat medicine.
28411—Reader, W. H., Stratford: Beeswax foundation comb.
28412—Mahlstedt, G., Melbourne, Vic.: Motor-car speed accelerator.
28413—Panton, J. A., Waterloo, Eng.: Brake block.
28414—Simpson, W. S., London, Eng.: Coke manufacture.
28415—Simpson, W. S., London, Eng.: Volatilizable solids distilling.
28416—Simpson, W. S., and Oviatt, H., both of London, Eng.: Iron and steel production.
28417—Beard, W. A., London, Eng.: Rotary pump and engine.
28418—De Colombier, M. R., and Clement, J., both of Paris, France: Separating metallic particles.
28419—Sweetman, J. T., Rupanyup, Vic.: Wheel tire.
28420—McAven, J. S., and Grigson, T. R., both of Auckland: Reinforced concrete block.
28421—Neal, C. C., Te Kowhai: Milk strainer and aerator.
28422—Hutchinson, J. H., Auckland: Material handling and transporting.
28423—Grey, C. D., Avondale: Carton.
28424—Gray, A., Canterbury: Closet seat.
28425—Day, H. L., Christchurch: Article displaying device.
28426—Wightman, E. E., Wellington: Signalling apparatus.
27427—Edwards, T., Ballarat, Vic.: Ore-roasting furnace.
28428—Edwards, T., Ballarat, Vic.: Feeding device for ore-roasting furnace.
28429—Furphy, V., Smithton, Tas.: Animal feeding device.
28430—Levien, E. P., Oroua Bridge, and Parker, A., Wellington: Fibre catcher.
28431—United Shoe Machinery Company, Paterson, U.S.A.: Boot and shoe manufacture.
28432—United Shoe Machinery Company, Paterson, U.S.A.: Boot press.
28433—Perry, W., and Jones, A. L., Woollongong, N.S.W.: Shaft coupling.
28434—Heli-Cushion Drive, Limited, Sydney, N.S.W.: Shaft coupling.
28435—Linard, A., Elsternwick, Vic.: Dust and draught excluder.
28436—Sutherland, D. G., Christchurch: Scissors sharpener.
28437—Stewart, A. P., Hunterville: Pot scraper and brush.
28438—McGaffin, R., Hastings: Flax catcher trip.
28439—Friar, M., and Richards, V. C., both of Auckland: Non-refillable bottle.
28440—Schlaadt, H., Dunedin: Strong-room door.
28441—Bertinshaw, G. J., Wilson, T., McArthur, C., and Hutcheson, J., all of Wellington: Postal pillar-box.
28442—Reid, J. M., and Wills, W., both of Wellington: Fireplace.
28443—Allan, E. A., Auckland: Basket attachment to saddle.
28444—Northcott, F. J., Christchurch: Milk receiving and delivering.
28445—Liggins, J., Tokomaru: Flax scutcher.
28446—Parker A., Wellington: Printing machine.
28447—Shield, E. R., Hobart, Tas.: Fruit grader.
28448—Kidd, T., Invercargill: Milking apparatus.
28449—Kidd, T., Invercargill: Milking machine.
28450—Dunne, R., Dunedin: Paper holder and deliverer.
28451—Rees, E. S. G., Wolverhampton, Eng.: Ejector, compressor, etc.
28452—Fruhling, O., Brunswick, Ger.: Dredged material removing.
28453—Rose, W. D., Dunedin: Sterilizer.
28454—Haswell, J. A., Hoar, G., and Cairncross, J., all of Eketahuna: Roofing.
28455—Griffen, P. J., and Eustege, T. P., both of Wellington: Water heater.
28456—Suttie, C., Waharoa, and Wynyard, M. H., Auckland: Flax dresser.
27457—Evelyn, E. S., Harkness, F. W., and Frith, S. J. R., all of Auckland: Bottle.
28458—McGregor, J., Dunedin: Boiler.
28459—Stokes, P. J., Dunedin: Potato blight mixture.
28460—Waters, W. H., Melbourne, Vic.: Ore-smelting.
28461—Lowenstein-Wertheim, Anne of, London, Eng.: Cot, bunk, etc.
28462—Johnstone, J. C., Boksburg, Trans.: Conveyor-belt pulley.
28463—McDonald, M., Clunes, Vic.: Railway signalling.
28464—Obery, S., Christchurch: Candle extinguisher.
28465—Ridley, W. H. J., Penrose: Furnace.
28466—Glass, H. A., Christchurch: Trolly pole.
28467—Mackenzie, A. C., Melbourne, A. C., Melbourne, Vic.: Carcase rail switch and skid.
28468—Norton, G. F., Wellington: Fanlight stay and fastener.
28469—Davies, L. H. R., Oamaru: Fire guard.
28470—Gordon-Jones, W. G., Taheke: Seed sower.
28471—Marshall, W. F., and Burman, E. S., Melbourne: Rail miller and grinder.
28472—McDonald, D. M., Donnybrook, Vic.: Cream aerator and cooler.
28473—Ward, T. E., Balmain, and Gaut, J., Leichhardt, N.S.W.: Totalisator.
28474—Bailey, G. H., Major's Creek, N.S.W.: Glove.
28475—Grayland, C., Wellington: Ice-cream freezer.
28476—Shaw, T., sen., and Shaw, T., jun., both of Westport: Suction-dredge pipe.
28477—Harper, G. H., Grey Lynn: Level.
28478—Ashworth, H., Wellington: Time-table.
28479—Firth, A. T., Auckland: Electroplating.
28480—Firth, A. T., Auckland: Goldplating.
28481—Smaill, J., Timaru: Boiler cleaner
28482—Mueller, C. B., Cleveland, U.S.A.: Tennis racquet.
28483—McDonald, T. W., Stratford: Pasteuriser.
28484—Rees, W. J., Upchurch, R. A., both of Hunterville: Filter.
28485—Pownall, A. B., Wellington: Acetylene lamp.
28486—McCarthy, M. J. N., Wellington: Kinematograph, etc.
28487—Dixon, T., Cronadon: Boring brace.
28488—Dickson, A., and Weniger, F., both of Auckland: Turbine.
28489—Heycock, H. F., Martinborough: Trolly-pole retriever.
28490—Hudson, C. E., Addington: Water chute.
28491—Norgrove, H., Takapuna: Dry dock construction.
28492—Wakefield, C. C., London, Eng.: Acetylene generator regulator.
28493—Martineau, F. L., London, Eng.: Marine steering gear.
28494—Hood, T. W. A., Ashfield, and Glenvale, T. R. M, Bondi, N.S.W.: Tie attaching device.
28495—Hood, T. W. A., Ashfield, and Glenvale, T. R. M., Bondi, N.S.W.: Tie, securing in position.
28496—Hood, T. W. A., Ashfield, and Glenvale, T. R. M., Bondi, N.S.W.: Tie or scarf construction.
28497—Hume, E. J., and Hume, W. R., both of Adelaide, S. Aust.: Concrete pipe, etc., construction.
28498—Duggan,, W., Jun., Dunedin: Mitre-box.
28499—Geary, J., and Semb, F. G., both of Christchurch: Heat detector.
28500—Goulet, A. O., Auckland: Peanut roaster.
28501—O'Hern, D. P., Christchurch: Signal lamp controller.
28502—Hind, J., Sydney, N.S.W.: Sheep-shearing machine.
28503—Muston, J., Auckland: Cup and saucer display rack.
28504—King, A. E., Annandale, N.S.W.: Carriage arm rest.
28505—Stanbrough, A. H., Richmond, Vic.: Concrete wall mould.
27506—McDonald, W. S., Preston, Vic.: Crate.
28507—McDonald, W. S., Preston, Vic.: Crate lid.
28508—Hellyer, R., and Nelson, I., both of Sydney, N.S.W.: Sprayer.
28509—Edwards, A. H., Sydney, N.S.W.: Shirt collar.
28510—Volk, F. W., jun., Ashfield, and Sigmont, W., Waverley, N.S..W—Shirt or blouse collar.