PROGRESS

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PROGRESS

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EDITORIAL COMMENT.

The Medical Congress now assembled at Sydney is destined to do some good work, in the right direction. In that direction, if one looks far enough ahead, one sees a most wonderful vista. Forty years ago medical science had advanced but little beyond the point where Hervey left it after his great discovery. To-day the increment of scientific knowledge is marvellous, and with that increment the art of the surgeon has kept pace fairly well. The king of the scientific situation has been and is, and ever will be the microbe. All illness is microbe, and every microbe has got his fatality just as every man was by the Shakers said to have his affinity. That is to say, for every microbe of the wrong sort there is one of the right sort. Disease being caused by the first kind, cure comes from the second, for when the right microbe is found he at once attacks the other and proves fatal to him, the result being recovery of the patient ill with the assault of the wrong microbe on his system. This truth was ascertained in a perfunctory sort of way, but remarkable for results, back in the Middle Ages, when the Turks found out that inoculation was a sure preventive of small pox. While civilised Europe died of the scourge, the barbaric Turk enjoyed life immune altogether. Rabies microbes are now divided into right and wrong, and rabies, therefore, is cured where cure was once deemed impossible. The microbe of Typhoid has been provided with a fatality, with the result that thousands live where they used to die. Diphtheria is in the same state, and the right use of "serum" is a sovereign specific. Phthisis shows signs of coming into line, while millions are looking on interested to the point of fascination. Cancer, the most dread of all the scourges dominated by the microbe, is about to have a fatality in the shape of a microbe capable of "cultivation" to the right intensity. These are the things in sight of the probable end. In addition there are untold things in the region of possibility. Looking past them to the end of the great vista of the future, we see a world without disease, a race of beings stronger, healthier more perfect than anything ever dreamt of in these our days of degeneracy. With the help of the microbe we are going in that direction more and more rapidly from day to day, at a pace, in fact, which depends entirely on the medical profession. In its turn the medical profession depends entirely on the medical congress. For which reason mankind is so vitally interested in the Congress of Sydney. The men of a noble profession have met together to discuss the latest achievements in the war against the microbe world by the help of emissaries from that world itself. They will talk of microbes for weeks, their essays will be of radium and the X Rays. They will enlighten us about the true position of the famous Dr. Kosch in the medical profession; they will have much to print about spine curvature and paralytics, and in connection with the first of these there may be some useful paper on a case which is making a sensation in Wellington at the present moment. In short, the Congress will take its place among Congresses, along with the threads of achievement reaching towards the well-healed future. There are many things wonderful in our day, things which to our forefathers would have appeared uncanny: things of the air and the water, men flying as the birds of the one and travelling like the fishes of the other; reaching forth to talk to one another across space without wire, and even able to talk at vast distances. There is such a thing, moreover, as leading the mind of another, and such a thing as forcing others to your bidding. But nowhere is there such a marvellous record of achievement as there is in the microbe world. The manner in which man has come to understand the myriads of beings of the invisible world and to use them to counterbalance one another in their preying warfare upon man is as great a miracle as the miracles performed by the microbe world itself. What the end will be is clear enough—a dependible cure for every ill to which man's flesh is heir. And the road to the understanding of that great conclusion lies through the records of these congresses of the medical profession.

* * *

When the water power scheme of the Government was made public last session there was, it was widely noticed a liberal reference to the proposal to establish factories for the making of nitrate from the nitrogen of the air by electric process, much in use elsewhere. The idea then seemed to be that in case no one wanted the electric power generated by the Government's scheme it would be possible to save the scheme by falling back on the manufacture of nitrates. Mr. Thomson, the member for Dunedin, who is well known in the scientific world and much admired there for his attainments had, we notice, something to say about this matter in his speech on the budget. He began by warning the Government that there could not be a greater mistake than to expect to make nitrates out of fag ends of power. He added that there would be no demand in this country, and probably none in Australia, for these fertilisers for some time to come, though no doubt in time they would be in demand. He also seemed to think that the process of manufacture leaves something yet to be desired. Now of course the Government scheme does not depend on fag ends of power. The idea was that in case the public did not take the power it could be used for this particular manufacture. Mr. Thomson said that substantial power would be required, nothing under five thousand to be depended upon in any one installation. But there are in the Dominion some four million horse-power available for electric conversion, 500,000 in the North Island, and 3,700,000 in the South Island. Of these there are in Tekapo Lake 550,000, Te Anau 750,000, Manapouri 420,000. These and many other powers were measured by Mr. Hay, and will be found by any

inquirer in his report of 1904. There is plenty of power, therefore. As to the processes of manufacture, the report of the engineers says nothing in detail. But it says that much information has been supplied through the High Commissioner's office from Sweden about the process now at work for the manufacture of nitrate of lime fertilisers. The information they had was got direct from the inventor himself, Professor Birkeland. The inventor's claim is that about 0.4 of a ton of nitric acid may be got per horse power year, giving about 0.52 of a ton of nitrate of lime per horse power year.

It is perhaps true that the nitrates would not be required in the Dominion, and that the demand in Australia would be but small. But the demand elsewhere in older countries where these fertilisers are in great demand would be very great.

Everything, of course, depends on the cost of production and conveyance. Of the latter it may be said that the sea is open to all, the sea which carries the nitrates of Chili to all parts of the globe can do the same for the nitrates of New Zealand. As for the process, Mr. Thomson said nothing definite. The engineer (Mr. Hay) estimated the cost at ten millions of a scheme at Manapouri capable of turning out 600,000 tons of nitrates a year, selling at six millions sterling, or ten pounds a ton. He mentioned that four thousand men would be thus employed, and he added that several similar establishments might be maintained at other places where the water power abounds. With these figures verified it would be easy to calculate how soon the nitrates would pay off our national debt. Prudence and caution should be used by all means. That we take to be the scope of Mr. Thomson's advice to the Government during the debate aforesaid. For the rest he spoke as an authority without advancing anything authoritative against the scheme.

* * *

The arrival of the new head of the water service has put a new complexion on the whole scheme of the North Island water power as it stood in the programme laid down, debated and accepted in the session of 1910. This expert has made a statement to the effect that it is possible now to transmit electric power by wire to distances of 500 miles without loss of more than five per cent. Now it will be remembered that this question of transmission was supposed last year to be the weak point in the scheme. Since then the Waihi mining company have determined to establish a scheme of water generated electric power for their machinery at their mine of Waihi. It is understood that if they can utilise 6500 of every 10,000 horse-power under the scheme the company will be quite satisfied. The discrepancy is serious between this deficiency of over thirty per cent. and the five per cent. loss estimated by the Government expert for distances up to five hundred miles. The distance of Hora Hora, the company's power station, from Waihi is under 100. If the new expert cannot prove that his statement is founded on some new discovery by which the transmission problem is made easy, there cannot be much in that statement. We understand that this is the very thing which the statement of the expert represents. It will be for him to prove the truth of the matter. There will be much careful scanning of the proofs he gives, for there are many expert electric engineers in the Dominion who will not be lightly satisfied.

Assume that this point of transmission is fairly established, it becomes necessary to review the scheme for the North Island. The various stations proposed by the Government, as stated by the Prime Minister in moving the Aid to Electric Power Bill (second reading) last session are as follows:—

Kaituna	...	10,000 H.P.	costing	£320,000
Akatarawa	...	10,000 ,,	,,	300,000
Makuri	...	6,000 ,,	,,	200,000
Wairua	...	3,000 ,,	,,	100,000
Totals estimated		29,000 ,,	,,	£920,000

There was some other station in the proposal, to be located, according to subsequent information, either at Lake Waikaremoana, or Te Reinga Falls some few miles further towards Gisborne. Now Waikaremoana is of all the North Island sources of power enumerated in the lists of the engineers who reported some years back on the powers of the Dominion, the largest. The estimate made by Mr. Hay in 1906 of the powers and their cost at this place was as follows:—

At 1½ miles from Lake		24,200 gals.	£105,000
,, 2 ,,	,, ...	44,900 ,,	264,000
,, 4 ,,	,, ...	67,700 ,,	486,000

The estimate of the four quoted proposals includes the cost of transmission to the centres to be served by the power. The above estimates for Waikaremoana do not. The question is whether it will pay to stop the four schemes, saving the cost of head works in four places, with dams, tunnels, dynamos, stations and the rest, and build one power station at Waikaremoana, where all the power needed is obtainable for the North Island. In other words, will the transmissions from Waikaremoana cost less than the saving on the four head works. It is a question for the engineers to answer.

To the lay mind it seems that the margin is large. If the Waikaremoana estimate of cost is to be relied on, enough power can be generated at Waikaremoana for the other four districts plus 15,900 for the Napier-Gisborne districts, (or 44,900 in all), or £264,000, leaving for transmission of the power £656,000. It is a large sum. The engineers ought to be able to tell us easily how many miles of transmission can be erected for this sum. They will also have to examine the estimates of the Hay report of the cost at Waikaremoana. The expert who reported that power can be transmitted 500 miles with loss limited to five per cent. in the longer distances ought to be able to answer the mileage question readily, and he should not find much difficulty in overhauling the other estimates of cost.

There is in addition, it may be said, the difficulty of the outlets. There are at Waikaremoana several outlets underground. But they do not affect the sources of supply covered by Mr. Hay's estimate, which are the streams issuing from the lake, to be tapped at their junction two miles from the lake. The outlets come into the calculation when the lake itself is tapped for an increase of the supply. But for the power to be obtained from the issuing streams the outlets are to be negligible quantities.

In the Budget, we observe, it is announced that this course of examining the Waikaremoana problem is to be at once determined. It is the logical conclusion from the statement of the new expert.

* * *

Photography, as its name implies, consists of drawing by the aid of light, and is based upon the fact that various substances undergo such changes in their condition as to exhibit new properties under the action of light. This new property, generally speaking, consists of change of colour to a darker shade when exposed to light.

The progress of photography during recent years has been rapid and phenomenal. New fields of usefulness have been discovered, involving fresh and novel applications of the art or science to the increasingly exacting demands of modern life. Its use has become familiar to all, in magazine and book illustrations, and the many beautiful protogravures and tri-colour reproductions of the works of famous artists. Physicians and surgeons have gathered wider knowledge of the complicated human system by means of photomicrography and the use of the Rontgen Rays; the astronomer has discovered, as will be read in our Astronomical Notes, by means of the sensitive plate, stellar systems otherwise imperceivable, even with the aid of a telescope. One great boon which thousands daily enjoy is the reproduction of pictures of events occurring all over the world, by the Cinematograph. The criminal has a fresh deterrent in his course of crime, numerous pictures of him and his physical peculiarities being taken and filed by the Police Department for use in the detection of his future delinquencies.

Photography originated with the Camera Obscura (Latin—dark chamber), said to be invented by one Baptista Porta, of Padua, in 1569, although there is evidence of an even earlier knowledge of its principle and properties.

The earliest known discovery of the actinic action of light seems to have been made by Fabricius in 1556. He observed that the sun's rays had a blackening effect on silver chloride. In 1802 Thomas Wedgewood, son of the famous potter, discovered a method of copying paintings upon glass and making profiles by the agency of light on nitrate of silver. Attempts were made by both Wedgewood and Sir Humphrey Davey, without success, to secure a reproduction of the image formed by the Camera Obscura. Soon after this, however, two men, Niepce and Daguerre, notably the latter, were successful in fixing the image cast by the camera. This, however, was a positive and could not be reproduced, and it remained for an Englishman, Henry Fox-Talbot, in 1841, to discover the negative process. This he patented under the name of Calotype. After his process followed the Cullodion, and finally the Gelatine plate which we use to-day. Many different processes have been evolved, not the least beautiful among which is the oil-pigment process. A description of this appears later in our columns from the pen of Mr. E. Warner.

Apart from the commercial and scientific uses of the art, it has given pleasure and relaxation to thousands of workers, and no more enjoyable way of spending a holiday can be had than wandering over the country looking for choice bits, with the camera, or the "one-eyed friend," as Mr. A. E. Gifford calls it in his pleasing little allegory.

Photography

A Plea for the Pictorial in Photography

J. A. Heginbotham.

Photography has entered so largely into the pursuits of the average individual as well as the business life of the world, that it seems a pity more is not done to render the scope of its usefulness more pictorial than is generally found to be the case.

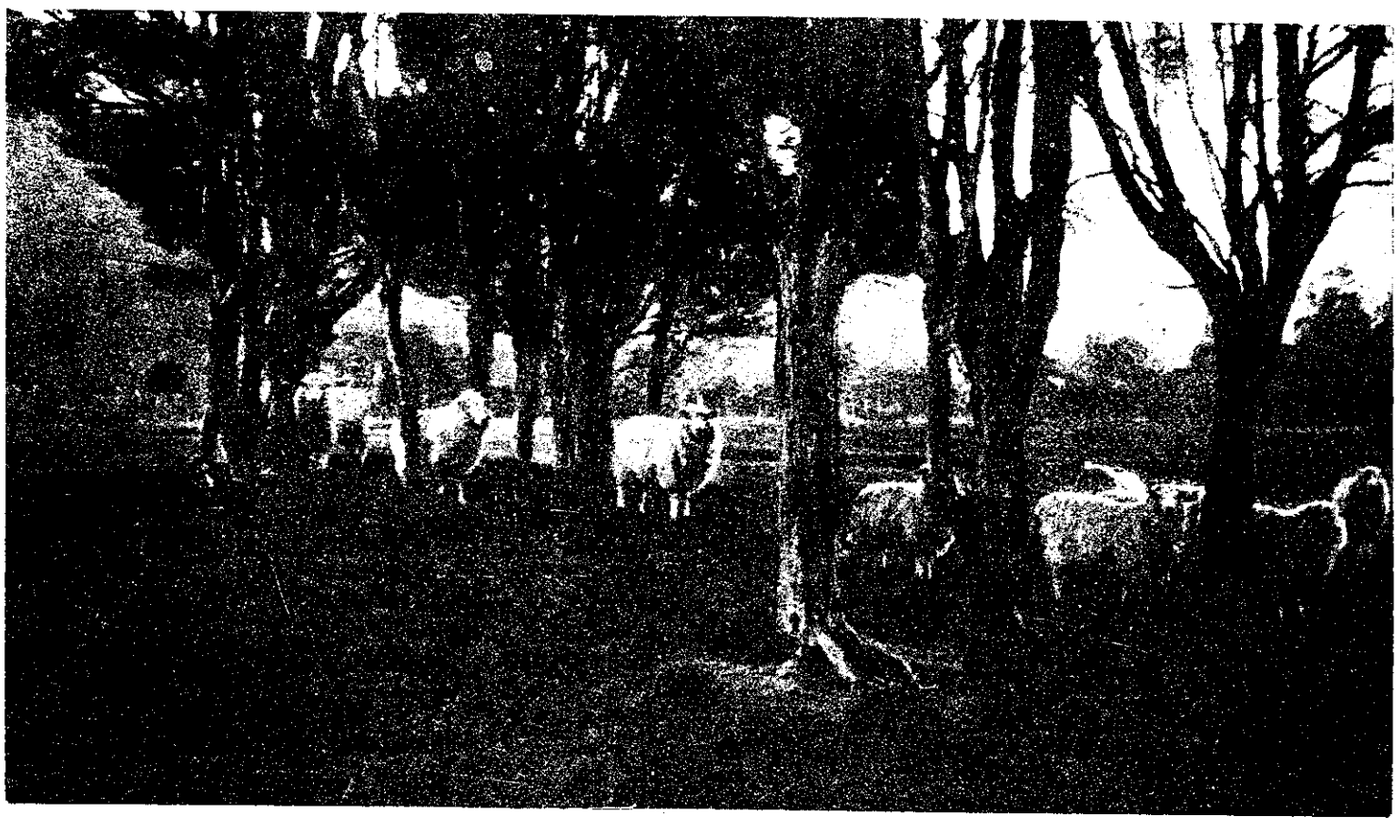
Photography pictorially would be better if its elements were not so easily comprehended as to make it almost a frivolous pursuit and cause it to be included with amusements and recreations. Photography is educative, and it is sad to think that of the many who practice it the vast majority never get past a certain stage. A little serious attention soon enables the student to produce a technically perfect negative and print, and there usually his artistic education ends, or perhaps it would be truer to say it never began. In the ease with which one arrives at this stage lies the evil of the pursuit, as the many photographs of a purely "Snap-shot" character prove.

Photography was intended to produce pictures, the very earliest photographers laboured to that end, and despite the many difficulties they had to surmount, difficulties which the photographer of today knows nothing about, the rough path of its research and progress having been made smooth by the plate and paper manufacturer. The facility in acquiring ordinary technique so as to be able to produce something that the student knows is technically good, but has not knowledge enough to know is artistically worthless, beguiles him from the path that would probably make him an artistic photographer, to follow the delusion of making technical discoveries, and lose himself in chemical and optical subtleties. *The real struggle begins after the student is capable of producing good technical work.* At this stage he wants to recognise where the merit of the materials ends and the power of art begins; to learn where to put his skill to the best use. The study of art will help him, and will be found to be an absorbing pursuit.

Photography for pictorial purposes must be used merely as a means to produce pictures, just as the art student in our art schools uses pen, paper, pencil and brush as tools of his adopted art. The camera is a tool, it does the drawing for him; the work of selection and all it means belongs to the man who uses it. Photography must be treated as a means of expression; the photographer must learn how to see and feel, he must study how others have felt and seen, and the means they have taken to show what they saw and what they felt about it. He must study works of art and pictures and endeavour to learn how the pictorial results gained have been attained. A course of instruction in the art section of the Wellington Technical School will help him. Those whose names are greatest in pictorial photography will be found to have considerable artistic knowledge and ability apart from their photography; and it is only reasonable to attribute the superiority of their work to the fact that they have had artistic training.

The photographer who wants to advance in the art must reach beyond mechanism. He must cultivate the emotions; must get into closer touch with nature; must be able to grasp the scene in his mind and feel its beauty as well as to capture it in his camera. Landscape expression varies in form and intensity with the hours. The freshness of spring; the heat of summer; the gold of autumn; and the cold of winter are phases of nature which we should not only be able to see and feel in ourselves, but also to represent in our pictures. If the photographer once gets the feeling for the beautiful in nature he will never tire of photography—as so many do owing in many instances to lack of effort to cultivate and "develop the latent image" of their talents—but will cling to his "one-eyed friend" as a life-long companion well able to help him in giving expression to his observations, thoughts, feelings and individuality.

By taking his hobby seriously the photographer will find that further study is required; study that can only end with



Keepers of the Links, Heretaunga. *Photo. by J. A. Heginbotham*

life itself. A knowledge of composition is absolutely necessary, which should be felt in the most simple subject, as well as in the most elaborate picture. Composition teaches how to get the greatest amount of variety together without straggling; variety in unity. It helps towards obtaining the most pictorial effect that a subject would admit of or the art of making each part of a picture help the other parts. With the majority of photographers this question of composition and its help in picture-making is either not considered or not known, and nature is too frequently taken just as you find her, as is evidenced by the many

TRENTHAM. *Photo. by J. A. Heginbotham*

technically excellent prints one sees which are absolutely void of interest and giving no proof or reason for their production. A picture should "draw you on" to admire it, not show you everything at a glance. Let the principal features, as the head in a portrait, claim first attention, and the rest follow. There is a great deal to be done by the use of emphasis. This is attained by concentrating the attention of one part of the picture by so arranging that the part shall be darker or lighter than the rest of the space, so that it shall be more conspicuous.

In landscape we must have not merely the facts, but the grace and charm and the expression. There must be a feeling that the photographer did his work with sincerity and conviction, and not for the fun of the thing. Let a man have implicit confidence in his work while he is about it, it will be all the better for his belief in it; when it is finished let him doubt for ever after and try to do better.

Selection has much to do with the art of the photographer, but there are many other things to consider afterwards before the work is complete. Beautiful subjects may be obtained from very simple bits of nature. A broken bit of a river bank and its almost always picturesque surroundings; sea and skies; and woodlands. It is worth while to consider if a part is not more valuable than the whole, which in picture making it almost always is, and if it is possible to get rid of what you do not want, whether you can get rid of it altogether or hide it. Different subjects require different devises, different treatment, and there is endless fascination and charm in treating them.

If photographers would more seriously study the pictorial side of photography I am convinced they would retain life-long interest in its pursuit and give greater pleasure and charm to those it is their effort to please, and, moreover, derive greater pleasure and profit themselves.

The photographic literature of the day should be read and studied. Books on photography written by the late H. P. Robinson, and the late A. Horsley Hinton, Major Puyo, and Robert Demachy, are worthy of study, thought, and reflection. These gentlemen have done much to lift photography to the sphere of the arts.

The Oil Pigment Process

E. WARNER.

There are many methods of using the oil pigment process. The following is the one that finds favour with most oil workers at home. When this has been mastered other ways and means will no doubt suggest themselves to the enthusiastic "Oiler."

A sheet of paper thinly covered with gelatine is the first essential—double transfer carbon paper, the oil paper specially put up by Messrs. Griffin, London—and many smooth and mat bromide papers—Wellington & Ward's carbon surface, Ilford Carbon Surface, Kodak Permanent, Griffin's Lingrain, and Barnet smooth. These I can recommend; other papers are perhaps just as good, but I have not tried them. The Bromide Papers require fixing in a clean Hypo. bath and a thorough washing afterwards.

The experienced oil worker can get good results from any description of negative, but I strongly advise the beginner to use for his first attempts a well-exposed, lightly developed negative, free from fog, with clean shadows and translucent blacks. Some oil pigment brushes will be required, a tube of black or brown pigment, a quire of fluffless blotting paper, and a piece of plate glass, rather more than two inches larger each way than the size of paper worked on. The sensitizer used is the Bennett Carbon formula—

Pot. Bichromate.....	4 drams
Citric Acid	1 dram
Water	25 ounces
Ammonia, .880, about	3 drams

The pot. bi. and citric acid are dissolved separately in *hot* water, the solutions mixed and sufficient ammonia .880 added to change the colour from orange red to lemon yellow. The ammonia *must* be added immediately after mixing the two solutions. If mixed as described the solution will keep indefinitely.

To sensitize put sufficient solution in a dish and immerse the pieces of paper required, being careful to remove any air bells and allow the paper to soak for two or three minutes in warm weather, for four or five minutes in cold weather, then remove the sheets to a warm, dry and dark cupboard. When thoroughly dry the paper is ready for printing.

Printing should be carried out in the shade, and as the image is very faint and the paper extremely sensitive, it is advisable to inspect the print in a dark corner of a room. The print is finished when all but the highest lights are visible. The colour of the image should

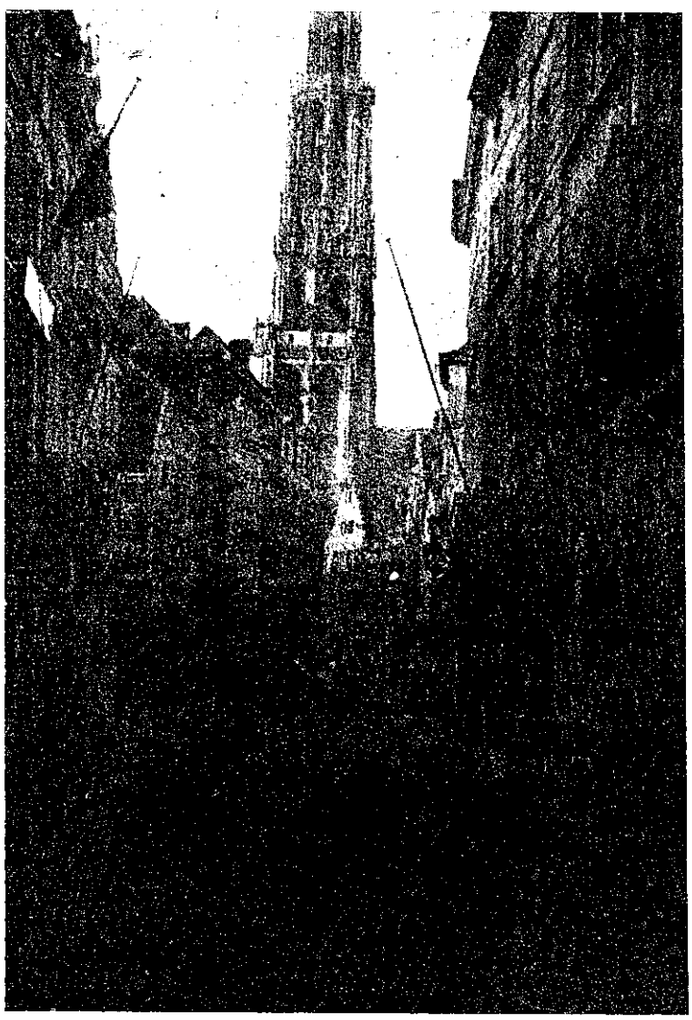
be a faint greenish brown, and as this is a difficult colour to judge by, as beginners in Platinotype printing know, it may be as well to print in strips, to learn by trial and error as to the exact time to stop printing. This should not prove a difficult matter, and a trial or two will put the beginner right.

The paper, as soon as printed, requires soaking in three or four changes of water to remove the biehromate stain. The water may with advantage be just tepid in cold weather. When the stain has quite left the paper place in a clean dish of water for one hour.

Now that the gelatine print has been thoroughly soaked, place it on a pad of at least half a dozen sheets of blotting paper, wet, but holding no superfluous moisture. Rest the whole pad on the sheet of plate glass to present an even surface, and proceed to dry the gelatine film. A piece of butter muslin or a handkerchief will do this as well as anything. Roll the material into a pad and dab the surface gently. When the last spot or streak of water has been removed the print is ready for "oiling."

Now take the tube of pigment and squeeze a little (very little will do, a piece the size of a small dried pea will cover a 15 x 12 print) on to the palette—a spoilt negative answers—and rub down with a knife. Take a medium size brush and dab gently on the pigment, lift the brush and crush it firmly two or three times on a clean portion of the palette, then attack the print. The pigmenting is done with a dabbing action. This can only be learnt by practice, but very little practice is needed to show the beginner the right and wrong way. Do not be in too great a hurry to get a finished print. Be content to give all attention to a small portion, then, when this begins to show a well graduated deposit of pigment, gradually work over all the print. It will be found best at first to apply as little pigment as possible, and to build the image up gradually. After one or two prints have been produced it will be possible to charge the brush full of colour and apply it to the print in larger quantities. By this method the shadow detail can be built up very quickly and the picture evolved by the removal of superfluous ink by a hopping action of the brush. The latter method is more effective for strong subjects, and gains a spontanity by its rapidity of execution. But the beginner is advised to leave this method alone until some knowledge has been gained by the first and simplest method.

A guide print—either a small contact print or a bromide enlargement—will prove of great assistance while the pigmenting is being carried out. Alterations or additions can be indicated on the guide print and will leave the oiler free to give individual attention to the manipulative side of oil printing. When the print is finished and the gelatine surface dry—this usually takes about two hours—the pigment is still in a tender state and now is the time to wipe out any high lights, either with a leather stump or a piece of pointed indiarubber. Should, however, any parts require darkening, soak the print again in tepid water and pigment locally. By carefully following the above instructions a successful oil print can be made at the first attempt. When the print is finished lay flat to dry. The pigment will take from one to three days to dry and until thoroughly dry should not be touched. Brushes must be cleaned with petrol.



The Cathedral, Antwerp—Straight Bromide Print.

Oil Print of the same. *E. Warner, photo.*

The Copyright of Photographs

The concensus of opinion is that the copyright in all photographs should, in common justice, be vested in the author.

In Great Britain, and in the United States of America, an organised effort is being made to obtain more satisfactory legislation in this direction.

There was an attempt made in 1896 to secure photographic copyright legislation for New Zealand, but the Bill then passed was rendered useless to portrait photographers by the introduction of a clause making it apply only to landscape photography; but, even had this clause not been inserted, it would have been of very little value to portraitists, as in another clause it is stated that when a photograph is made to order for "a valuable consideration," there shall be no copyright in such photograph. The receiving of a valuable consideration is undoubtedly the critical and only sticking point in all artistic copyright legislation, and we fail to see why it should be so. It is only just and equitable that the copyright of all artistic work should be vested in the

author or producer, whether he receives "a valuable consideration" or not for his work, and that the purchaser of such artistic work has no equitable or just right to have same copied or reproduced unless the copyright has been legally assigned to him by the author.

Now, if this contention of equity can be substantiated, and proved by sound argument to be justifiable, we fail to see how the legislators in a country which boasts of its democracy can longer refuse to grant the protection afforded by such a copyright, especially when it can be clearly shown that it is necessary in the best interests of the public, and that it will also have a considerable influence towards raising the standard of artistic and photographic work in the Dominion.

Many will say, "I paid for this photograph. It is my photograph, therefore I can do as I like with it, and employ anyone I wish to make reproductions of it."

This very common statement is generally made without thought, and contains no argument. The argument is not so much whether, after an individual has for *certain* reasons selected a *particular* photographer to produce his portrait, he has then the right to have it reproduced by other than the original author, but whether *other* than the original author has any *equitable* or *just right* to reproduce such portrait for "a valuable consideration," and thereby deprive the originator of the portrait of the just profits of his labour.

A photographer does not sell the *knowledge, skill, individuality* or *idea* he puts into the production of the negative; he sells only a certain number of prints or pictures from such negative at a stated price.

To reason this point by analogy: Take the author of a book; he is granted copyright in his book, although he receives "a valuable consideration" by the sale thereof. It is recognised that he sells the result *only* of his acquired knowledge and *ideas* in the form of a book; the photographer sells the result *only* of his acquired knowledge and *ideas* in the form of a photograph or picture; but, for some unknown reason, this has not up to the present been recognised by our legislators, and the present law permits any unskilled and unscrupulous copyist to plagiarise and reproduce the *ideas* contained in a photograph, and to sell them as his own, and thereby rob the author of his just reward. In most cases these copyists go so far as to sign their own names to the plagiarism. To sell the ideas and thoughts of an author of a book is a crime, yet to sell the ideas and thoughts of a photographer is justifiable according to the present law. Where is the equity?

The above argument is sound, and is founded on precedent, for all Governments have recognised that it is only just and equitable that *original ideas* should be protected, and have at all times legislated accordingly.

There is no need of argument as to whether photographic work contains original ideas, as this point was settled as far back as 1862 by the British Government, when photographic work was included in the Artistic Copyright Bill of that date. This Act is still the only protection at law enjoyed by portrait photographers; for, as stated before, the New Zealand Act of 1896 does not include portraiture; and, moreover, the New Zealand Act was rendered of very little practical use by the introduction of the "valuable consideration" clause. The only advantage gained in this Act is that New Zealand landscape photographers can now protect any photograph, for which they have not received a valuable consideration, for the term of five years without registration. In fact the passing of this Act in its present form was, it seems to us, a waste of time. Now the only protection at law enjoyed by the portrait photographers of New Zealand is the British Act of 1862, and this Act is of little or no practical use for two obvious reasons:(1) On account of the bugbear clause *re* valuable consideration; (2) because of the condition necessitating registration. The deletion of the "valuable consideration" clause from any future Photographic Bill is the only point on which there can be any debate, for under the present law a photographer may copyright only a photograph for which he has not received valuable consideration. In the first place, he does not receive a valuable consideration for the *idea* contained in the negative, but it is obvious that he must receive some payment for his *work*. This he receives from the sale of positives or prints, in like manner with the author from the sale of his books. Therefore there is no reason why the copyright should not be vested in the author or producer of a photograph. It is absolutely the only method of protecting the public and photographers from an organised army of unscrupulous copyists, whom photographers under the present law are powerless to combat.

Many other arguments could be brought forward to support this contention.

With regard to registration, we think it would be granted that almost any form of registration must prove unworkable when it is considered that a photographer makes from one to twenty negatives a day of different individuals, and any mark or word such as "Protected," name and date, etc., such as required by the present New Zealand Act for landscape work, is cumbersome and greatly mars the artistic beauty of small work.

Making Moving Pictures

Probably the highest pinnacle of success to which the photographic art has attained is in the presentation to us of those marvels of modern science known as moving pictures

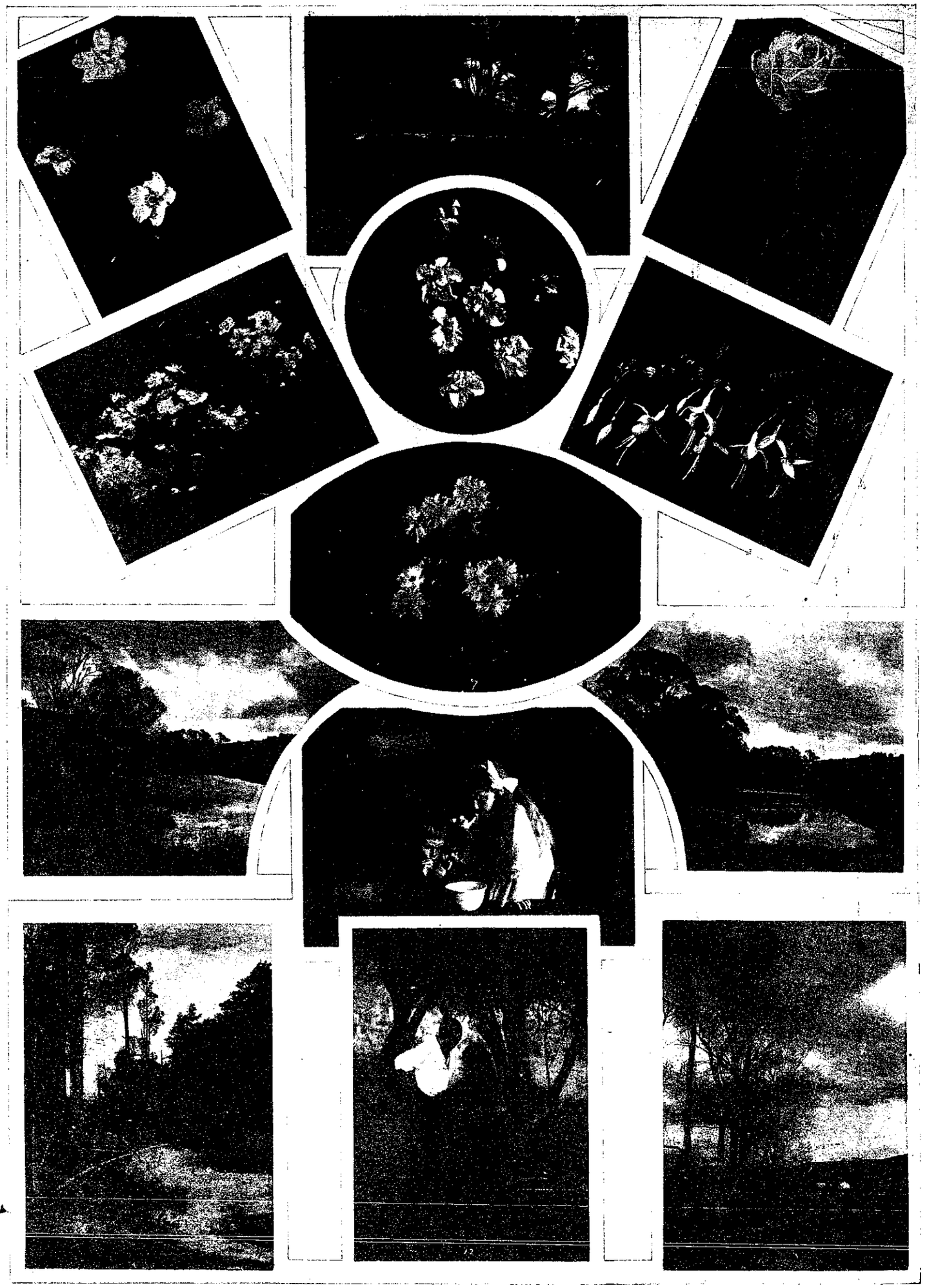
We have all seen the finished result in the Theatres, but probably few realise the immense amount of careful thought and scientific ingenuity which was expended before we enjoyed our evening's pictures. Without going into the "acting" side of the question, which, of course, is a great industry in itself, we will endeavour to give some idea of the working of cinematograph machines such as are employed at the principal theatres. Progress is indebted to Mr. Joe Dunn, of the King's Pictures, for the information contained in this article.

There are three instruments or machines employed before the pictures are thrown on the screen. All of them embodying the same mechanism and principles, though each has a function of its own. The first, of course, is the camera, which takes the negatives from which the finished pictures or positives are printed. The sensitised film on which the pictures are taken is contained in a perfectly light-tight magazine with internal gear to permit of the winding and unwinding of the film as required. Another magazine, precisely similar to the first, is provided for the exposed film to wind in, after passing through the camera. The passage of the film through the camera is chronicled on a dial outside, facing the operator, so that he can see at a glance how much is exposed and how many feet of film he has left. The intricate mechanism which takes the pictures, is operated at will by turning a crank. The film apparently passes continuously through the machine, yet there is a distinct pause for each picture to be taken. That is to say, each time the lens is exposed the film is stopped automatically, and it does not pass on again until the lens is covered, otherwise the pictures would be blurred. The pause occupies only an infinitesimal fraction of time, as may be judged when at the average rate of picture making there are 16 exposures and 16 closures each second. The most common, and perhaps the best lens used is a 3-inch Dallmayer Stigmatic working from F5 to F22, sharp at full aperture. It gives simply marvellous results when one considers that the little picture 1 inch by ¾ of an inch enlarges to 30 feet by 26 feet, and shows a perfectly sharp picture, that size at a distance of 140 to 150 feet.

The process of development requires great care, owing to the rapid nature of the film, and is carried out in a dark room filled with special tanks for the immersion of the film, which is wound upon frames carrying about 100 feet each. The developer used is from any of the standard formulae for rapid negatives, and when the film is immersed, the operator has to stand by with the bromide to restrain the development should it flash up too quickly. A few seconds delay might spoil the whole film. There are also tanks for washing and fixing, through which the frames go in due course, after which the films are wound on cylindrical slat frames, gelatine outwards, for drying.

After drying, the next process is printing, or making the positive which eventually reproduces the picture on the screen. This is performed by a machine which is, in its working, similar to the camera, except that the light is supplied from inside by an 8 c.p. 100 volt Osram light, which is adjustable to suit the varying intensity of the negative film. This requires great attention, and the operator watches it critically as he turns the handle. No lens is used in this process, the negative and the blank film, which is to form the positive when developed, being both passed by the same set of cogs and claws and pressed closely together, over the aperture from which the light is passed through the negative on to the positive film. The same ingenious arrangement as in the camera permits of movement of the film only when the light aperture is closed, and automatically locks the film in place while the light is exposed.

The positive film is rolled on racks and developed in the same way as the negative, except that it is a much slower pro-



SOME CHARMING PHOTOGRAPHIC STUDIES

1.—Anemones. 2.—Golf Links. 3.—A Rose. 4.—Hawthorn Spray. 5.—Petunia Blooms. 6.—Fuchsia. 7.—Primulas. 8.—Winter at Silverstream. 9.—"Bubbles." 10.—Summer at Silverstream. 11.—Trentham. 12.—The Nest. 13.—At Silverstream.

Photos. 1—8, 10, 11 and 13, by H. Davidson. No. 9 by A. C. Gifford. No. 12 by Gerald E. Jones.

cess, being about the same speed as ordinary Ilford plates. Any bromide formula is used. The tanks for developing and fixing usually hold about 4 gallons of their respective solutions, which is sufficient to treat 100 feet of film at a time. They are usually maintained at a uniform temperature of 70° Fahrenheit to get the best results. The positives are dried in the same manner as the negatives, and when dry are carefully scrutinised for defects. A defective picture can be cut out and the film joined invisibly with a special cement prepared for the purpose.

The third machine, the lantern or reproducer, is more complicated than either of the others, inasmuch as in addition to the mechanism for driving the film it contains the electric Arc light, and condenser, and the lens. The light is supplied by a 60 volt continuous current to a flame arc of 12,000 candle power. The carbon pencils are 6in long, and are almost used up at the end of an ordinary evening's run. The lantern in which the arc burns is of sheet steel, and has to stand considerable heat, as may be imagined when it is said that between the points of the carbon pencils the heat is 2009° Fahrenheit. A piece of steel, such as a knife blade, fuses immediately and drips away on being introduced between the points.

The arc light, as mentioned above, is of 12,000 candle power, and is situated at the right focal length behind the double lens condenser, which gathers in the rays and concentrates them so that they are applied to the film at approximately 60,000 candle power. The heat at this concentration point is also intense and would fire the film if it were exposed to such heat for even a second of time. To obviate this risk of fire, and it is a very serious risk, for the film is highly inflammable, an ingenious contrivance has been devised, whereby a steel shutter, backed with asbestos, interposes itself automatically between the light and the film every time the machine stops. The same intervals are observed in reproducing as with the camera, i.e., 16 exposures and 16 closures per second. Beyond the film is the Darlot lens, which magnifies the picture and projects it on the screen.

THE FALLING SANDS OF TIME. *Gerald E. Jones, photo.*

My One-Eyed Friend.

By A. C. GIFFORD.

Some years ago a striking figure took his place in the circle of my friends. I had often passed him in the street; and, long before we spoke a word to one another, I felt a great attraction towards him. When at last I had the good fortune to be introduced to him, we became at once fast friends. It was almost a case of love at first sight. There is something very prepossessing in his appearance. He stands erect, is well-proportioned, and of medium height. His clothes are always trim and neat, except for a dark and rather ragged cloak thrown carelessly, in a characteristic fashion, about his head and shoulders. His features are sharply cut, clear and honest; and he looks you straight in the face. He has, indeed, only one eye; but what an eye it is—large and bright and clear as crystal! You feel instinctively that he can see right through you, and there is something almost embarassing in his penetrating glance. I have often noticed the self-conscious look that many people put on in his presence. They feel that nothing can escape his searching eye; they try to look their best, and fail. There is, however, no need whatever for such uneasiness. My friend has really a very kindly disposition, and the estimates he forms of people even when most severe, are thoroughly honest and free from bias.

He is a great friend among the children; but, strange to say, most animals, and especially cats, are very shy of him.

Many people accuse him of looking at things, and of turning things, upside down. He is certainly more or less addicted to each of these habits. With regard to the latter, I can only say, in the words of one of my old masters, "A great deal must be excused in the cause of Science." The former I must acknowledge to be one of his most characteristic habits, but it is hardly noticed by those who know him best. By the way, have you ever looked at a sunset upside down? If not, you should seize the first opportunity. I shall be surprised if the increased brilliancy of the sky is not a revelation to you.

To an ordinary observer, the most remarkable thing about my friend is his memory. It is truly marvellous. No student of Loisette could hold a candle to him in this respect. Remembering the value of Π to 700 places of decimals is nothing to the feats he can perform. I confidently believe that if he had one good look at a page of logarithms he would remember for years every single figure. Do not imagine that I am exaggerating. I am speaking sober truth. I have had countless opportunities of testing his memory, and I shall presently give you an example.

My friend is a great traveller. I have had the pleasure of his company for many hundreds of miles, on sea and land. He is the life of every walking tour in which he takes a part. He has three legs; but, strange to say, he is by no means a good walker himself. He requires, in fact, constant assistance, especially when passing over rough or hilly ground. But he always repays a thousand times for any trouble he gives by the pleasure his presence affords. He is an ideal companion. Always on the alert to help or to amuse, ever ready with advice or illustration, he never thrusts a jarring spoke into the wheels of the conversation. I never knew a man so modest as he. He never brags. He is, indeed, no great talker. You could hardly choose a more silent comrade. He will sometimes travel for miles as if asleep, even his eye may be closed; but a lovely face, a beautiful landscape, or even a passing cloud is enough to rouse him in a moment from his apparent indifference; and when he is once roused he can accomplish, in a few seconds of life and action, more than we in our slow way could do in days.

One spring, as we were travelling together on the West Coast of the South Island, we came to a beautiful lake. The day was stormy, and through the waving branches of surrounding trees, we had a charming view over the wind-stirred water of the distant cloud-capped hills. I gazed for some time at the scene, and then roused my friend, who gave one momentary glance before we were forced by the sinking sun to turn away. We both went back to our work amid other scenes, and it was not till more than three years later that I spoke to him again about what we had seen that afternoon. I found that he remembered every detail of the view. Every ripple on the water, every rock on the shore, every branch on each tree was accurately recalled. In one second he had taken in more than I could have noticed in an hour, and years after he could recall the scene more clearly than I could have done next day.

You must not think that I admire my friend only for his good looks, his remarkable eyesight, and his marvellous memory. I do indeed admire him; but I feel affection for him too. He has so many good qualities that I might speak of them all night and yet not mention half. A sympathetic companion in prosperity, adversity draws him still closer. He encourages energy and perseverance. He inspires enthusiasm. He fosters the love of beauty and the respect for truth.

I need say no more. Some of you have made friends with him already; more, I feel sure, will do so soon. None, provided they have kindred spirits, are ever likely to be disappointed with the fruits that spring from his inspiring friendship.

Moonlight Effects.

The so-called moonlight effect is a photographic deception. To secure this effect select a view with the sun almost in front of the camera, but itself hidden or partly hidden by clouds, and preferably when the sky is full and well defined, and well broken up with cloud masses. Then expose about the usual time for the view in question, and develop with a developer containing only ¼ grain of Pyro to the oz., until the details are just out. Wash off the developer and apply a fresh one, 4 grains of Pyro and 4 grains of Bromide to the oz., until the high lights have attained the requisite density.

Another method, which frequently gives good results, is, still with the sun in front, and preferably shining strongly, to give a very short shutter exposure, and develop strongly. This gives brilliant lighting, and dense masses of shadow.

Trimming Prints.

There is more art in print trimming than meets the eye at the first glance. It is not sufficient merely to cut off the edges evenly, so as to include everything there was on the plate, or to place a cutting shape upon it and trim it round. There are two main considerations in print trimming. First, that the sides of the print are cut true with the horizontal or vertical lines of the picture. If your picture is a sea view, cut the top and bottom of the print parallel with the horizon line. If you have no horizon line to go by, take the side of a house, or anything else in the picture, which must of necessity be vertical. Use this as your guide, and cut the sides of your picture parallel with it. Of course in both cases the other two sides will be square with the first two treated. Secondly, trim your print down if it can be improved thereby. In the majority of cases the appearance of a picture will be improved by cutting off a little of the foreground, reducing the amount of sky by about half an inch or more, or cutting off more or less of either or both ends. Get four pieces of white cardboard, and cover up different portions of your print and see whether you cannot improve its appearance by excission of superfluous parts.

THE VASE. *Gerald E. Jones, photo.*

Titles on Prints

To print the name on the photograph several methods may be adopted. The simplest is to write the title of the subject on a slip of paper with aniline copying ink, or with ordinary copying ink mixed with gamboge or vermilion. Then slightly dampen the surface of the negative near the bottom right hand or left hand corner in as unobtrusive and unimportant a portion of the picture as possible. Press down the paper with the writing upon it. Leave for a few minutes, and then remove the paper, when the writing will be found to have adhered to the negative. When printed, the name will print out white. Another way is to write backward on the negative, while another and better plan is to write the name in Indian ink on the surface of the paper before it is printed on. The ink will wash off in the after operations and leave the name in white where the surface of the paper has been protected by the ink.

Halation and its Preventions.

Halation is the term given to the halo which often surrounds windows in photographs of interiors, and blocks up the details. Also it is found to occur in landscapes taken in a strong light, the tops of trees and other objects which are surrounded by strong light being lost in a mist, or entirely obliterated. It is caused by reflection from the back of the plate, and occurs most strikingly in plates of the cheap class, which are thinly coated. With very thickly coated plates it rarely occurs, except when taking brightly lighted interiors. To prevent it the back of the plate may be coated with a mixture of powdered burnt sienna ½oz., gum arabic ½oz., glycerine 1oz., water 5oz. This is readily washed off before development. A specially ready-made preparation of this is sold for this purpose if preferred. Another way is to cut dead black needle paper, or black American cloth, to the size of the plate, coat it with glycerine and squeeze it on to the back of the plate when placing it in the slide.

Arts and Crafts.

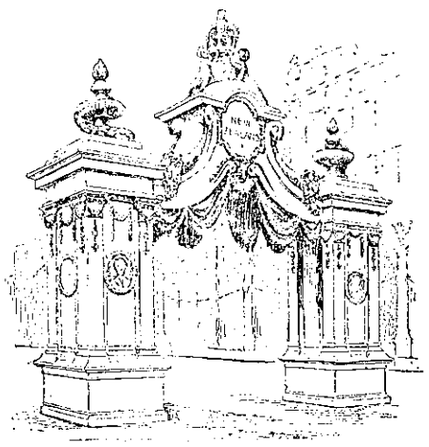
Exhibitors at the coming yearly exhibition of the N.Z. Academy of Fine Arts are now busy finishing off the very last touches and trying the effects of various frames. There have been several attempts made by different members of the council to introduce a rule that all exhibitors should use frames of a similar colour. The usual gilt has been suggested as well as the rather dangerous white and the somewhat too strongly insistent black. There can be no doubt that an exhibition has a better all-round effect from every point of argument with a uniformity of framing than as at present, with its jumbled assortment of colours, each frame struggling for prominence and injuring its neighbour in the eye of the public.

However, nothing yet has been done in the acceptance of any rule to alter or improve this state of affairs.

The coming picture show will be opened on Saturday, October 7th, by His Excellency Lord Islington, who will be received by Mr. H. M. Gore, the new President.

Unfortunately, the work of Sydney artists, which is usually a source of interest and attraction, will not be seen this time, the Sydney show of work being held at almost the same time.

At the annual meeting of the Academy held on August 29th, Mr. H. S. Wardell, the retiring President, bade his official good-bye to the members of the society. Mr. Wardell has held the office of President for so many years, has done so much good for the Society, and given to it all his interest and all his time, that those present found it difficult to fully express their appreciation of his valuable services.



N.Z. ARCH AT THE CORONATION PROCESSION.

The following new officers were elected:—President, Mr. H. M. Gore; Vice-Presidents, Dr. Fell, Mr. H. Linley Richardson; Council, Miss Holmes, Miss D. K. Richmond, Mr. A. Hamilton, Mr. L. H. B. Wilson. The four non-retiring members of the Council of eight are: Mrs. J. A. Tripe, Mrs. J. A. Hannah, Mr. A. T. Bate, Mr. H. Rayward.

It was unanimously agreed that should an extraordinary vacancy occur on the Council, Mr Wardell should be asked to accept the position. The Society was anxious to retain his services and the help of his advice.

Mr. Wardell expressed his thanks and pleasure at the high opinion the Society was pleased to hold of him.

A scheme has been organised, after much thought and debate, for the spending of the Government grant of £500.

Mr. G. Clausen has kindly offered to overlook a collection of work to be sent out here if the Wellington Council could arrange for some one to make a preliminary selection. After much thought it was decided to ask Mr. John Baillie, of Baillie's Gallery, London, to get a number of pictures together for that purpose, and Wellington can hope to see in the near future a small exhibition of fine work.

NARCISSUS, by G. E. Butler.

No art critic has a better claim to write the first English book on post-impressionism than Mr. Lewis Hind, for he, from the very first hint of the approach of the new movement in England, has faced the innovator boldly, with every intention of understanding his aim and meaning, and, if consistent with his own intellectual honesty, of joining hands with the newcomer. Most English critics have trembled before the latest note in art, either in bewilderment or indignation, and many have hit out blindly at the new thing as though they were endeavouring to strike a half-seen enemy. Mr. Lewis Hind has "kept his head," as we say, insisting upon that necessary part of the anatomy, solving the riddle of the pictures of Cezanne, Van Gogh, Ganguin, Matisse, and the others. The result of this conflict of ideas are now set forth in his handsome volume, "The Post-Impressionists" (Methuen, 7/6 net), and the argument is embellished with several very excellently reproduced examples of the work of the painters under discussion. Mr. Hind is now a convinced believer in the new movement, and his book, although it does not do more than mention the living exponents of modernist art, with the exception of Matisse, may be taken as an earnest non-technical introduction to the subject, written with that graceful literary buoyancy which has made Mr. Hind the one art critic who can make the discussion of art interesting to the lay mind.

The presidents of the Art Societies of Auckland, Wellington, Christchurch and the Public Art Gallery, Dunedin, have petitioned Parliament for the grant of a sum for the present financial year for the purchase of works of art. They ask that such sum as may be granted may be apportioned between the petitioning societies, and be expended by them in the purchase of works of art of educational value, to be placed in galleries to which the public shall have free entrance, subject to such reasonable exceptions and restrictions as are usual.

Although there is not the same call for designers in New Zealand as there is in England, it is gratifying to note that the Royal College of Art, London, is taking active steps to train men as designers for purely manufacturing purposes. There are so many manufactured articles that one sees day after day which show such poor designing that it is pleasing to know that steps are being taken to give us something better.

A moment, please! We do not often transgress in wearying you with personal matters, but, alas! in a weak moment we allowed our trumpeter to visit the Coronation—said he wished to acquire the latest and most original thing in fanfares —and the beggar hasn't returned! That means—but you see the point? Yes! We have to do our own trumpeting for this occasion at least. You see we have been told that it was impossible to do high-class printing and reproducing in New Zealand. That artistic striking individual issue covers were not to be found except upon the front of the very best American magazines. That expensive process blocks and really good paper would be altogether beyond the scope of a modest little journal such as ours. In

PENDANT BY REUBEN WATTS FOR HER EXCELLENCY LADY ISLINGTON.

contradiction of this we point with pride to our last issue—the Railway Number. The cover is the work of Mr. E. Warner, an artist of English reputation, now living in Wellington. The centre engine is the winning photo in our photographic competition, which was won by Mr. Hutchinson, of Wellington. It is one of the Dominion's largest locomotives ready for the Main Trunk run. The design and effect are as striking as the tones are delicate and artistic.

Motoring and Aviation

Modern Warfare

Guns Mounted on Motor Cars

OUR GERMAN CORRESPONDENT

It is an irony of fate that, just now when the armies are equipped with the most modern weapons against the usual targets of the earth, a new enemy appears in the air against whom these weapons are powerless. They are too slow in motion and use; indeed, compared with flying machines, one might say they are antiquated. As the heavy masses of artillery are unable to meet the increased requirements of the times, a new weapon has to take up the struggle against the hostile spy, a weapon to which the open country presents no difficulties and which can make changes of location with ease. Guns mounted on motor cars will have even more cause for existence when the guns of the field artillery are more adapted for taking up the flight in the air, than they are to-day, for in speed and readiness for action they will always be superior. In time of mobilisation, and when the army is in full action, they will be able to go far beyond the outskirts to keep off the dangerous approach of this aerial enemy and prevent its doing any damage. To accomplish this, not only speed, but also facility of attendance, rapid and sure aiming, high ballistic efficiency and effective ammunition, are required.

The "Rheinische Metallwaren-und Maschinenfabrik," Dusseldorf, have constructed their 6.5 cm. gun mounted on a motor-car to meet these requirements.

Fig. 2.—Gundayer Training the Gun.

The Gun (Fig. 1).—Without considering the car for the present, the gun itself by its light weight favours speed. Despite the high speed of exit of 93.8mt., the gun and carriage weigh only 846kg. The barrel is constructed according to the Ehrhardt pressing method and has no mantle. It is so well journalled in the pivot-fork that the trunnion can be turned back without its being necessary to balance a spring. As a result, the vertical and lateral adjusting machines work with equal facility for all heights.

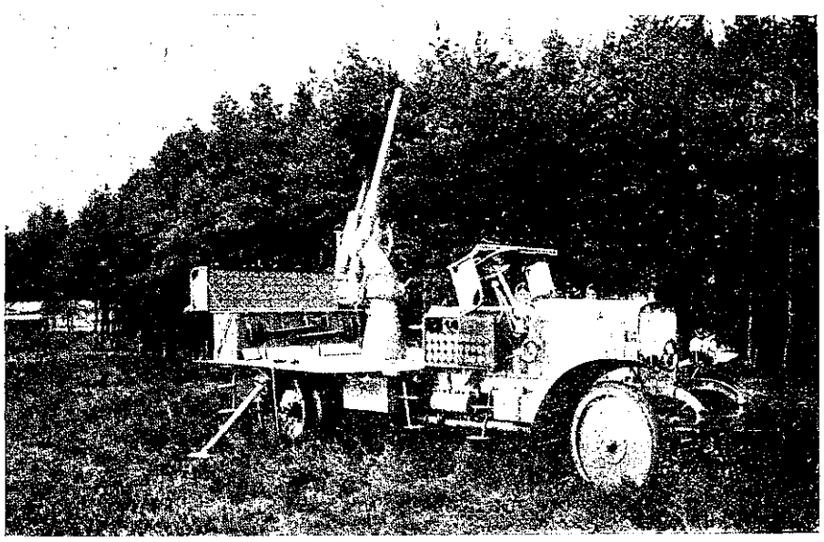


Fig 1.—Gun Mounted.

The calibre of 6.5cm. is particularly well-suited for a gun of this nature. Shrapnel shells and a uniform shot of strong action may be used, and abundant ammunition may be taken along. The firm also builds guns for the same purpose of larger calibre, up to 10.5 cm. These of the size of the present field-guns present the advantage of the ordinary ammunition being available for use. By lengthening the barrel of a field-gun, the same speed of exit of 93.8m. of the 6.5cm. gun may be attained. In this manner, the time of its flight is reduced and its range increased.

It is absolutely essential that the attendance of the gun be simple, in order that its effectiveness against its unsteady target may be as great as possible. The Ehrhardt sliding-crank lock, therefore, is arranged automatically. It opens, closes and fires by itself. By disconnecting the automatic device, one can use a contrivance on the left and right for firing by hand. The gun layer has to level the gun at the target and to follow it in the vertical and lateral directions.

As compared with other systems, the aiming has been considerably simplified and accelerated. There are no calculations to be made, nor is even a simple shot-table necessary. A simple optical distance-gauge indicates the distances to the target. It is arranged on the top-piece, so that, when operating the vertical and lateral aiming-wheel, the position of the top-piece changes automatically as the angle of the field increases. There is a tempering-plate connected to the top-piece, a pointer on it automatically indicating the proper burning-time for each elevation and distance.

The form of the gun-carriage (Fig. 1) and the fact that the gun-layer, as may be seen in Fig. 2, can always look into the ocular from the side, without changing his seat, make aiming even simpler. By a peculiar arrangement of the pivot-fork, it is possible, after assuming the firing position, to eliminate any inclined position of the gun for any lateral direction and in the whole periphery.

The upper part of the carriage rotates on ball-bearings of the lower part; hence, it follows the worm-gear with great ease. The fine lateral directions are effected by the worm-gear. By disconnecting this gear by a lever, the aimer seated on the upper part of the gun-carriage can easily make modifications of the lateral direc-

tion in the whole periphery, by pushing himself off with his feet on the platform of the motor car.

These arrangements on the barrel and carriage make it possible to give the rapid fire of 30 shots a min.

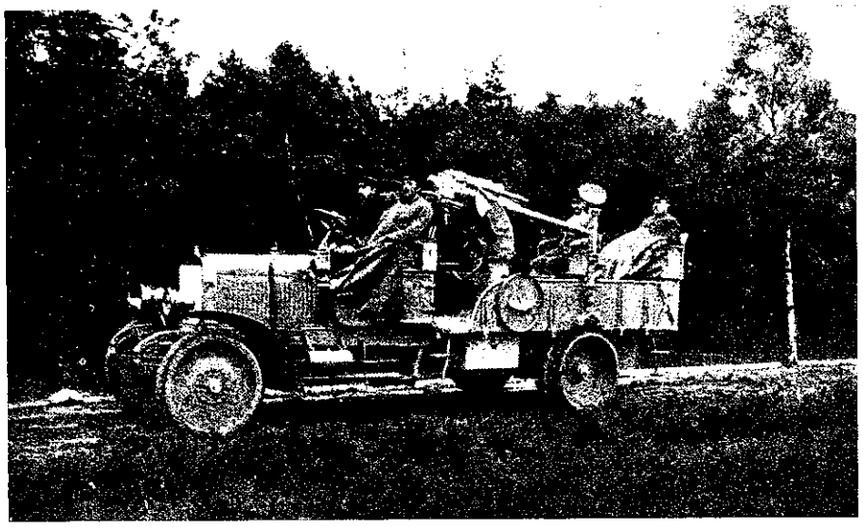


Fig. 3.—The Complete Outfit.

The Ammunition.—A gun for dealing with balloons requires a uniform shot more than any other gun, since it may often be far from the troops and the ammunition stores. If furnished with different kinds of shot, it may spend one, without the other being as effective against the target. It must, consequently, be equipped with a shot available for any target. The Ehrhardt-Van Essen brisanz shrapnel, as shown in Fig. 5 meets these requirements, by uniting in itself the action of the shrapnel and the brisanz grenade; and, in addition, good power of observation. Fired at an exit-speed of 670m. a second, it covers the distance to the target at such a velocity that the latter cannot have materially changed its position in the mean time. At the point of exploding, the shrapnel throws its balls and the grenade containing the brisanz charge, forwards. A retardation so regulates the ignition-flame, that it detonates 100 to 150m. from the spot where the shot explodes, provided the striking-igniter is not set in action beforehand by the shot striking the target. Hence, the shot controls a space of several hundred meters' depth and 300 to 400 meters' breadth, with balls and pieces of shell. This space may be instantly increased in depth, by quickly giving to five successive shots an increased burning length of 100m. and above, by means of the adjusting key.

The gun can also make use of the smoke shrapnel and balloon grenade. The head of the former, which at the point of explosion flies forward with the balls, contains only a burning layer. From the point of explosion, it evolves a plain strip of smoke. The grenade is charged with brisanz explosive, but also has a burning layer in a bottom chamber. It develops a strip of smoke 250m. before and beyond the distance at which the burning igniter has been adjusted. Both shots make it impossible for the gun to be located, by not developing smoke from the beginning. The burning layer, however, occupies a sufficiently large space in the shot, as to be fully utilised in the action of the brisanz shrapnel. If the grenade does not strike its target, it vanishes in the air, without doing any damage to troops on the ground.

The Motor Car.—The motor car is built on the principle of the four-wheel drive. It carries considerable ammunition, works its way across even difficult country with speed and steadiness, and affords a safe rest for the shot. The 50-60 h.p. gasoline motor works with 4 cylinders and develops a maximum speed of 60km. an hour. As a rule, even a lower speed would suffice for aeroplanes which move much more quickly, since one can usually drive towards a free view upwards. It will often be valuable to pursue the flying machine, particularly in bad weather or when it has suffered injury. The idea must always be to keep it constantly under fire. As the motor power is applied to both front and hind wheels, the car can cover very difficult territory. 20 per cent. gradients and deeply-lying ground offer no impediment whatever. The wheels are extra wide (Fig. 1 and 2), and are furnished with rubber tires and fluted steel tires, preventing the car from sinking into soft, and skidding on smooth, ground. There is a gasoline supply of 250 to 500 litres, generally carried in a tank under the back seat. The car is provided with the most modern cooling and oiling arrangements, so that it can easily cover a distance of 250 to 500 kilometres. This capacity has been thoroughly tested, the car carrying 6 men and 140 shells, weighing 6080kgs. As may be seen in Fig. 2, the shells are in separate receptacles under the front and back seats, and may be extracted without any trouble. The platform of the car, to which the pivot-jack of the gun is screwed, may be widened by letting down the sides of the car. It can be made perfectly stable for the shot. The platform is connected rigidly to the hind-axle by two male-screws. When shooting to a lower elevation, it is stiffened against the ground by two props that can be turned down, with broad foot-plates. In this manner, there is no possibility of vibration, irrespective of how much the gun is levelled to the side, as in Fig. 2.

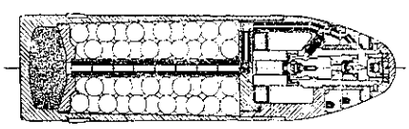


Fig. 5.—The Ammunition.

The sensitive parts of the car—the motor and ammunition box—may be protected from bullets and pieces of shell by armour. If desired, also the back rests may be fitted with armour-plates to be raised. Armour-plates for protecting the men and the gun are not furnished, for the loss in speed owing to the greater weight cannot be counter-balanced by the greater safety. Speed is often a greater protection than armourage; and, finally, this gun, whose enemy is in the air and can do it no damage, can take care of itself against the weapons of the field-troops even better than field artillery.

This car, with its gun, affords so many advantages from a standpoint of tactics and stratagem, that armies will not be able to dispense with it in the fight with aeroplanes and airships.

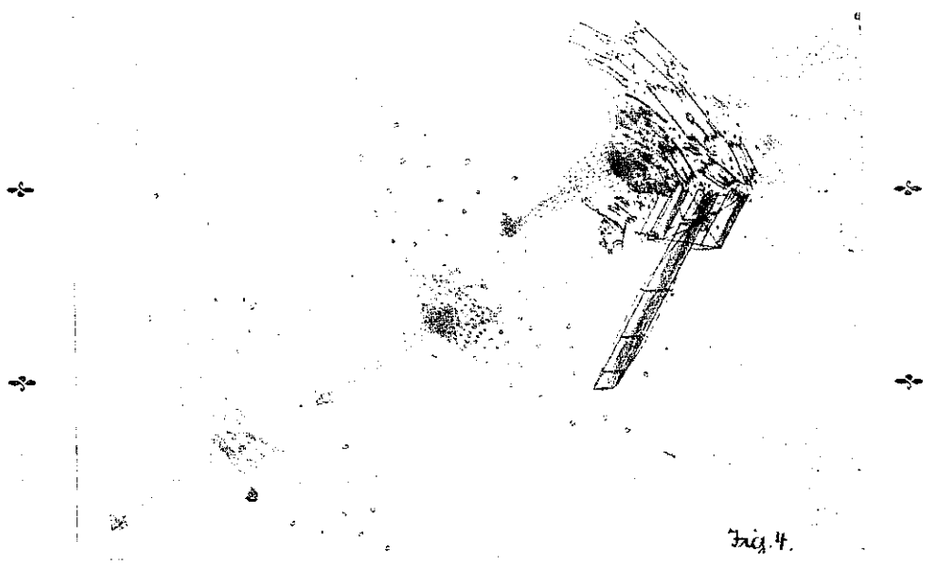


Fig 4.—Showing Effect of Gunfire on Aeroplane.

Fig. 4 shows the effect of 3 shots on an aeroplane. It is in the midst of a hail of bullets and pieces of shell, bringing it down to earth. The maximum range of the shot for the igniter reaches up to 7000m., for the striking shot up to 11,000m. Thus, at this respectable distance, the flying-machine is either destroyed or forced to return. There is no

need of smoke to follow the flight of the shot, since both the shrapnel and the grenade partly indicate the point at which they explode, by very clear clouds of smoke. A further advantage of the brisanz shrapnel is that it can perform full service against the troops of the field, and the gun for destroying balloons can reach them whether they are in open order or concealed. For the latter case, there is a field-angle water-level arranged on the sight, making possible indirect aiming as with field guns.

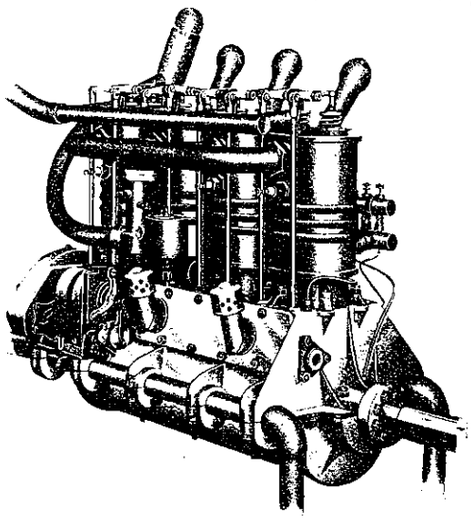
The "Wodan" Airship Motors

OUR GERMAN CORRESPONDENT

Engineer I. Schneeweiss, of Chemnitz (Saxony), has just succeeded in constructing a new type of airship motor presenting many advantages from a technical and practical standpoint. The "Wodan" motor is made of an extra tough aluminium composition of low specific gravity. The form of the crank-case is such that it can be mounted in six divers ways. The six motors may be fastened to round Mannesmann pipes, flat U irons, angular or T irons, or joists. There are two types working with 4, 6 and 8 cylinders. The 4 and 6-cylinder motors have the cylinders beside each other; the 8-cylinder motors are arranged in the shape of a V. The six different models are as follows:—

Number of Cylinders	4	6	8	4	6	8
Bore	135	125	125	160	160	160
Stroke	130	130	130	180	180	180
Capacity per H.P. ...	55/60	80/85	110/120	100	150	200
Revolutions per min.	1200	1200	1200	900	900	900
Weight in hundred-weights... ...	2	3	4	4	6	16

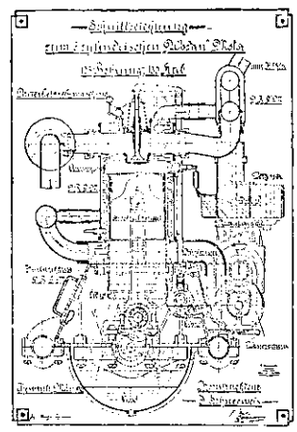
The gearing is enclosed in a case that can easily be removed. The crank shafts have five journals of the very best kind,



50/60-H.P. "WODAN" MOTOR FOR AEROPLANES OF ALL KINDS.

the 6-cylinder motors have seven main bearings. The crank-shafts are of good dimensions, hollow-bored and provided with oil-canals. There are ball bearings for taking up the axial pressure. Each of the main bearings has also one or two oil troughs.

Particular attention has been given to the cylinders, so that they may meet all requirements. The walls are of almost the same thickness, varying only 4 to 5 millimetres, so that there is an even expansion and warming on all parts. The material used is a fine-grained castiron, the only kind that warrants long life. The running cylinder is furnished with a number of longitudinal and transverse ribs which makes it more solid. The ribs lie in the water-tank and aid in cooling the cylinder walls. The water mantle is a seamless drawn copper tube, caulked with two steel rings. The exhaustion canals are arranged in the hot-water tank, thus helping in preliminarily warming the



DESIGN OF 6-CYLINDER 85-B.H.P. "WODAN" MOTOR FOR DIRIGIBLES.

gases entering. The blow-off canals are very short, so that very little heat can reach the cooling water. Each of the cylinders is fastened by six steel bows, which make it impossible for them to get loose. The valves are in complete sets and may be exchanged. The ignition is the most perfect on the market to-day: the Bosch igniter. The carburetter has automatic air regulation. Special care has been given to the distribution and fore-warming of the gas, the method adopted being patented in Germany and abroad.

The central lubrication is with fresh oil, no oil-pump being used. Every drop of oil can be regulated and controlled, which is impossible when a pump is employed. The water pumps are a special construction and are driven positively.

Engineer Schneeweiss supplied the two 200 h.p. 8-cylinder motors for the airship of the Veeh Airship Constructing Co., of Munich, which is one of the strongest and fastest dirigibles in the world. He also delivered a second set of two 150 h.p. 6-cylinder motors. In addition, he builds aeroplane motors of 55, 85, 110, 150, and 300 h.p., with 4, 6, and 8 cylinders. These have been installed in large flyers in Germany and abroad.

The Car and the Aeroplane

OUR LONDON CORRESPONDENT

Interest in the Old Country remains centred on the aeroplane. The motor-car takes second place nowadays as an instrument from which to extract amusement. This is an unsolicited testimonial to the car as a vehicle. Its reliability is an accepted fact; its utility is proved. As a sporting machine it has lost caste, because of its virtues. By reason of these cars racing will never "draw" as does the horse-race, or the aero meeting. The result of a race between horses is not foretellable; that of a motor race is, provided the competing cars are not "dead horses."

As for the aeroplane, it is still a great crowd collector. How long its popularity will last is solely dependant on the progress made in design. The more the improvement, the less attraction the aeroplane will have for the populace. This has been proved in the case of the cycle and the car. Let us pursue the subject and attempt to find analogy.

Then and Now

November 15th, 1896.—On this date the (now) historical procession of motor-cars set out from London *en route* to Brighton. A fleet of 54 motor cars, whose drivers had glad hearts. For was not their emancipation complete? Had not the restrictive "Red Flag" Act been displaced by the Motor-car Act (1896), which gave them a new legal limit of 12 miles an hour? Even so it was. And therefore these 54 motorists rejoiced. But of these fifty and four, but a dismal dozen completed the journey to Brighton. It was hardly a triumphant procession. Breakdowns occurred with depressing and monotonous regularity, and the pace at which most of the vehicles proceeded was slow—was certainly not "12 miles an hour!" Immense crowds had turned out to see this wonderful epoch-making motor parade, but their opinion of motor-cars was not heightened by this awful display.

The (London) "Evening News" of 14th Nov., 1896, however, came out with this hopeful headline:—

BIRTH OF THE MOTOR-CAR.
DAWN OF A NEW ERA, WHICH MAY END IN THE FLYING MACHINE.

Whoever was the journalist that penned this headline, he must have been inspired with prophetic foreknowledge. He could not, sanguine though he was, have surmised that fifteen years afterwards there would be organised aerial tours, in which almost as high a proportion of the starters would win through as did cars in '96, and on the latter date it was but a "fifty mile run"! The "Daily Mail" wrote in that year:—

"Shall we, therefore, write down the motor-car a failure and join in the neigh of scornful triumph with which the horses of Brighton greeted the draggle-tailed remnant of the invading mechanical army? Certainly not. The zeal of the pioneers outran their discretion when they arranged a fifty-mile run for untrained motors and inexperienced drivers in the most abominable weather on a difficult road. That some of the cars made the distance, and made it in good time supplies proof, if proof were needed, that the auto-motor has great possibilities before it."

Cannot it now be predicted that within a decade the aeroplane will have "made good," even as did the car? Surely such prophecy would not be far fetched.

If, and when, the reliability of the aeroplane is established, then will it fail to attract public attention, for it will have become a vehicle of commerce even as the cycle and the motor-car.

Joy-Riding

Our American cousins are certainly apt in granting phrases to suit the case. They have given us the word "Joy-ride" to denote the unauthorised use of a car by a chauffeur. In the States this evil has been quite as extensive as one would surmise for a country of Big Things. New York State has taken prompt steps to produce legislation of a deterrent nature. I culled the following from an American contemporary. It is a new Penal Law for New York State:—

"Any chauffeur or any other person who, without the consent of the owner, shall take or cause to be taken from a garage, stable or other building or place an automobile or motor vehicle, and operate, or drive, or cause the same to be operated or driven for his own profit, use or purpose, steals the same, and is guilty of larceny, and shall be punishable accordingly."

Canada, I see, has also been moving in the matter, and six months in gaol is offered to any driver who cares to "joy-ride."

My readers may not be aware that in most countries (New Zealand included, I assume) the motorist possesses absolutely no recourse from a chauffeur who makes free with his car. Strange though it sounds this is so. More frequently than not a charge in this connection will be held by the Courts to be unsustainable. In England the motorist, in despair, has resorted to subterfuge in the effort to bring the joy-rider to book. Charges are being brought against drivers of *stealing the petrol* used in the course of the surreptitious ride. In Scotland, recently, such a charge, although at first dismissed, was subsequently upheld by the Higher Court. An entirely different result attended a similar case at the London Sessions; this was thrown out by the Grand Jury; and the remark offered by the presiding Judge that he considered a car used petrol much as a horse needed oats. The inference being that just as a groom who made misuse of his master's horse could not be charged with stealing the feed given the horse before the ride started, even so would a chauffeur be guiltless of stealing petrol for running the borrowed car. I'm afraid I cannot follow this logic. In the first place a horse would have to be fed whether it were used or not; not so a car. In the second place, a chauffeur, to run his master's car a mile, would be converting the latter's petrol to his own use. This must be an offence. If such doubt exists in New Zealand as apparently does here, legislation of a specific nature is required in order to give the owner of a motor-car that protection he is entitled to.

The "Daily Mail" £10,000 Aero Race

Whatever we may have to say against the Harmsworth influence in other affairs (and there are many who have much to say) in motoring, both on land and aloft, the Harmsworth influence has been all to the good. The last example of this is the £10,000 cheque which constituted the incentive to British and Continental airmen to jog, or attempt to jog, around the Blessed British Isles. Despite the tropical weather Londoners took immense interest in the event. Whatever the future might hold, the start was most auspicious, and the scenes at Brooklands were remarkable. The story of the race would be a long one if told in detail, so I must be terse (even at the expense of my journalistic reputation!).

After a few preliminary delays, the aviators started off, and as they whizzed at a mile a minute gait over the difficult country between Brooklands and Hendon, they soon illustrated the advantages of the directness of aerial flight. Lieut. Conneau was first away, and landed at Hendon within twenty minutes. After him sped Astley, and in quick succession came the other fifteen starters, among whom were numbered the very flower of the aero world.

There were thirty entrants for the race. Twenty lined up to start, and, of these, three met with accident at the post.

That was on a Saturday. Monday, at 4 a.m. (dreadful hour for a Londoner to be up!) the trek from Hendon to Edinburgh, thence via Stirling, Glasgow, Carlisle and Manchester, and home via Bristol to Brooklands and Hendon. By the Tuesday morning there were practically only two men left in the race: Beaumont (Lieut. Conneau) and Vedrines. All the rest of the field, more or less, *hors de combat*.

England has been outclassed; her contingent of aviators, even though some of them possessed similar machines to that which "Beaumont" won on, failed to complete the circuit. Valentini (Deperdussin monoplane) battled on, after the race was over, and got through a week late! Cody, with Anglo-American pluck, arrived soon after on his home-made two-ton "bus."

BEAUMONT
Winner of *Daily Mail* £10,000 Prize

VEDRINES
Second Place

We must rest content with the result of the race. The best man on the best machine won. He showed his superiority as an aviator in many ways. He excelled in nursing his engine. He steered an accurate course. He rested himself from time to time at the various controls. His flying time for 1010 miles was 22 hours 28 minutes and 18 seconds.

Vedrines, the much-pitied runner-up, took 1 hour and 10 minutes longer. The rest—nowhere. Between these two men and our hundreds of amateur potterers there is indeed a vast difference. "Flying is easy," these people say. This is rank bunkum, for an aviator to endure he must not alone be able to merely work his control levers; he must be a first-class motor mechanic; he must have more than a smattered knowledge of meteorology; and he must have the instinct of the homing pigeon, so that he may drive through fog and darkness without losing his bearings.

Beaumont, alias Lieut. Conneau, of the French Navy, has come, has seen, has conquered. His example is worthy of emulation. This can only be consummated by intense study of the theory before attempting the practice.

As for Vedrines, we all feel sorry for him, and the plethora of bad luck he encountered. But, as Bernard Shaw has it, the Englishman is too prone to gush with absurd sentimentality. An instance of this is the weeping there has been over Vedrines, and which there was over Dorando in the marathon foot race. By the rules of the "Daily Mail" £10,000 air race there was only one prize. He who wins it, therefore, and not he who loses, should get the bulk of the public's praise and plaudit.

Christchurch Aero Club

The members of the Christchurch Aero Club, about whose existence and doings very little has been heard so far, held a field day at Hagley Park yesterday afternoon and gave demonstrations of the powers of flight of small model aeroplanes built by members of the Club. There were about half a dozen models in use yesterday, all of the monoplane type, some being fitted with single propellers, others with twin. Power for driving the propellers when the models were in flight was derived by the twisting of strands of elastic rubber, which extended from end to end of the body of the machine, and although the winding up of these strands was a rather tedious process, yet when the tension was released they drove the propellers at an astonishing speed for quite a long time. The weather conditions were by no means satisfactory for the trials, a somewhat strong nor'-east wind blowing, and the flights were more or less erratic on this account, but the demonstration served to show the ability of the tiny planes to cover long distances and rise to big heights when their equilibrium in the air was not disturbed by eddying winds. There was a large crowd of spectators present, all of whom took the greatest interest in the flight of the models.

To Paint your Car.

Do you want to repaint your car? You can do it if you know how. Of this knowledge there are five parts. The surface perfectly free from grease; (2) the surface perfectly smooth; (3) a warm room without any dust whatsoever; (4) the right kind of brushes; (5) the right way to use them. It is said that "any fellow can paint his car." True, on condition that he is familiar with these conditions and secures them all. How long will it take "any fellow" to acquire the knack of the brush?

Yachting and Motor Boats of the Dominion

By Oscar Freyberg

There can be no doubt that class racing gives the best sport when one contrasts the racing in the four Mullet Boat Classes on the Waitemata, with that in the nondescript classes in all the other ports of the Dominion. What chance have you of close racing when the boats are so widely divergent in size and type: Practically none. The unfortunate handicapper gets the blame, and all hands are more or less dissatisfied. The only thing that will build up the sport to its right height again is the racing boat against a boat of approximately equal dimensions. This is understood in Auckland, and Lord Islington knew it when he gave his Cup to the Yacht Squadron the other day for metre racing. It will undoubtedly promote building and keen racing, the two things essential to the life of yachting. While a believer in anything that helps the sport, I am not in love with the boats produced by the metre system, as they are not suited for cruising in our waters and I would rather see a sturdier class built here, capable of crossing and racing in Cook's Strait in its sterner moods.

* * *

We have it from Thomas Fleming Day, than whom no higher authority exists, that the only rule for measurement of sea-going vessels is the over-all length, and that nothing else matters. I think he is right. That means that a boat, to have an equal chance of success with the others, would have to be of the same length, and boats of a length would race together in classes, and the sturdiest and most powerful boat would probably win, owing to her sail-carrying abilities, while the others should not be very far behind. Of course we cannot do this all at once, but a very good chance is at hand now to start the thing in a small way. Two, for certain, perhaps three, able little 20ft. deep keelers are being built this season, and will form the nucleus of a class to correspond with the Auckland Mullet boats of the same length. Mr. Birnie's 30-footer may have a twin sister built to the order of a yachtsman of long standing, if he can sell his present boat. Here, again, we have the foundation of an excellent class, thoroughly suited to the rough water conditions obtaining round Wellington. I should be very pleased to supply the lines of this boat to anyone thinking of building.

* * *

Mr. Ted. Bailey, of the Boat Harbour, has still another order in hand, a deep-keeler for the new 20ft. class which it is hoped will be formed this season. She is to the order of a medical man, who is a keen yachtsman.

* * *

I hope to be able to reproduce this design in the near future. It shows a boat 20ft. over all, 18ft. water line, 4ft. draught, 6ft. 6in. beam. The headroom is 4ft. 6in., under a coach roof 12in. high. She is a little sister of the 30-footer at present on the stocks in Bailey's shed, and should be able to give a good account of herself in a sea way.

Mr. Birnie's new 30-footer is now complete as far as planking is concerned, and is being fastened and smoothed off. She looks very big and powerful for her length, and fit for service in any weather.

* * *

I am indebted to Messrs. T. M. Lane & Sons for a table showing at a glance the results obtained with the Scripps engine in the "Coquette" during the Kapai v Scripps test. In addition to the results mentioned in our last issue a test was held on August 18th for fuel economy at an average speed of 8 knots from a standing start over the same course, 6½ miles, as before. The fuel tank was emptied absolutely, and a sufficient quantity of benzine carefully measured in. The launch completed the course and returned to the starting point. The benzine remaining in the tank was then carefully drained off and measured by a local chemist, who had also attended to the filling of the tank.

The following are the full results of the speed and oil consumption tests: —

SPEED TEST.

Date	State of Tide	Number in crew	Average r.p.m.	Time covering 6½ knots	Knots per hour	Miles per hour
July 31	In. water	four	665	43m 5s	9.05	10.4
Aug. 9	flood	five	627	43m 6s	9.07	10.45
Aug. 11	ebb	four	700	42m 37s	9.15	10.52

FUEL TEST.

Date	State of tide	Time cov. 6½ knots	Total time under power	Total benzine consumed	Speed maint'ned	Fuel consm. per hour
Aug. 18	ebb	46m 52s	48m 52s	99½ fluid oz. = 4.9 pints	8.3 knots	6.1 pints

* * *

One Bill Webb—not Wanganui's Pride —just Bill Webb. Our Bill Webb, if you like, bought a boat. She wasn't a racing yacht or even a motor boat, just a common, ordinary every day clinker built open boat, and Bill and his crew sailed her—when she was having some, and pulled her when she wasn't—all over Wellington Harbour. They more often pulled than sailed, by reason of her contrariness under canvas, and very naturally got rather tired of the process. Then Bill bought an engine, and his ideas began to grow while the boat became a launch, and teuf-teufed merrily where she had formerly laboured along under man power. Now she has acquired a deck and a deckhouse, and lies at moorings among the rest of the power fleet, a veritable motor yacht. Later on—well, who can look into the future?

* * *

At the annual general meeting of the P.N.Y.C., the following were elected:— Commodore, Mr. C. J. Ward (re-elected); Vice-Commodore, Mr. H. E. Chisholm; Rear-Commodore, Oscar Freyberg; Secretary, Mr. Norman Gibbs; Racing Secretary, Mr. C. Ward, junr.; Treasurer, Mr. A. Lancaster; General Committee—W. Birnie, A. Duncan, F. Kiernan, R. Millman, W. D. Rough, and W. Moore; Starter, Mr. L. Sleightholm; Handicappers, Messrs. W. Moore, F. Kiernan, and J. Moffatt, the last-mentioned to be principal Handicapper and the others as advisors; Picnic Committee—Messrs P. Freyberg, F. Cooke, E. Rough and A. Lewis. The Racing Committee elected comprised the Flag Officers and Messrs. Gibbs, W. Moore and C. Ward, junr., Secretary; and the Regatta Committee, in addition to the Flag Officers, also comprised Messrs. Rough (2), Taylor, Millman, Cooke and Lancaster.

The Balance-Sheet shows that the Club has a balance of assets over liabilities of £35 15s. 8d.

Several important measures were passed. The Mark Foy system of starting was adopted for the season. The subscription fee was fixed at a guinea, as in former years up to last, when it was reduced to half a guinea, in the hope of attracting a wider membership. The third class was merged into the second and the 20 minute time limit abolished, and a more sound financial policy in regard to prize money was adopted. Altogether, I think the Club has a good season ahead of it.

* * *

The yawl "White Heather" has had her cabin plan re-modelled. The forward bulkhead has been shifted some feet further forward and a galley built in aft, in the place where it should be, so that the steam and smell of cooking can go right out of the hatch instead of hanging about in the cabin. A 4 h.p. Colonial engine is to be installed under her cockpit in time for the Christmas cruise to the Sounds, and should be a great boon to her crew.

* * *

The "Muritai," G. Bothamley now sole owner, is to be painted black, with a gold band, this season, and will sport a yawl rig. A suit of sails are at present being built for her by Jagger and Harvey.

* * *

The 9-ton yawl "Pandora," of Bunbury, W.A., at present on a cruise round the world, arrived at New York on June 23rd last, having taken just 13 months and 20 days for the trip of 22,00 miles.

* * *

The 25-foot yawl "Seabird," under command of Thomas Fleming Day, editor of the "Rudder," has arrived at the mouth of the Tiber from New York. Her spars will be removed and she will proceed under power to Rome and take part in the nautical carnival scheduled to take place upon the arrival of the Venice-to-Rome cruise contestants.

* * *

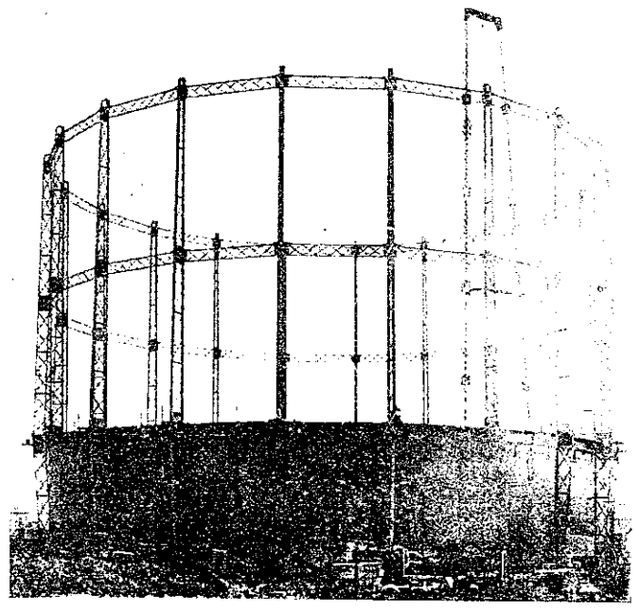
I regret to have to record the death of Antony B. Watty, sailmaker, at the age of 81 years. He made good sails, and yachtsmen will feel his loss, in this port at least.

Engineering

A New Concrete Gasholder for Christchurch

The Gasometer which has been erected in the Gas Co.'s property near the South Belt for the Christchurch Gas Company, under the direction of the Company's engineer, R. English, M.I.M.E., F.C.S., is the work of Messrs. C. and W. Walker, Ltd., Midland Iron Works, Donnington, near Newport, Shropshire. It was built and temporarily erected at the works in England, and then knocked down and shipped to the Dominion, where it has been erected by local labour under the direction of Mr. J. Hurley. It is an enormous structure, as may be imagined when the gasholder, when extended to its fullest capacity, encloses no less than one million five hundred thousand cubic feet of coal gas.

CONCRETE TANK BOTTOM (where figure standing).



GUIDE FRAMING COMPLETE.

The principle of all the larger gasholders is that of an inverted bell or tank for holding the gas, sealed with water, in which the lower or open end of the tank is immersed. The holder, rising from the water as it is filled with gas or sinking into it as the gas is used, shows by its height above water the amount of gas there is available for consumption.

The new Christchurch holder is described as a three-lift; that is to say, it is on the principle of the telescope. There is first of all a steel tank 142ft. 6in. in diameter, and 36ft. deep; inside this works the outer lift, one hundred and forty feet in diameter, and 35 feet in depth. Inside, again, is the middle lift, and flanged in such a way that when it has risen to its full height it lifts the outer lift. This is one hundred and thirty-seven feet 6in. in diameter, and thirty-five feet three inches deep. Inside of all is the inner lift, one hundred and thirty-five feet in diameter, and thirty-five feet three inches deep.

There is a tremendous volume of water —seventeen thousand tons—contained in the tank, which is sunk into the ground and houses the entire gasometer when empty of gas.

The approximate weight of the whole structure is one thousand tons, all English steel.

The tank is built of eight tiers of plates. The first tier is 1 inch thick, second tier ⅞ inch, third tier ¾ inch, fourth tier ⅝ inch, fifth tier ½ inch, and the remaining three tiers are ⅜ inch thick each.

The guide framing consists of twenty standards round the circumference of the well tank; each standard one hundred and eight feet high. Round these standards are two tiers of girders and two rows of diagonal tie rods. The top row is 1⅜in. and the bottom row 1½in., each rod being provided with right and left hand coupling box for adjustment. The inner lift is a flying one, i.e., when extended to the full capacity of the holder, 1,500,000 cubic feet, it is raised 41 feet above the full height of the standards.

Another considerable item in this work was the enormous number of rivets used, no fewer than 10,000 1in., 10,000 ⅞in., 30,000 ¾in., 80,000 ⅝in., 25,000 ½in., 25,000 ⅜in., and 40,000 5/16in. being headed up, and all by hand, a truly terrific amount of hammering. In addition to these 220,000 rivets, many thousands of bolts were used to hold the work together while the rivets were being put in.

Walkers, Ltd., manufacture everything used in gasworks, as well as making the plant, and their wares are known all over the world.

How to deal with Stopped Drains

Most men, when they find that their lavatory basin obstinately holds the water they want to let out, relieve their souls through a big "D" and when they have done growling send for the plumber. But there is an easier way of dealing with the trouble. Take out the stopper and fill the basin half full of water or more, as circumstances may require—how much you will learn with practice—then take a swab and job it straight up and down in the water. This starts a pumping action in the drain pipe, in sympathy with the violent disturbance in the basin. Keep it up awhile and generally you will find the sediment brought up from the trap and the pipe free.

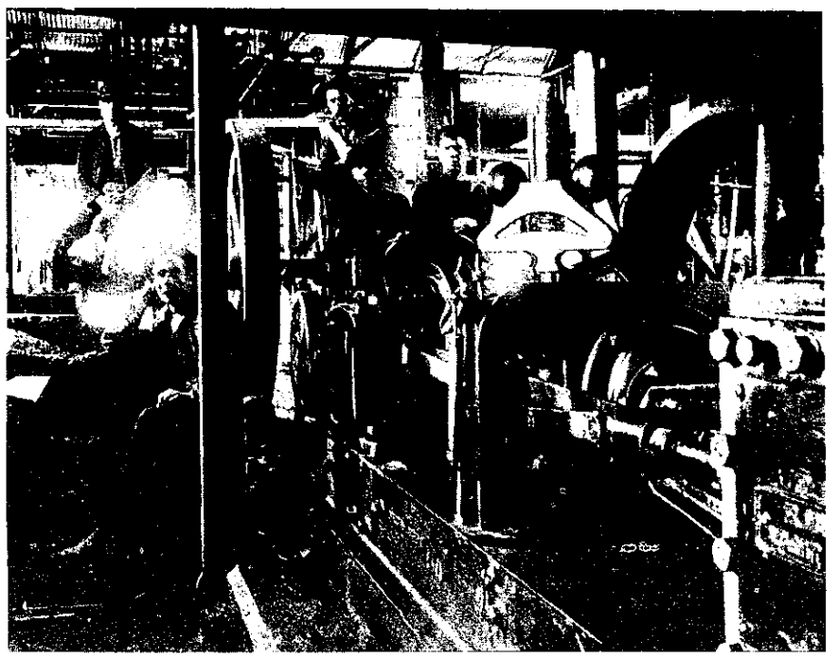
Prevention is, of course, better than cure. Think, therefore of the state of the drain pipe in constant use, and imagine the accumulations going on every time you wash your hands. The first thought to strike you will be that this pipe requires flushing occasionally, just to keep it open. Then you will, if you are resourceful, get a short length of rubber tube, you will find a cork to fit the exhaust outlet, and that cork you will bore through, after which you will fit the tube into the cork, and then you will put the cork into the outlet, stick the end of the water pipe into the other end of the tube, and turn on the Wainui pressure, as much as ever you can get. Result, complete clearance of drain pipe of all obstacles to progress. The plumbers in the neighbourhood may swear when they hear of it, but that wont prevent them from being angelic, for certainly their visits will be rare as those of the angel of the proverb.

N.Z. Sandstone for Building

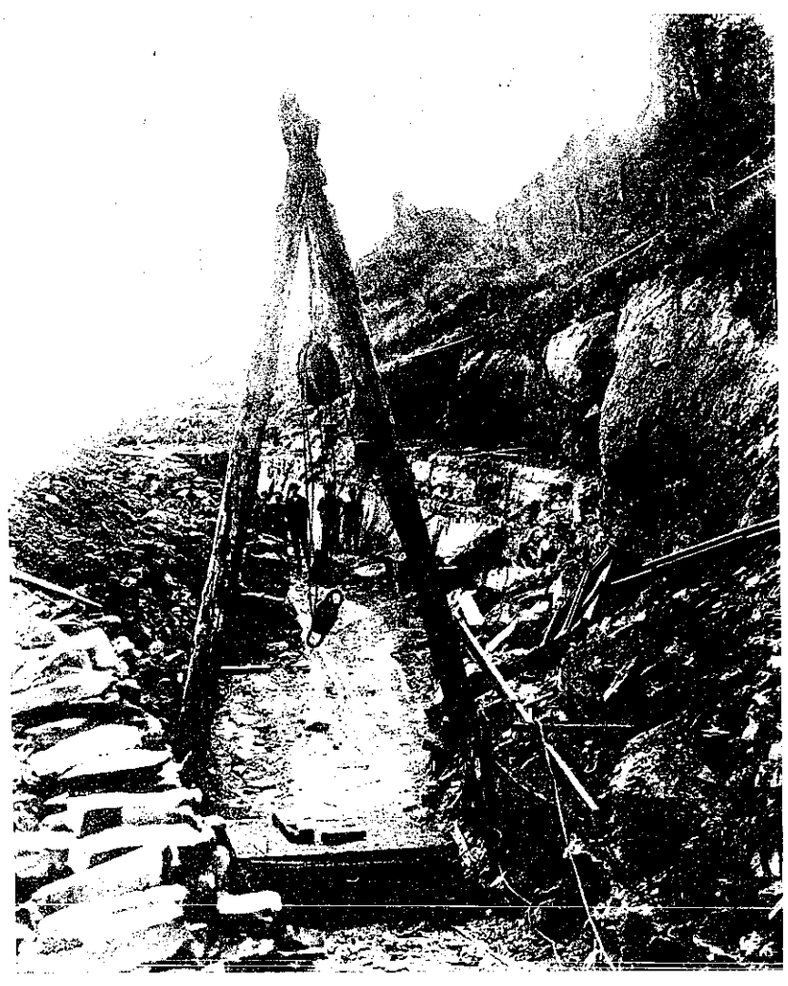
Professor Speight, in his article on Building Stones of New Zealand in our August number, says that "the chief desideratum for building purposes, is a really satisfactory sandstone, such as the Hawkesbury stone, used so freely in Sydney and even occasionally in this country. The best that we possess is probably that got from Dobson, near Greymouth. It is of a fine greyish colour, is easy to work, can be obtained in large flawless blocks, and the amount available is in all probability very great."

He goes on to say that it is early yet to speak of its weathering qualities, although it has lasted very well in some situations. We append some tests made by Prof. Scott, M. Inst. C.E. of Canterbury, from which it will be seen that the stone is of more than ordinary strength and durability, and compares most favourably with the Hawkesbury or the best known English building sandstones.

Two pictures are shown herewith, the upper one being of part of the Dobson Building and Monumental Stone Co.'s plant and engine-room staff. The lower is of one of their three quarries, showing the stone in the face of the cut and the sheer legs and tackle used for lifting the rough stone on to the trucks to take to the cutting yards. A quantity of rough hewn stone is shown at the side of the lift awaiting transportation.



DOBSON QUARRY CO.—SOME OF STAFF AND PLANT.



DOBSON COY.'S QUARRY.

As Professor Speight says, in many cases where good stone occurs, there is the great disadvantage that it is remote from railway or other means of carriage, so that the cost of transporting the stone is prohibitive, or nearly so. This is not the case with the Dobson quarry, as it is connected by rail with the port of Greymouth, and from there stone can be shipped to its destination quite cheaply.

While it compares very favourably with any other sandstone obtainable in the Dominion for ordinary building purposes, the Dobson stone is very suitable for steps, risers and landings, paving sets and curbings, and its durability and weather resisting qualities make it particularly useful for monuments or pillars to stand the test of time in the open air.

RESULTS OF TESTS ON SPECIMENS OF SANDSTONE FROM DOBSON.

ABSORPTION TEST.

Specimens:—
Cubes nominally 2¼" x 2¼" x 2¼"
Actual Dimensions—(1) 2.21" x 2.24" x 2.25"
(2) 2.25" x 2.16" x 2.15"

Process of Test:—The specimens thoroughly dried and then weighed. Then placed under a vacuum of 28" mercury for 30 minutes, then put into water for 3 days. The specimens weighed again on removal from water.

No. of Test	Weight of Specimen. Before immersion (dry) Grammes	Weight of Specimen. After immersion (wet) Grammes	Water Absorbed. Grammes	Water Absorbed. Per cent. of original weight of stone
1.	446.4	462.2	15.8	3.54
2.	418.0	434.2	16.2	3.87
			Average	3.705

COMPRESSION TEST.

No. of Test	Dimensions of Specimen. Cross dimensions inches	Dimensions of Specimen. Length inches	Maximum Load. Tons total	Maximum Load. Tons per sq. foot
1.	2.10 x 2.10	2.20	22.5	701.3
2.	2.25 x 2.25	2.18	23.9	679.8
3.	2.12 x 2.24	2.22	22.3	676.2
4.	2.25 x 2.10	2.22	25.2	768.0
			Average	706.3

WEATHERING TEST.

Specimens:—Cubes nominally 1" x 1" x 1"

Process of Test:—The specimens thoroughly dried and then weighed (1st dry weighing). The specimens boiled for 30 minutes in sulphate of soda solution and hung up to dry for 24 hours. Then washed, boiled again in sulphate of soda and hung up to dry. This repeated 7 times, after which the specimens washed and dried thoroughly, then weighed again (2nd dry weighing).

No.	Weight of Specimen. 1st dry weighing Grammes	2nd dry weighing Grammes	Loss Grammes	Loss per cent on original weight
1.	41.40	39.96	1.44	
2.	40.57	39.58	0.99	
3.	42.63	41.79	0.84	
4.	41.25	39.97	1.28	
5.	41.97	40.87	1.10	
6.	40.11	38.74	1.35	
Total	247.93	240.91	7.02	2.83

ROBT. J. SCOTT, M.Inst.C.E.,
Professor in Charge.

Voltite in America*

The Wonderful Discovery of Coating Metals with Gold, Silver, Nickel, Copper, Tin and Brass by Frictional Precipitation.

By CHAS. H. PROCTOR, Pres. Electroplaters' Assn., U.S.A. and Canada

The industry of electroplating of metals has become so vast in its proportions in connection with electrometallurgy that on every hand in our social and commercial life we behold the transmutation of one metal to another for personal adornment, in connection with art, household utilities and the thousand and one purposes for commercial use. Metals are deposited upon metals for protection (a more positive metal will protect a less positive one), for instance the deposit of the metal zinc upon iron or steel, or the deposit of a negative metal upon a more positive metal will give protection when such metals are thoroughly understood in their ratio.

One of the great problems that has offered itself, for years, for solution is the replacement of electro-deposited metals lost by friction when in constant use. Of course such metals can be renewed, but to accomplish this every house would have to be provided with an electroplating plant, which of course is impossible. Patents have been granted galore in an effort to overcome this important problem, only to prove worthless in their application for commercial use. Such substances when applied to the metal to be renovated would only give an infinitesimal film that could almost be removed with a stroke of the hand. Recently such a patent was granted in England and the United States for the deposition of nickel and other metals by friction. The subject proved interesting and created considerable discussion in the electro-metallurgical world, but from a number of experiments made to prove its utility as a method of replacement for iron or exposed surfaces coated with the regular method of electro-deposition, its value was found to be nil—a dream. The energy used in this application was so great in proportion to the results obtained that the process was more of a theoretical than a practical demonstration of its commercial utility.

The solution of this important problem was reserved for Arthur T. Firth, of Auckland, New Zealand, internationally known for his research work as a chemist and metallurgist, whose special studies have been the electrical precipitation of metals and the origin of the deposition of metals in their natural state, together with the treatment of the refractory gold and silver ores. Mr. Firth, realising the great possibilities of frictional precipitation of metals and the results of untold value that could accrue from a successful application of a metal to a metallic surface, made a special study of the problem.

The writer had the privilege of witnessing, and also making a number of experiments, through the courtesy of Messrs. Holmes C. Walton and F. A. Hood, of Wellington, New Zealand, at the Hotel Astor, during the week of May 8. These demonstrations proved beyond a doubt the commercial value of Voltite.

*From the "Metal Industry."

One of the most interesting, and, might say, wonderful applications of Voltite, was that of silver direct upon steel without any preliminary effort, at an absolutely chemically clean surface, such as must be obtained in the regular method of electro-deposition. The articles used were steel knives, such as may be found in hotels. The silver deposit was uniform, dense, homogenous and adherent, and could be burnished after a few moments application of Voltite. This one experiment alone proved the practical utility of the method and removed every trace of scepticism from the mind of the writer. When we take into consideration the millions of steel knives in use in this country, it can readily be seen the demand that would be created for such a valuable article in every household to replate worn articles of such a like nature in every day use. Again, when we consider the vast amount of metal articles that become worn from constant use by friction and never reach the electroplater for refinishing, the wonderful possibilities of the invention can readily be seen.

Hundreds of thousands of women in this country are always anxious to keep their table and silver-plated ware like new, but it is impossible for them to do so, because every time the articles are cleansed so much of the silver or other metal is removed by the friction of the polishing powder, causing each time a reduction of the thickness of the deposited metal. This is where the advantage of using Voltite comes in; instead of decreasing the thickness of the plate it increases it by continuous friction, so articles in daily use can always be made to look like new without the unsightly appearance that results from articles when the electro-deposit becomes worn in spots. Many times such articles would be sent to the jobbing electroplater to be refinished, but it is only possible to find these in cities of considerable size, and then because they do not advertise it is sometimes difficult to locate them; again, every home does not subscribe for a business directory. But Voltite will give to every home the advantage of refinishing their metal goods in gold, silver, nickel, copper, tin and other metals, and the housewife can thank Mr. Firth for the years applied to the discovery of such a wonderful method of coating metals, so simple that a child of immature years can apply it.

Voltite, of course, can never take the place of the regular method of electro-deposition, because each article must be treated individually, and it can therefore never take its place in regular manufacture. Those that understand the methods of electroplating can readily realise this. The possibilities of the application of Voltite are so many that in the event of its being placed upon the market in this country, I predict a tremendous demand for it. Dr. Graham Bell, the inventor of the telephone, when in New Zealand said: 'I am greatly interested in Voltite. It is undoubtedly a wonderful and simple process. Articles that have been sent to the electroplater can now be treated by anyone on the spot. I have seen practical demonstrations with Voltite. Its practical possibilities are many. The action of Voltite is electrolytic, the same as electroplating, and much simplified."

Tunnel under the Elbe at Hamburg

OUR GERMAN CORRESPONDENT

A tunnel under the Elbe at Hamburg became absolutely imperative owing to the immense expansion that Hamburg underwent in the last few years. It was impossible to replace it by a bridge, since that would have acted as a serious impediment to the marine traffic. Hence it was decided to begin the difficult work and to lay a double-tube tunnel. The two tubes are at a distance of two meters (6 feet) from each other. In each tube the traffic is only in one direction. There is a passage in the middle for vehicles and a footpath on either side. For a short distance in the middle of the river, the bottom is exactly horizontal. As the banks are approached it ascends imperceptibly. The tubes are made of iron rings riveted to each other and reinforced with concrete on the inside and outside. The walls are covered with tile

The successful completion of this tunnel in three years reminds one of the construction of the London Thames Tunnel by Isambert Brunel, which was built 70 years ago, only after surmounting the worst difficulties and after a loss of about seventeen years. A company was formed in 1824 to construct the tunnel, and began its work in 1825. The banks to be joined were about 400 metres (1250 feet) from each other. The tunnel is composed of two vaults running beside and touching each other, and containing a passage for vehicles and a footpath. The work began with sinking a large shaft about 75 feet deep on one side of the river, at Rotherhithe. Above this shaft was placed a steam engine for transporting the earth removed. In 1826, they began to drive the tunnel, and on June 30 of the same year it had proceeded so far that they were under the bed of the stream. It was soon discovered, however, that between the upper edge of the tunnel and the bed of the river, there was a layer of earth only 9 feet thick. This was not strong enough to prevent the water of the river from coming through. The situation became critical. Brunel examined the bed of the river in a diving-bell, and tried to stop the inpour of the water, which was becoming dangerous, by sinking layers of clay and loam into the Thames. A misfortune befell them, when some sailing boats cast anchor just above the tunnel and caused so much water to flow into the tunnel that the steam pumps could not master it. On May 18, 1827, the tunnel was under water in 15 minutes, happily without any lives being lost.

Brunel again examined the bed of the river and found that the tunnel was not damaged. The hole made by the inflow of the water was filled with earth, the tunnel pumped out, and work resumed. More inpourings of water, costing the lives of six workmen, repeatedly interrupted the work, but without diminishing the courage of Brunel. Then there was a want of funds, which stopped the work for seven years. Finally, the State placed the requisite sum at his disposal. On August 13, 1841, the tunnel was so far finished that it could be passed through. It required a year and eight months more for the building of the entrances.

Astronomy & Science

Notes on Eclipses of the Sun

By Joseph Brooks, F.R.A.S., F.R.G.S.

When any one body obscures the view of another, the latter is said to be "eclipsed," either partially or wholly, according as that view is partially or wholly obscured But, as a rule, the term "eclipsed" is confined to the interposition of one celestial body between two others. Thus, an "eclipse of the moon" happens when the Earth is in line between the Sun and the Moon, and "an eclipse of the Sun" happens when the moon gets exactly in line between the Sun and the Earth.

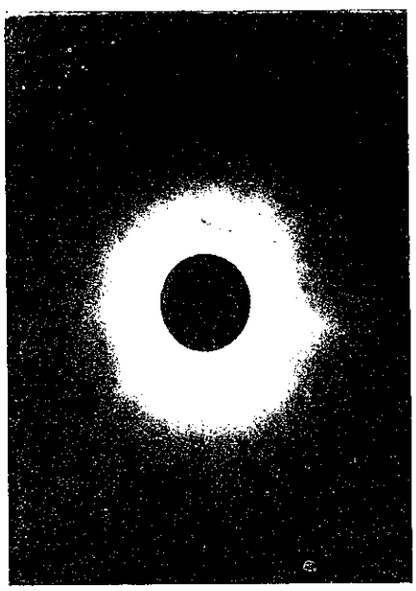
In astronomical importance a lunar eclipse cannot compare with a solar eclipse, and herein the lunar will be neglected. The Moon's orbit—or path through the heavens—does not lie in the same plane as the Earth's orbit, but it is inclined to it at an angle which may be as large as 5° 20′ or as small as 4° 58′. Thus, suppose the Moon, when "new," or just born, happened to be as far as possible "north" of the ecliptic, then it would gradually approach the ecliptic until in about a week's time it would cross it, and, continuing on, in another week it would be as far south as it could get, when it would, as it were, turn back, and in about a fortnight's time it would return to near its starting point. The two points where the Moon's path crosses the ecliptic are called the Moon's nodes.

If the Moon and Earth followed the same path in the heavens, there would be an eclipse of the Sun every time there was a new moon, but owing to this movement of about five degrees either side of the ecliptic, the Moon will pass sometimes above and sometimes below the Sun. When, however, the sun happens to be near one of the nodes at the time when the Moon is crossing the ecliptic, then there will be an eclipse, and the nature of the eclipse will vary with the positions and apparent magnitudes of the Sun and Moon.

Suppose that the centre of the Moon passed exactly over the centre of the sun —as seen by an observer in Wellington— then, if the Moon's disc is "apparently" bigger than the Sun's, it is manifest that the Sun will be entirely hidden from view. This would be a "Total eclipse of the Sun," and its duration would depend on how much bigger the Moon's disc apparently is. Should the two discs appear to be exactly the same size, there would be "total eclipse" but of only a moment's duration. If the Moon's disc was apparently "smaller" than the Sun's then there would be an "annular" eclipse, so called because there would be a "ring" of sunlight all round the moon. The Moon's distance from the Earth varies between 252,972 and 221,614 miles; manifestly the closer it is to the Earth the larger it will "appear" to be. The Earth's distance from the Sun varies between 91 and 94 millions of miles, and the Sun appears smaller the further it is away from the Earth. Now, when the Moon is at its nearest point and the sun at its farthest—if there is one—the Eclipse will be of longest possible duration to an observer on the Equator, and, under the most favourable conditions, the greatest duration will be 7 minutes 58 seconds. The shadow of the Moon on the surface of the Earth is only about 167 miles wide, so that an observer, say 90 miles to right or left of the path of the shadow would see a "partial" eclipse, whilst an observer, just inside the shadow's path would have a total eclipse of briefest duration. The Moon travels along its orbit about 2100 miles in an hour, and if the Earth did not rotate on its axis the shadow would pass the observer at that speed. But the Earth turns from west to east at the rate of 1040 miles per hour at the Equator, and where the shadow would pass the observer at the "difference" between these rates—that is, at about 1060 miles in an hour. The further the observer is from the Equator the quicker the shadow travels until, under certain circumstances, it would pass at something like 4000 to 5000 miles an hour. It has been calculated that in 100 years the Sun is totally eclipsed for about "twenty-four hours only," but taking into account the loss by clouds and bad weather, and the fact that a solar eclipse is only visible from a limited portion of the Earth which might be near the frozen poles or the shadow might pass (as did the last one) almost wholly over an ocean, only about twelve hours of eclipse are available in a century to astronomers in which to make observations which are possible at no other time. It will readily be understood from this why astronomers spare neither time, trouble, nor money in their endeavour to get successful observations of a total solar eclipse.

The last total solar eclipse took place this year on April 29th (Eastern date), and five different parties went to Neiafu (in Vavau) to observe it. The most northerly site was chosen by Mr. J. H. Worthington, who was assisted by Messrs. Johnson and Cruickshank, of Hobart, and by Mr. J. Short, photographer, of the Sydney observatory.

Mr. P. Barrachi, of Melbourne Observatory, and leader of the Australian Party, had his instruments fixed about 100 yards further south than Mr. Worthington, both of them being on vacant allotments in the town of Neiafu. Mr. Barrachi was assisted by Mr. W. A. Cooke, Govt. Astronomer of Western Australia, Mr. Dodwell, Govt. Astronomer of South Australia, Messrs. Byrnes and Merfield, of



No. 1.—Total Eclipse of the Sun as seen at Flint Island.

—*Photo. by J. Brooks*

No. 2.—Transit Instrument Electrically Connected with the Chronograph.

—*Winkelmann, Photo.*

Melbourne Observatory, and by Messrs. Beattie, Moors and Holloway, of Sydney, together with two or three amateur assistants.

Dr. Stefanik erected his instruments on a low hill about a couple of hundred yards south-east of the R.C. Church. The two British expeditions—one under the direction of the Rev. Father Cortie, of Stonyhurst College, the other under the direction of Dr. W. J. S. Lockyer, of the Solar Physics Observatory, South Kensington—selected a site on the north-west side of a low hill and near its summit, about two miles south of Neiafu.

Father Cortie was assisted by Mr. W. McKeon, photographer at Stonyhurst College, and by Rev. E. F. Pigott, of St. Ignatius College,, Riverview, near Sydney, N.S.W. Dr. Lockyer's party consisted of F. K. McClean (England), the writer, and W. E. Raymond (Sydney), Mr. H. Winkelmann (Auckland), and Mr. Anderson (England), who joined the party *en route*.

In addition, the British expeditions had the co-operation and very willing assistance of the officers and men of the H.M.S. "Encounter," beginning with Captain Colomb, who had charge of the telescope for watching the progress of the eclipse, and who had to call out the very instant the eclipse began. The "Encounter" took the "English" contingent to Vavau, arriving there about 2nd April, whilst the remainder of the party travelled by the Union steamer "Atua," which reached Vavau on the 4th of April. Thence on, every one was busy building concrete foundations for coelostats and siderostats, levelling ground for the erection of horizontal cameras and spectrographs, pier for transit instrument, stand for chronograph, etc., etc., all to be used in one way or another during the (then) coming eclipse.

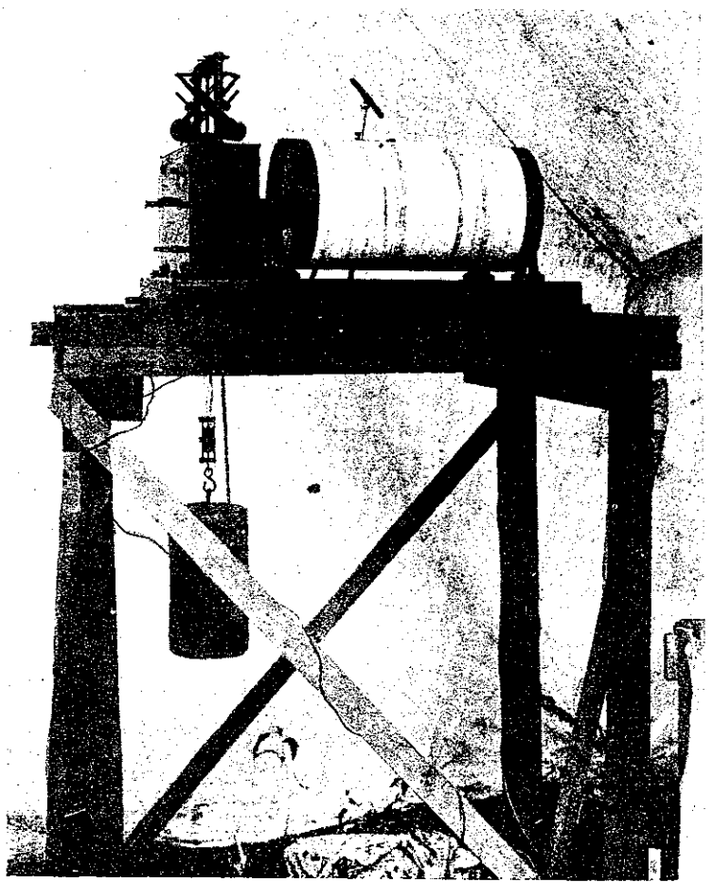
The instrumental equipment of Dr. Lockyer's party was a 6in. prismatic camera, 7½ feet focus, with four objective prisms of 45° angle, which Dr. Lockyer attended to. Lieut. Clover first operated a "Cusp" projector for indicating how far off the beginning of the totality was, then he went to a small spectrograph with a Thorpe replica diffraction grating. A 12in. siderostat reflected light to these instruments.

Mr. McClean's 21in. siderostat (by T. Cooke & Sons, of York) supplied light to a 10-foot concave grating spectrograph having a 6in. aperture Cooke photo-visual object glass of 31½ feet focal length. At the focus of this lens was a 2in. slit by Hilger, and the concave grating had 14.438 lines to the inch, having been ruled with a Roland engine in 1889. The films used were 24 inches (nearly) long and 3¼ inches wide, and exposed in a specially made dark-slide which held the half-dozen films at once, the exposure of each separate film being controlled by a rack and pinion in such a way that when the rack reached a certain place a stop indicated that that film was completely ready for exposure.

A 5in. doublet worked by the Rev. R. Pestall (of H.M.S. "Encounter"). Mr. Winklemann's telephoto camera of equivalent focus of 63 inches, and a very short focus, large apertured camera (which works at the unsual focal length of 1.6) were all fed, the two last by auxiliary mirrors, from the 21in. siderostat.

The writer had charge of the 16in. coelostat (lent to the expedition by the Government Grant Committee (England), and which supplied light directly to the 16ft. coronagraph, having a 4in. Cooke photo-visual object glass and giving an image of 1¾in. diameter, and to the 8ft. coronagraph, having an object glass of 4 ⅝in., and forming an image about ⅞in. in diameter. The 16-foot was worked by the writer, Lieut. Clutterbuck attending to the 8ft. An auxiliary mirror (10in. x 6½in., with corners cut off) reflected light from the coelostat to the 42-inch transparent grating spectrograph with a 4in. object glass, and in front of which was placed a transparent Thorpe grating of 17,000 lines to the inch, giving a visible spectrum of 10 inches. Lieut. Mortimer had charge of this instrument. Another auxiliary mirror (oval on shape) reflected light to Mr. Raymond's telephoto camera, the lens of which had an equivalent focal length of 9ft., and giving an image of nearly an inch in diameter. A 48in. focus 6in. doublet was mounted as an equatorial telescope, which Mr. Anderson looked after. Everything was ready and in good going order by the 27th April, and only a clear sky was needed to make the expeditions complete successes.

The morning of the 29th April broke with scattered clouds all over, but towards the critical time they cleared off, or, rather, thinned out apparently north and south of the island, whilst over the island it seemed to be all clouds. The "beginning" of totality was seen by us, then the clouds closed in again, and although just glimpsed at intervals, the eclipsed sun remained obscured until just about the middle of totality, when it was distinctly seen, but only faintly, and it remained more or less obscured until after the eclipse was over.



No. 3.—The Chronograph Worked in Conjunction with the Transit Instrument. *Winkelmann, Photo.*

No. 4.—The Six-Inch Steward Equatorial Telescope. *Winkelmann, Photo.*

Only when the sun is nearly obscured is there anything of more than ordinary interest to note, although before then the lights and shadows begin to look peculiar. About a quarter of an hour before totality begins the darkness becomes very evident, the birds cease to twitter, fowls go to roost, flowers close up, animals go to rest, the temperature falls, and the larger stars and planets shine out and, during totality, a very peculiar gloom seems to have settled over the face of nature. The darkness is quite unlike the darkness of night, but rather as though a veil of neutral tint had covered everything.

During totality the Moon's disc appears to be surrounded by fringe or crown of silvery light (called the corona) rising to a height of from one to three hundred thousand miles and out of which shoot tongues of pale, rosy-coloured flames of varying shape, and called protruberances, or prominences. Astronomers direct their attention to the study of these phenomena, both by use of the camera, to register the shape, and by use of the spectroscope, to analyse and determine the constituents.

None of the instruments which were fed by auxiliary mirrors gave any results, the clouds were too thick, the light from the main reflecting instrument was only faint, and this faint light being again reflected by the auxiliary mirror became too feeble to impress an image on the photographic plate.

Of the instruments fed by the coelostat (or siderostat) direct, Mr. McClean's 31½ft. spectograph did not produce a single result, whilst Dr. Lockyer's 4 prism camera only gave two faint pictures. The 16-foot coronograph produced one faint and one fair image, whilst the 8-foot gave a faint picture, in each case, of the end of the eclipse.

Mr. McKeon, of Father Cortie's party, got several faint pictures, but the details have not yet been made public.

No. 6.—Father Cortie Supervising the Erection of his Coelostat.
—*Winkelmann, Photo.*

Mr. Worthington and Dr. Stefanik seem to have been much more fortunate in their selection of a site than the British parties, the former getting pictures which both Mr McClean and Father Cortie describe as "really magnificent," and the latter (Dr. Stefanik) told the writer that his results were quite satisfactory.

It is understood that the Australian party was fairly successful, although no official report is yet available.

The Photographs.

No. 1 is a picture of the total solar eclipse of January, 1908, and was taken at Flint Island.

No. 2.—At an eclipse it is necessary to know the local time very exactly, amongst other reasons, so that the observers shall not be taken by surprise. Photo. No. 2 shows the instrument which determines time by indicating the passage of a star across the meredian.

No. 5.—F. K. McClean's Siderostat (21-inch Mirror) Drill Picture.
—*Winkelmann, Photo.*

No. 3 shows the chronograph. On the drum is wrapped a sheet of paper and, by means of electricity, the indicated passage of the star across the meridian is recorded on that sheet of paper, at the same time that a chronometer is recording the time, second by second.

No. 4 shows a camera which is pointed straight at the sun and driven by clock work so as to travel just as fast as the sun, thus keeping the Sun's image exactly in the same place on the photographic plate.

No. 5 shows the 21in. siderostat, the mirror being almost in front of Mr. McClean—the third figure from the left. At the time when the photograph was taken the mirror was reflecting a cocoanut palm leaf to Mr. Winkelmann's camera.

No. 6 shows Father Cortie and his men adjusting a coelostat.

Astronomical Notes for October

(Hon. Director Wanganui Observatory.)

The Sun is in the constellation Virgo during the whole of this month; he passes in Libra just as it ends. His declination is now south of the Equator, increasing from 3deg. on the 1st to 14deg. on the last of the month. His altitude will therefore show an increase of about 11deg. at noon for the same period. Sunspots have not entirely disappeared, but from the smallness of the areas disturbed, and the rapid merging of the same, into the bright conditions surrounding them, we consider our luminary to be well within "the minimum stage."

* * *

Eclipse.—An annual eclipse of the Sun will take place on the 22nd. The line of central contact passes nearly 30deg. to the north of our position, but Wellington and places to the north may be favoured with a glimpse of part of the phenomenon. For New Zealand time it will begin 5h. 21m., and will end 5h. 35m. p.m., lengthening for places to the north.

* * *

The Moon, in her monthly circuit of the heavens, comes into the vicinity of the planets and some of the brighter stars, and serves as a convenient pointer to them. She will be near Saturn on the morning of the 11th, Mars on the following evening, Venus on the morning of the 19th, Mercury on the 22nd, Jupiter on the 24th. Her path through the constellations, visible in our evening skies at about 8 o'clock, is as follows:—In Sagittarius on the 1st and 2nd, Capricornus on the 3rd and 4th, Aquarius on the 5th and 6th, Pisces on the 7th and 8th, Aries on the 9th and 10th, Taurus on the 11th and 12th, and nearest the bright star Aldebaran, in the Hyades, on the 12, Gemini on the 13th, 14 and 15th, and nearest the two bright stars, Castor and Pollux, on the latter date. She will appear again as a crescent in the Scorpion on the 25th and 26th, Sagittarius on the 27th, 28th and 29th, and in Capricornus at the end of the month.

The phases of the Moon in New Zealand mean time:—

First Quarter ..	1 days	10 hrs.	38 min. p.m.
Full Moon ..	8 days	3 hrs.	41 min. p.m.
Last Quarter ..	15 days	11 hrs.	16 min. a.m.
New Moon ..	22 days	3 hrs.	39 min. p.m.
First Quarter ..	30 days	6 hrs.	11 min. p.m.
Perigee	12 days	6 hrs.	6 min. p.m.
Apogee ..	28 days	10 hrs.	6 min. a.m.

* * *

Mercury is a morning star during the month, coming into superior conjunction on the 24th, after which she will set after the Sun. He will be in conjunction with the Moon on the afternoon of the 22nd., and in his descending node on the 30th.

* * *

Venus is now a morning star in the constellation Leo, drawing away to the west of the Sun. She will appear stationary amongst the stars on the 5th; in conjunction with the Moon on the 19th; at greatest brilliancy on the morning of the 23rd, when she will present a fine spectacle in the early morning sky.

* * *

Mars is an evening star, rising later in Taurus. He is now drawing away from the Sun, and will soon be visible in our early evening skies. He will be in conjunction with the Moon on the night of the 12th, and will appear stationary amongst the stars on the 18th.

* * *

Jupiter is still an evening star and visible for a while after sunset, underneath Alpha Librae. He will be in conjunction with the Moon on the 24th, and may be seen in the western sky rather lower than our satellite on this and the preceding evening.

* * *

Saturn, rising shortly before midnight, in the constellation Aries, is now a fine object for the telescopist in the early morning hours. His ring system is well inclined to the line of vision, and presents a most attractive appearance at this time in a telescope of fair dimensions. He will be found near the Moon on the morning of the 11th, being on the same meridian at 5hrs. 58min.

* * *

Uranus is an evening star in Sagittarius, at this time, and has a forward motion amongst the stars and making very nearly a perfect equilateral triangle with the stars e and h2 in that constellation. He will be in conjunction with the Moon on the 2nd, stationary on the 5th, after which his motion will be forward, and is in quadrature on the 20th.

Neptune is in Gemini moving to the east amongst the stars. He will be in conjunction with the Moon on the 15th and stationary amongst the stars on the 28th

* * *

The Constellations for the middle of the month, at about 8 p.m., are placed as follows:—In the north the "Great Square" of Pegasus is the object which first catches the eye, the lower right hand corner being made up of the bright star Alpha in Andromeda. Aquarius and Capricornus are over the "Square" and Piscis Australis, with the bright Fomalhaut, near the zenith. In the east Cetus, the Sea Monster, is now seen well above the horizon, with Aries just emerging to the north-east and Pisces over it. In the south-east we may see the long trailing shape of Eridanus, the River, with the fine star Achernar in the end of it, nearest the Pole. West of the northern meridian is Cygnus, and over this Aquila, the Eagle, and the bright stars Altair, and those of the Dolphin. Ophiuchus and Serpens are now partly below the horizon, to be followed by the Scorpion and Sagittarius. In the south is Argo, the Ship, rising from its lower passage beneath the Pole, the fine star Canopus coming once more into prominence in the clear sky. The Cross and the bright "Pointers," Alpha and Beta Centauri, are moving down to their lower passage in the south-west, followed by the Centaur, Lupus and the Triangle.

* * *

The Zodiacal Light has been seen to great advantage on several evenings during the past month, the delicate cone of soft pearly light being a most beautiful sight when seen away from the glare of street lamps and other artificial lights.

* * *

New Comet.—A new comet, found on a photographic plate, at the Lick Observatory, became visible to the naked eye in the northern hemisphere during July, and was seen in powerful telescopes, in the south, during August, but has very rapidly receded from us and was at no time visible to the naked eye in these latitudes.

September 30, 1911.

The Home Worker.

Necessity the Mother of Invention

He was an inventor from the Middle West with an improvement in farm equipment; but he also evidenced his abilities in other directions. His left leg was paralysed, requiring him to walk with crutches. He had removed the chain and right pedal from an ordinary bicycle, leaving the left pedal as a rest for the foot of his bad leg, and he propelled the machine by his right leg, pushing the foot against the ground. Thus he was able to go from place to place with facility.

Fastening a Hammer Mead to the Handle

The following method of securing hammer heads to handles may prove useful: It consists in taking an ordinary washer, cutting it away at opposite sides, and then bevelling it to form a wedge. When this is driven into the end of the hammer handle it is held firmly in place by the fibres of the wood that are forced into the original washer hole in the centre of the wedge. This idea is not offered as something new, but the average handy man has probably not heard of it, and may find it a very serviceable kink.

The Aquaplane

Among the new things advertised is the Aquaplane, with which the makers say it is possible to have a real joy ride. Riding the Aquaplane at a speed of 20 miles or more offers the wildest speed maniac innumerable hair-raising and thrilling sensations. An Aquaplane is a small flat platform towed behind a motor boat. To use the Aquaplane one lies flat upon it, face downward, feet just extending over the rear edge until the boat is under way, then gradually brings the body to a kneeling position, after which, gradually stand erect—if you can. The makers recommend the first trial being attempted at slower speed, and much fun can be had in finding the proper spot upon which to stand at a given speed. The Aquaplane is made of the best cypress lumber, and is sold at a price which places it within the means of any motorboat owner. Imagine the possibilities of entertaining your nervous friends with the Aquaplane.

Removing a Broken Handle from an Axe Head

When an axe handle or a chair rung is broken much time is apt to be wasted, and serious damage is sometimes done, through misguided efforts to remove the end from the eye or hole; yet it is a simple matter if one goes at it rightly. There is not the slightest occasion for heating in the one case nor for marring in the other. Bore a hole through the plug with a bit or drill small enough to insure against striking the sides of the original hole; then, with a narrow chisel, cut a slot from each of opposite sides of this hole to the outside of the material to be removed. This will leave the plug in two separate parts, which, if they do not drop out of themselves, may be easily knocked out or split out with the chisel.

If the problem should happen to be that of a handle which is secured by an iron wedge, then a small hole drilled through, close to each side of the wedge will make an opening through which it may be punched out, and from which to chisel the slots. In cases where metal is apt to be encountered it is best to use a twist drill for the boring, as such a drill works very well in wood and is not injured by moderate contact with metal, where a bit would be apt to be ruined.

Screws that Stick.

They are a difficulty and trouble. The man at the end of the screwdriver twists till he perspires, and goes on twisting and perspiring until he gets the head of the screw off. Then it strikes him that his object was not the decapitation of the screw, but its extraction from the wood. There is a good way of persuading these screws to come out without decapitation, which is, as you will have observed, not effective. Take a red hot poker and put the hot end on the screw head and leave it there awhile. Take away and let the screw cool off. Then take your screwdriver and twist as before. This time your screw will come out quite easy. How is this? Simply because the heat expands the screw, and the screw enlarges the hole in the process, and when cold shrinks, whereas the wood does not. This method is infallible.

Architecture and Building

Comfort in the Modern Home

These notes may be of use or interest to those about to build or buy a house. The first consideration is, of course, locality in relation to distance and means of locomotion to and from one's place of business. To the proud possessor of a motor these matters may be of little moment; to the average man they are of considerable importance, and will govern his selection of a place in which to live. One thing is certain, if he is going to live more than two or three miles away from the heart of the town, he will have to choose one of the suburbs linked up with the tram or railway.

Having chosen the locality, the selection of the site itself should be made with due regard for a pleasant sunny outlook, and last, but not least, water and lighting supplies and drainage. The condition of the roads, and the average price of ground in the neighbourhood are also of importance. The drainage of a house is a matter that very greatly concerns the comfort and health of the inmates, and the term must be understood not only to apply to the conveyance away of sewage, but also to any necessary drainage of the site.

The planning of houses demands most careful attention, and requires unusual skill on the part of the architect to get half as much into a small house as the client usually wants for his money.

The average man is very apt to base his ideas of a home on the combined advantages and features of four or five houses that he knows, or has visited. Thus the house of A is small but beautifully filled up with oak-panelled rooms, marble bathroom, etc; the house of B has much greater accommodation, but is very plainly fitted. The prospective home builder conceives a home having the accommodation of B's house with the decorative effects of A's, and cannot quite see why the cost is so much greater than the respective costs of the houses of either A or B.

The keynote of the ordinary house should be simplicity. Many bays, gables and wings, generally, cost more than their effect warrants, and if the house is small, will necessarily look trivial and small also. Breadth of effect is by no means impossible in a small house, but the attempt to crowd into it all the features of a large mansion invariably ends in disaster, both to convenience and artistic effect.

A plain roof is one of the most economical features; once you begin to throw out bays and patch on gables you incur heavy and unnecessary expenditure in your roofing. More beauty can be secured by a well proportioned plain roof with well-placed and finely designed chimney stacks than with any number of elaborate gables and decorated barge boards.

The arrangement of the rooms so that the chimney flues can be collected into one or two large stacks not only tends to economy, but also greatly increases the possibility of artistic effect. A number of small spidery chimney stacks make breadth of effect quite impossible. Chimney stacks are better placed at the ridge of the roof than on the slopes and centre stacks as a rule look better than stacks at either end. As regards the roof, tiling is pre-eminently the best material. The interlocking composition tiles are better than the Marseilles, as they stand the weather better, and do not become so discoloured, particularly in smoky neighbourhoods. The porous nature of the Marseilles tiles makes them particularly liable to collect smoke and dirt, so that in a few years they have a very dingy appearance compared with the first-mentioned tile of the same age, though one cannot deny that the Marseilles tile has the more handsome appearance when new.

The verandah is one of the most important adjuncts to the home. One could wish, however, that, generally speaking, its treatment was a little happier. Too often the unfortunate little roof supported on skeleton posts gives an uncomfortable feeling that it is stuck on to the main building as an afterthought. The satisfactory arrangement of a verandah requires some effort on the part of the architect, and in most of the successful case it will be found that the verandah forms an integral part of the building.

In area, the verandah is now being made more extensive than it used to be, and in particular the depth is greater. In some modern houses the kitchen or dining-room is planned to open on to the verandah so that meals can be served there in hot weather if desired.

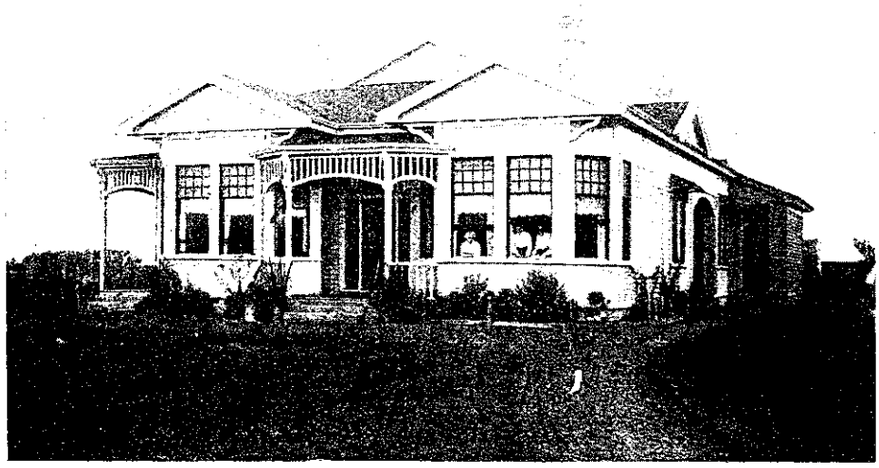
SMEETON'S BUILDINGS, QUEEN STREET, AUCKLAND. *Winkelmann, photo.*

In the arrangement of the interior everything depends upon the accommodation to be provided. There are certain elementary rules in the planning of all houses, large or small, which may be briefly catalogued. The principal rooms should face the north or east; the kitchen south or west. The kitchen must be handy to the dining-room, and the range should be lighted from the left wherever possible. The larder should be on the south.

The ordinary bedroom is by no means irreproachable. Considering the length of time passed in bedrooms, their shape, cubic contents, window space and ventilation are all matters of hygienic importance. Science would demand that our bedrooms should be even larger than our sitting-rooms, because of the greater air space required. The demand of scientific men for larger bedrooms and more window space has generally been met with the retort that people should leave their bedroom windows open. We know perfectly well, through the modern treatment of tuberculosis, that it is quite possible, under skilled medical attention, for very delicate people to sleep in the open air. But such patients are always carefully screened from draughts. And in many modern bedrooms it would be impossible for anyone to sleep with open windows without catching a violent cold or incurring perpetual neuralgia. It is not sufficient to say "Open your window"; the bedroom must be so arranged that there is not a continual draught across the head of the bed.

There are two main defects in many bedrooms, and these are their shape and arrangement. Too often there is every

indication that the planning of the ground floor, with the living rooms, has been regarded as the "be-all and end-all" of the design, and the bedrooms are disposed as best they may be over them, or in bungalow type of houses they are just crammed into the spaces left after the living-rooms are planned.



HOUSE AT MARTON. F. Chinn, architect.

The long, narrow room, where the bed must be set lengthways along the wall in order that one may get past it, is not a pattern to be adopted, for the bed has to be moved every time it is made, which is neither good for the temper nor the floor. Equally irritating is the bedroom which has the door in the middle of one wall, the fireplace in the middle of another, and the door in the centre of the third, so that the fourth wall, the only possible one against which to set the bed, is in the full line of draught between the door and the fireplace, the window and the fireplace, or the door and the window. An examination of most of the bedrooms would show these defects to be the rule rather than the exception. The idea that anything is good enough for a bedroom should by now be an exploded fallacy.

A good bedroom should have plenty of air space, the door near the corner, not in the centre of a wall, with fireplace and window as nearly in line as possible and not cross-firing cold draughts all over the room, so that there is sufficient area of quiet territory, as it were, in which to stand the bed.

In the conception of a home there is one point in which the many architects fail, and that is the provision of cupboards, and in the majority of cases where cupboards are provided they are so small and awkward as to prove more of a nuisance than a blessing. Now, in America they believe in cupboards, large ones and plenty of them. Very often these are contrived by planning a space two or three feet wide between two bedrooms; half this space forms a cupboard for one bedroom, and half for the other. Storage accommodation is a necessity in every house, and is even more important in the small house than the mansion.

The question of timber in building is daily becoming more difficult and serious. The world's supply of this useful material is now being used up so rapidly that adequate time cannot be allowed for its proper seasoning. For this reason door frames warp and twist, panels shrink and split, and all timberwork is liable to seasoning defects. Oregon pine is now being largely used in place of some of our timbers, and it certainly has a good appearance, varnished or stained, for inside work.

One difficulty of the modern house owner is his floors. Stained and polished floors are very generally desired for decorative effect; but too often such alarming spaces, not to say cavities, appear between the floorboards, that the continuance of a stained floor seems out of the question. Here again the seasoning difficulty crops up, and frequently floorboards properly put down and cramped up during laying will afterwards shrink and disclose unsightly cracks. With a floor very defective in this respect, practically the only remedy is to take up and re-lay it.

The question of windows is a most important one, and on hygienic grounds there is much to be said for the old style of window with the double sash, which makes it possible to ventilate a room without creating a draught in the lower portion. The casement window, however, has many advantages, and numbers of people who have once tried them would never put up with the sash window again.

The main consideration in the treatment of the window itself is to keep the panes small. Large sheets of glass never look well, and their tendency is to make the cottage appear much smaller than it really is. Large panes, besides, being most costly to replace if broken.

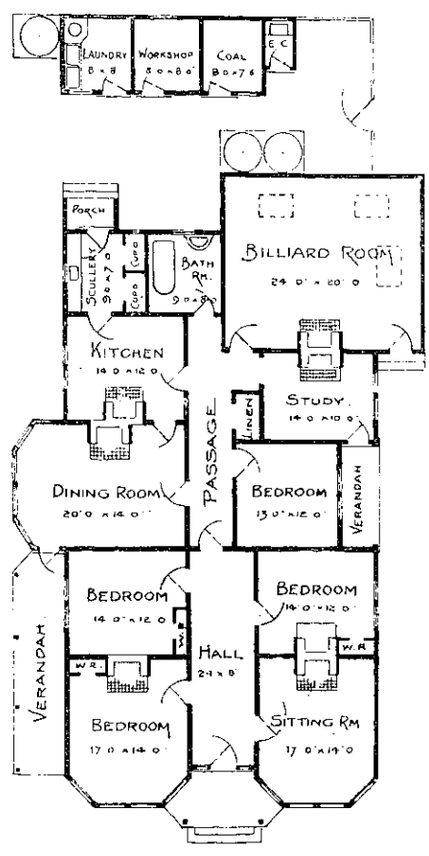
Leaded lights are increasing in popularity, but are more difficult to repair when broken; but the elasticity of the lead saves the glass from many a breakage. Coloured glass should be used very sparingly, if at all.

Jalousies are only occasionally needed in this country, and their use must be determined by preference or question of cost. It must be admitted that they often add to the appearance of a cottage, and are more in keeping than the sun-blind, which too often is put up after the place is built, and ruins the appearance of the window.

Doors are one of the most troublesome features of a house, being specially liable to shrinkage and twisting from their position and functions. A warped door which sticks or a shrunk door which will not fasten and bangs all night long, are both abominations and irritations to the flesh. Therefore, to have the doors well made and of the best material is a *sine qua non*. The folding door is an early Victorian abomination, happily becoming extinct. Where it is desired to afford some means of throwing two rooms into one, sliding doors are far preferable. In this case the aperture is closed by two doors sliding into grooves formed in the walls on either side of the aperture.

The value of good grates and stoves is known to all housewives, but with the improvement of the electric oven and the cheapening of the cost of power, it seems that soon a good deal of the cooking will be done by electricity, and what is not done by that means will be done in the gas or oil stove, so that the old dirty range will be relegated to the scrap heap in the near future. The old open fireplace for burning logs is much the cosiest to sit round, but firewood, in the towns, is becoming scarcer and dearer every year. Some of the Well fires, which burn coal, will burn wood, and have almost the same appearance, though their grate area is tiny in comparison, and they are thus much more economical. Several were exhibited at the Wellington Industrial Exhibition, held in June, and the tilings in some were works of art.

The ingle-nook now finds a place in many, but is a somewhat over-rated fea-



— PLAN —

ture of the modern homes. It boasts of a comfort that it rarely possesses. The seats seem inviting enough, but often the backs are too straight or the seats not deep enough. To be really comfortable the ingle-nook requires to be deep-seated with the back inclined for eighteen inches at least, and upholstered well.

The average kitchen fittings comprise, beside the range, a dresser and a few cupboards. In the twentieth century these things should show some modification and improvement. If the dresser were made as a cupboard with close-fitting glass panelled doors, more like a china closet intended for valuable specimens, much unnecessary washing of chinaware would be obviated. It is better if a proper pantry can be provided for the china and glass, with a sink, etc., for the washing of these articles, but in a small house it is not always possible to afford the room. In such a room drawers for holding the plate, tablecloths, dusters, etc., should also be fitted, and if it forms a servery ample counter or flap accommodation should be provided for setting down trays or dishes.

Cupboards are generally set in the kitchen where it is thought they will not be in the way. This is quite the wrong method of regarding them. If necessary, the whole of one side or end of kitchen or scullery should be cupboards. These need not be extraordinarily deep, but should contain the stores in current use in separate shelves or pigeon-holes, so that the mistress of the house can see practically at a glance what things require replenishing. In the scullery there should be a cleaning cupboard, so arranged that the various brooms, brushes, dustpans, etc., can be hung up, a locker provided for the boot brushes, blacking, polishing paste, and drawers for clean and dirty rags.

The sink is the most important article in the scullery; it should have good big draining boards on either side and plate racks over the draining boards. It is desirable that the sink be placed in front of a window, but the walls round should be faced with glazed bricks, tiles or non-corrosive metal for at least three feet on either side, and two feet above the sink.

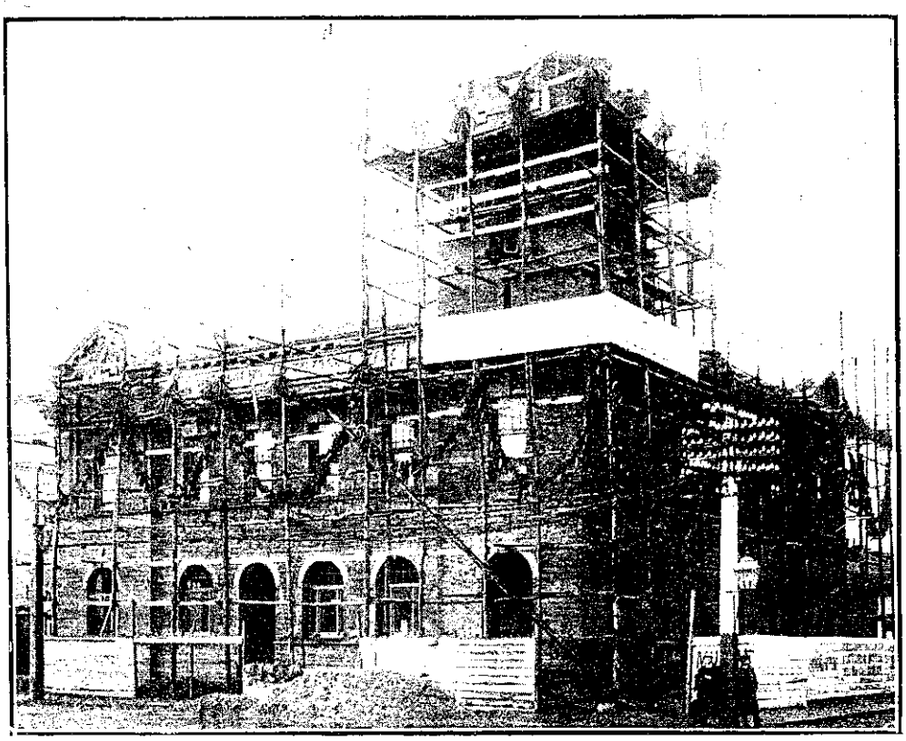
In the matter of bathrooms we are reverting to the luxury of the Romans. In fact, educated people look upon their baths as an enjoyment, and not, like our forefathers, as a necessary but troublesome item of cleanliness. The porcelain bath is a beautiful thing in itself, but takes more heating than the iron one, with a resultant loss of temperature in the water. Unless a big fire is kept going in the kitchen range for a considerable time (in summer a matter of great discomfort) the water never seems hot in the average hot water service. Moreover, one bath exhausts the stock of hot water for some time, and a continuous supply of hot water is an impossibility. Therefore a geyser is to be recommended, for with it a constant stream of hot water is immediately on tap after lighting the gas. Where gas is not available there is a special geyser made for burning chips of wood and is quite as effective. Several of these appeared in Ballinger's exhibit at the recent exhibition.

In small houses the water closet is often placed in the bathroom. Though there is little to cavil at in this, considering the excellence of modern fittings, there is much to be said against it on the grounds of convenience, as both fittings may be required for use at the same time by different persons.

Most of the interior walls will be scrimmed and papered, but if money is not an especial object some rooms, such as the dining-room, may be panelled in polished wood. Wide vertical Oregon panels stained dark, with narrow varnished kauri styles about breast high, and a brownish or buff paper above, would give a dining-room a very nice appearance. Picture rails are a great boon and not expensive. The division of a wall into dado, filling and frieze is largely a matter, however, for the artistic skill of the architect.

Chimney pieces and doors may also be included in the objects for careful design, and the metal work (lighting, fixtures, door plates, handles, knockers, and other metal included under the title of door furniture) offers immense possibilities for the expression of art.

It is by the discretion and restraint exhibited in the choice of these appurtenances that the householder may preclaim his intelligence and refinement to his visitors.



New Post Office in course of Erection at Westport.

New Opera House in London

Mr. Oscar Hammerstein, the great American Impresario, who has gone to London to wake the English public up, as he puts it, is sparing no expense in the construction of his enormous theatre in the Kingsway. In his prospectus Mr. Hammerstein says: "Grand opera can succeed ony when it is presented 'grand' in every detail; it must be grand in auditorium and on the stage; grand in singers, musicians, scenery, and costumes; its director and his staff must be imbued with the loftiest of purposes. Unhampered by any influences, I have succeeded in what will be found an incomparable *ensemble* . . . To be successful, I must not teach; I must interest."

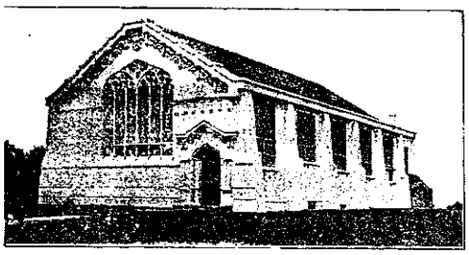
Interest is beginning to be aroused already in the manner of the execution of the work, no fewer than one thousand plasterers being at work on the interior, and the London "Standard" adds to this impression of Yankee hustle the startling information that "a number of American millionaires are chartering an Atlantic liner to bring them to England for the purpose of witnessing the first performance on November 11th." The "Standard" goes further:

"If thoroughness and attention to every requirement means success, Mr. Hammerstein is going to be eminently successful. There is a note of completeness about the whole undertaking. The work is a wonderful combination of speed and thoroughness. On November 1 last the excavations were commenced, and on November 11 next the curtain will rise for the first time in one of the most beautiful theatres in the world. Three hundred men have been employed, and the number of hours worked up till Saturday was 570,000. In creating the foundations 24,000 tons of earth were excavated, and the quantities of materials used have been 120 tons of granite, 2800 tons of sand, 2000 tons of ballast, 1090 tons of breeze for the floors, 3000 tons of Portland stone, 3,500,000 bricks, 800 tons of steel, and up to the present 1500 tons of cement have been used.

"The Opera House is constructed to accommodate 2700 persons, and forty-three boxes are being constructed, including a handsome suite for the use of the King. The stage measures 90ft. by 60ft., and is specially constructed with a view to magnificent spectacular effects. A fireproof curtain will be provided, which in case of fire will be lowered and automatically flooded with water, while on the stage itself a lantern light will be arranged which will open automatically in case of fire, thus causing a draft to carry away the heat and smoke from the public portion of the house. The ground floor below the street level will be entirely devoted to stalls and boxes, and above the stalls, suspended from the circle, will be a complete tier of boxes, each with its own retiring-room. Two other tiers are arranged on each side of the auditorium. Above the boxes will be the grand circle, and above that the lower and upper galleries. Every seat throughout the house will be a *fauteuil*. The proscenium arch

will be 45ft. by 30ft., and somewhat funnel-shaped, to throw out the sound. The back of the circles and gallery will be screened off, thus preventing the audience from being disturbed by promenaders.

"The entrance hall will be 60ft. by 30ft., and surrounded by a peristyle of Corinthian columns, the special feature of the frontage being the central window, 39ft. in height. Statutes illustrative of music and art stand up on the corners, and each end of the building is crowned with large groups of classic statutary. The work is being carried out entirely by British workmen, and only British material is used. The architect is Mr. Bertie Crew, and Mr. Thomas Rudge is the sculptor."



CHURCH BUILT IN SECTIONS, FLAT ON THE GROUND.

A Unique Building Method

Casting Cement Buildings Walls on the Ground.

We have been accustomed to look to our American cousins for the last thing in concrete construction, both as to the results attained and the manner of their attainment.

Edison recently promised to show how it was possible to build moulds for houses so that when you wanted a house all you had to do was to erect the mould on the site chosen, pour in the concrete, allow it to set, and there you were. However, that doesn't seem to have quite come off yet, but almost as quick a way of attaining the finished result, is a scheme of building carried out recently with success as shown in our illustrations. These and the accompanying text, both from "The Scientific American" (New York, July 29) illustrate how a reinforced concrete church was built in sections lying flat on the ground, which were afterwards raised into place, and cemented into one homogeneous whole. Although there is no doubt a size limit to the walls that can with safety be built horizontally and raised afterwards, still there is no doubt that buildings of a considerable size could be put together in this way. One advantage of this system over the old way of building is that it practically does away with scaffolding and the time taken in its erection, and the elevation of material piecemeal as the building grows. We read:—

"The accompanying illustrations show a method of a new system of reinforced concrete building construction, in which the church walls are erected by means of raising-jacks.

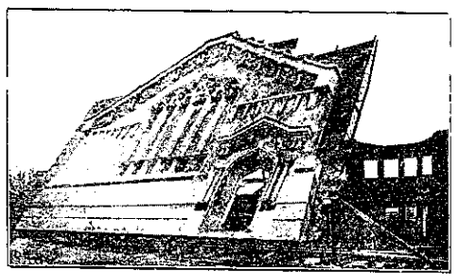
"On the foundation wall, and on piles inside of the building-lot are set a series of jacks made of steel. These jacks consist of a supporting-carriage, a pivoted walking-beam, and a collapsible screw driven by a worm gear and worm. A platform is laid on the jacks and on this platform are set in their proper relative positions all door frames, window frames, and other openings. The concrete is poured around the opening thus established. The reinforcement is easily and properly placed horizontally and vertically, because the wall resembles a great drafting board, and is very readily 'laid out.' The entire wall is poured at once, which can be done in a single day, even though the wall be 200feet long and three stories high. After the wall is finished, it is allowed to set for forty-eight hours; then a small gasoline engine or electric motor is connected with the driving-shaft, and the wall rises from the inside slowly and quietly to its permanent vertical position.

"When all the walls are in place the corners where reinforcements from either wall project and interlock are poured, and we have a complete, monolithic, well-finished structure. Floors and roof of concrete or of any construction desired are put in place in the same way as in any other building.

"No forms are used whatsoever in this wall construction, except the wooden jack platform which is never destroyed, but is used over and over again. An air space can be made merely by filling in with loose sand, which is rodded out when the concrete sets and the wall is partially raised. The reinforcement is placed both horizontally and vertically exactly where it belongs in both inner and outer wall. It is possible to use rods, fabric, or any other kind of reinforcement without the slightest difficulty.

So-called "Fireproof" Buildings.

The disastrous fire at the Carlton Hotel, in London, news of which has just come to hand by the English papers, and its apparently narrow escape from total destruction, must raise serious apprehensions in the minds of all who use these large hotels. We were told in the "Times" at the time the hotel was opened that "there are four staircases, and two emergency staircases outside, while asbestic plaster is used throughout the building, this being a fireproof material



LIFTING A WALL IN PLACE BY MEANS OF JACKS.

which will render the Carlton, to all intents and purposes, fireproof." We often see it stated in similar reports of the opening of hotels, theatres, etc., that they are, "to all intents and purposes," fireproof. The public are beginning to ask—and not unnaturally—how far that expression is to be read literally, and nothing will allay their apprehensions but the fullest possible inquiry into materials and methods of construction used in buildings in which its use appears to have been little more than a *façon de parler*.

Parliamentary Buildings Competition

As we go to press the award of the assessor, Col. W. L. Vernon, F.R.I.B.A., is made public. The building of the winning design is estimated to cost £185,000. The 33 competitors' names are as follows:—1. (£1000), John Campbell, F.R.I.B.A., Government architect, and Claude Paton. 2. (£500), Thos. Turnbull and Son and J. S. Seddon (Wellington); 3. (£300), Wm. H. Gummer (Auckland); 4. (£200), John Campbell and Chas. A. Lawrence (Wellington); 5. Geo. A. Troup, F.R.I.B.A., and W. Gray Young (Wellington); 6. Henry S. Morran and R. A. Owen (Auckland); 7. Hugh C. Grierson (Auckland); 8. Hurst Seager and Hart (Christchurch); 9. Fleming Macdonald and W. Dunning (Dunedin). The other competitors were:—E. Anscombe (Dunedin), B. J. Ayer (Christchurch), Blake and Bennie (Wellington), Beere and Greenish (Wellington), L. D. Coombes (Dunedin), Charlesworth and Callender (Wellington), J. Charlesworth (Wellington), W. Houlker, Junr. (Nelson), O. A. Jorgensen (Palmerston North), R. Loweish (Auckland), D. M. Kean (Wellington), F. Mitchell and Co., Wellington), J. C. Maddison (Christchurch), O'Connor and Bartley (Auckland), W. M. Page (Wellington), F. W. Petre (Dunedin), D. B. Patterson (Auckland), A. D. Spiers (Picton), G. G. Schwartz (Wellington), Salmond and Vanes (Dunedin), G. A. Troup and J. Young (Wellington), Troup, Young and Robb (Wellington), L. G. West and Son (Palmerston North).

Our Illustrations.

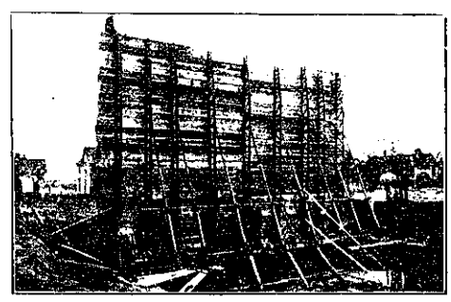
"The Old Mill." Smeeton's Premises, Queen St., Auckland.

Our illustration on page 843 shows what will be the ultimate result of the extensive alterations now in progress at the above. The building, when completed, will have a frontage to Queen Street of 90ft. by 120ft. deep. It is constructed of brick and concrete, the face of which will be finished with Melbourne pressed bricks and imitation Sydney standstone. It is divided across the centre by a light area. The front portion, except the ground floor, which is occupied by Smeeton's shops, will be devoted to suites of offices, approached by a corridor 10ft. wide from Queen Street. This portion has four floors.

The back portion, which will be wholly occupied by the firm, consists of a basement and five stories, and has a flat roof, on which will be erected coffee roasting rooms.

Two electric passenger lifts and one goods lift will be installed. The floors are carried on steel joists and stanchions, the ground floor being of reinforced concrete, and the rest of wood construction. The shop fronts will have Coromandel granite stall boards and British plate glass set in Duff's white metal framing, the piers encasing stanchions will be finished with handsome glass cases for the display of goods, so that the whole of the Queen Street front will be an unbroken display of glass.

Several strongrooms are provided for, electric lighting and heating throughout the building, with lavatories finished in the most up-to-date style.



BACK OF WALL, SHOWING METHOD OF SUPPORT

The architect of this handsome and efficient building, which will considerably improve the appearance of this part of Queen Street, is Mr. W. A. Holman, of Victoria Arcade, Auckland.

New Post Office, Westport.

The illustration on page 845 of the new Post Office in Westport shows how far this building has progressed, though it does not give any adequate idea of what it will be like when completed. It still has its "Coronation" dress on.

Mr. Wilson's House in Marton.

The house is built on a rise and a good view of the surrounding district is obtained from the

large windows of best rooms. The foundation is concrete, and outside walls are covered with heart totara weatherboards. Iron roof with gable ends. The house contains hall, drawing and dining-rooms, billiard-room, study, four bedrooms, kitchen, bathroom, scullery, detached washhouse, workshop, and all modern conveniences. The rooms are heated with Bell Interior Grates, with tile surrounds; and lighted with acetylene gas generated on the premises. The ceilings are 12ft. high and panelled with rimu heart, with wood cornices. The billiard-room is lighted by skylights. All the interior furnishings are of heart rimu oiled and dull varnished. Mr. Chinn, of Wellington, was the architect.

TENDER NOTES

Tenders are invited up till 12 noon on 2nd October, for the erection of Swimming Baths, Marton; also for the erection of balconies, fire escapes, etc., for the Marton Opera House. Plans and specifications at Marton Borough Council Chambers, "Feilding Star," and at the office of Mr. T. H. Battle, architect, 33 Victoria Avenue, Wanganui. Tenders close at the Council Chamber, Marton.

Tenders will be received up till noon on October 2nd for the erection of a building at Pukekohe (alternatively in brick or wood) for the Bank of New Zealand. Plans at the offices of Messrs. Edw. Mahoney & Son, architects, Swanson Street.

Tenders will be received at the office of Messrs. Collins & Harman, architects, Christchurch, till 4 p.m. on Monday, October 2, for the erection of house on Papanui Road.

Tenders are required, and will be received, at the office of Mr. S. Hurst Seager, F.R.I.B.A., A.M.P. Buildings, Christchurch, up till 4 o'clock on Monday, October 2nd, for Homestead in brick for G. A. M. Macdonald, Esq., Orari Station, Orari.

Tenders will be received at the office of the Auckland Education Board, 201, Victoria Arcade, until noon on Tuesday, October 10th, for a new school at Tuhikaramea (Waikato). Plans, etc., at 216, Victoria Arcade, and at the Town Clerk's Office. Architect, John Farrell.

Tenders will be received at the offices of Hugh C. Grierson, architect (late Mitchell and Grierson), Security Buildings, Queen Street, until noon on October 6th, for the erection of creamery managers' residences for the New Zealand Dairy Association at Motumaoho, near Morrinsville; Tautari, near Kihikihi; Patumahoe, near Pukekohe, and two at Frankton Junction.

Tenders are invited for plumbing and draining works, Grey Lynn, also Mt. Eden. For particulars, contractors are asked to call in the evening at 18, Picton Street, Ponsonby.

Tenders are wanted for painting, papering, etc., new house, Tutanekai Road, Grey Lynn. Lowest or any tender not necessarily accepted.

Tenders will be received at the office of Messrs. Collins & Harman, architects, Christchurch, till 4 p.m. on 5th October, for the erection of the Deaconess's Home.

Tenders will be received until noon of the 3rd October for the erection of two shops and premises, in brick, in Dominion Road. R. Keats & Son, architects, 301, Victoria Arcade.

Alternative tenders are invited for the erection of a bathing house in Queenstown. Plans (A and B) and specifications to be seen at the "Otago Daily Times" office up to Noon of Thursday, 21st September, 1911. Tenders, addressed "The Mayor," to be lodged at Town Clerk's Office, Queenstown, not later than noon of the 4th October, 1911. The lowest or any tender not necessarily accepted.

Tenders will be received at the County Offices, Paeroa, until 2 p.m. on 5th October, 1911, for the following works:—Contract No. 138—for the erection of chambers and county offices in brick and wood. Plans and specifications to be seen at the County Offices, Paeroa. Each tender must be accompanied by a marked cheque or cash deposit of five per cent. of its amount, addressed to the Chairman, and endorsed "Tender for Contract No. 138." The lowest or any tender not necessarily accepted. Charles Bray, County Engineer, Paeroa.

Tenders will be received in the Town Clerk's Office until 4 p.m. on 5th October, 1911, for the erection of the Public Morgue. Plans and specifications may be seen in the City Engineer's Office, Coburg Street. Henry W. Wilson, Town Clerk.

Tenders close at noon on the 2nd proximo for the erection of banking premises at Palmerston North, for the directors of the Union Bank of Australia, Limited. The drawings, specifications and conditions of contract seen upon personal application being made at the offices of Messrs. Penty & Lawrence, architects, Australasia Chambers, Customhouse Quay, Wellington, on and after the 18th inst., between the hours of 10 a.m. and 4 p.m. The directors do not bind themselves to accept the lowest or any tender.

Tenders are invited by Mr. E. Wolff, Cust., Christchurch, up till October 2nd for erection of House at Rangiora, from whom plans and specifications can be obtained.

Messrs. Crichton & McKay, F.F.R.I.B.A., architects, Lambton Quay, Wellington, invite tenders for the erection of a shop at Palmerston North for Messrs. Abraham & Williams, Ltd., to close at noon on Tuesday, 3rd October, 1911. Plans and specifications may be seen at Messrs. Abraham and Williams, Ltd., Palmerston North, and at the architects' office.

Building Notes.

WELLINGTON.

The following building permits have been received and approved by the City Engineer, Wellington:—

From 8/8/11 to 22/8/11.—34 applications for permission to erect, 33 examined and approved. City district, £8674; Melrose district, £2362; Northland district, £439; Wadestown district, £980.

From 22/8/11 to 5/9/11.—39 applications for permission to erect, 36 examined and approved. City district, £25,284; Melrose district, £5332; Onslow district, £990.

From 5/9/11 to 19/9/11.—24 applications for permission to erect, 20 examined and approved. City district, £5902; Melrose district, £2386; Wadestown district, £75.

For the supply of a motor-power waggon for the Tramways Department, the Wellington City Council have accepted the tender of Messrs Reid & Reid.

Among the above examined and approved are to be noticed:—House in Constable Street for Mr. A. Hinds, brick premises in Manners Street for Messrs. R. & E. Tingey, Sunday School in Riddiford Street for Trinity Church, shop and dwelling in Adelaide Road for Mr. G. A. Mawson, cottage in Comma Road for Mr. F. E. Baker, large warehouse in Dixon Street for Messrs. Sharland & Co. (the largest work recently, and is the means of making the City district appear at such a large figure in the 22/8/11 to 5/9/11 period quoted above), dwelling in Queens Drive for Mr. J. Creighton, residence in Norway Street for Mr. G. Rasmussen, building in Queens Drive for Mr. G. A. McClean, house in Hinau Road for Mr. J. C. Faulkner, dwelling in Sutherland Road for Mrs. M. Paton, house in Glen Road for Mr. H. King, cottage in Rodrigo Road for Miss Wilkinson, 2 cottages in Rhine Street for Messrs. F. & W. Perkins, residence in Queen's Drive for Mr. G. Rotheray, cottage in George Street for Mr. W. R. Morris, dwelling in Oriental Terrace for Mr. T. R. Waterhouse, cottage in Para Crescent for Mrs. Jones, dwelling in Una Street for Mr. T. Turner, dwelling in Waipapa Road for Mr. H. Amos, dwelling in Kelburne Parade for Mr. W. H. Ballinger.

For the erection of a Town Hall at Miramar, that Borough Council have accepted the tender of Mr. G. F. Day at the sum of £798. Unaccepted tenderers were as follows:—H. H. Knight, £827; Howie & Matthews, £839 15s.; Jones and Cameron, £847; Meyer & Illingworth, £877; Muir & Rose, £930; P. C. Watt, £931; F. J. Armstrong £935; Isaac Clark & Son, £997; Hoffman & Petley, £1050; L. Driscoll, £1061; Humphrey Bros. £1061; McClean & Gray, £1097; and A. Seamer, £1118.

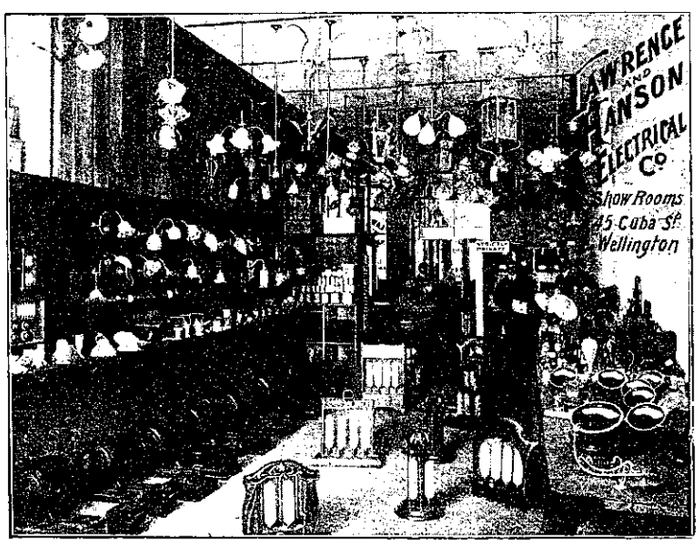
We understand a block of land in Manners Street is to be purchased for the erection of a modern up-to-date new theatre, and that the shareholders of the Wellington Opera House have decided to increase the capital of that company to enable them to supply this long-felt want.

In another part of this issue we publish the result of the judge's award in the competitive design of Parliamentary Buildings. The work of judging the 33 designs sent in must have caused the judge—Col. W. L. Vernon, F.R.I.B.A., late N.S.W. Architect—some concern. Prizes of £1000, £500, £300, and £200 are not often offered in this country, and the interest taken by the profession has been fairly keen. We have no doubt that from the collection a good design will be chosen which will be a credit to New Zealand.

APPLIED ELECTRICITY.

The illustration on this page will doubtless attract the attention of our readers by reason alike of its variety and comprehensiveness. The Lawrence and Hanson Electrical Company, whose headquarters in New Zealand are at 45 and 47 Cuba Street, Wellington, dates from the year 1886, when the business was founded in Sydney and Melbourne. In 1909 Mr. H. F. Vickery, A.M.I.E.E. (London), the Manager, came over to establish the local branch, and the Company's operations now extend throughout the entire Dominion.

The marvellous advance in the application of electrical energy to the varied needs and requirements of modern life has rendered it possible to utilise this unseen but powerful force in a greatly increased variety of ways. Its cleanliness, its regularity, the ease with which it can be brought into requisition and the reasonableness of the cost all combine to constitute electricity a most popular agent for all purposes to which it has already been applied. The future will, doubtless reveal many other methods of adapting the subtle fluid to the use and benefit of the human race. The picture gives a portion only of the extensive showrooms of the Lawrence and Hanson Electrical Company, and a small idea only is given of the extent of the stock carried at the New Zealand branch. A large number of electric motors are included in the stock, and these can be supplied from one-tenth h.p., for driving household, sewing, and other machinery, to 10 h.p. for factories. There are Dynamos, also, of varied sizes, from one kilowatt to ten kilowatts capacity, for generating energy available for lighting, heating, cooking and other purposes. Motor Car accessories, including accumulators, magnets, sparking plugs, and high and low tension flexible wire, are also kept in stock. Electric Radiators, in chaste and artistic designs, worked in hand-beaten, oxidised copper, in form either circular or straight, and fitted with four lamps and two switches, so that either two or four lamps may be used at once, are displayed. The XCELL dry baterics constitute one of the finest dry cells on the market, and are largely in use in the Post and Telegraph Department. Another special line is insulating tape, which is used in large quantities throughout Australia for joints. Generally the Company maintains extensive stocks of all kinds of electrical fittings, lamps, telephones, and cables, in addition to others already named. Although in Australia the Company are large contractors, the business in New Zealand is confined only to the wholesale trade. It is of general interest to note that the Wellington City Corporation has recently let a contract to the Lawrence and Hanson Electrical Company for supplying plant in connection with the extension of the water supply. At Roseneath a 64 brake h.p. motor, direct coupled to a six inch six stage high lift centrifugal pump, capable of delivering 300 gallons per minute against a total head of 378 feet, is being erected. The same power motor is to be used at Melrose, coupled to a six inch five stage pump equal to 350 galls per minute, at a height of 232 feet, and at Wadestown a motor of 150 h.p. will operate with a seven inch seven stage appliance capable of lifting 500 gallons per minute against a total head of 555 feet. High level residents next summer should therefore never suffer a water famine. The above not inconsiderable list of supply seems an ordinary thing because the various items are familiar now as household words. Even from that point of view the list is remarkable, for where else will you find so many, or dealing with all work from the colossal department which pumps water supplies for large populations, to the driving of the smallest labour saver. The point is that the list is really an epitome of the electric history of the world.



THE LAWRENCE AND HANSON ELECTRICAL CO., WELLINGTON.

AUCKLAND.

It has been pointed out to us that in our last month's issue we attributed to Mr. E. Bartley, architect, the designing of the Strand Arcade, Auckland, whereas it should have been to Messrs. Wilson and Moodie; this we much regret.

We remarked last month on the great activity in the building trade in Invercargill, but during a recent visit to Auckland we noticed that this city is also very busy. There are several large buildings in course of erection, viz, Post Office, Town Hall (this is very nearly finished), Nathan's, Safe Deposit Buildings, and Dalgety's, besides buildings in Albert and Lorne Streets. We understand that there is a big drainage scheme under consideration. All this will be very much increased when the extensive alterations decided upon at the Waverley Hotel come on. We learn that Mr. John Currie, architect, has been instructed to prepare plans for a large addition, the proprietors having secured a large four-storey building next door to them, and that this will increase the number of bedrooms by about 50 and also enable quite 250 persons to obtain meals at one time. A fine two-storey Courthouse, 126ft. x 65ft., is to be built, facing Victoria Quadrant, having on the ground floor a Criminal Court, 50ft. x 29ft., and the Public Office, 26ft. x 21ft., besides all the necessary private offices and waiting-rooms. On the upper floor is to be the Civil Court, 50ft. x 29ft., and also the Law Society's library and private rooms, etc. Two storeys are to be added to Firth's Bond in Albert Street, which will eventually have a flat roof and the whole of the front remodelled. Mr. John Currie is the architect. Messrs. Wade and Wade are reported to be preparing plans for a modern four-storey structure, to be erected in the place of the two-storey brick building now occupied by Messrs. Andrews and Clark, in Queen Street, to which it will present a very handsome appearance in brick and ferro-concrete; and we learn the same firm of architects are also preparing plans for the addition of another storey and a half to the Grand Hotel.

To all these extensive works may be added a very large wool store at King's Drive, Mechanics Bay, and numerous other buildings at Devonport, Grey Lynn, Onehunga, Birkenhead, etc., so that it appears as if all those connected with the building trade in the north are likely to have a very busy, and, we trust, prosperous time of it for some time.

A new theatre is to be built at Newton for Messrs. John Fuller & Sons' Vaudeville entertainments. Two sections of land adjoining the new Masonic Hall have been acquired and the new theatre, which will be of a modern approved design, will have a frontage to Upper Queen Street of 85ft. by 180ft. deep.

We understand the City Engineer could not recommend the granting of the application of Mr. H. C. Grierson, architect, to add two more stories to the nine-storey building now being constructed for Mr. P. Gleeson in High Street, so the matter has been referred to the Council Works Committee.

The Labour Department is calling for tenders for the erection of 22 workers dwellings at Ellerslie and Otahuhu, under the Workers' Dwelling Act of last year.

Tenders have been accepted quite recently for the following:—Cottage at Oneroa; Bamford & Pierce, architects. Bungalow at Epsom; T. W. May, architect; House at Howick; C. Trevithick, architect; Shops and dwellings at Ponsonby; W. A. Holman, architect. Shops and dwellings at Devonport; T. W. May, architect. Residence at Takapuna; T. W. May, architect. Police Station, Mount Eden; Mr. A. M. Mackay is the successful builder, the price being £1234. House on Dilworth Estate; E. Mahoney & Sons, architects; Messrs. Seed Bros., £1320, is the lowest tender. Additions to school at Remuera; J. Farrell, architect.

With reference to our foregoing remarks as to the present and past activity in the building trade, the following figures are worthy of note as to what has been done in the last nine months:—Auckland City, 132 permits, £191,574; Devonport, 57 permits, £28,520; Epsom, 30 permits, £15,714; Grey Lynn, 69 permits, £38,803; Mt. Albert, 138 permits, £55,600; Mt. Eden, 176 permits, £77,000; Newmarket, 12 permits, £10,700; Onehunga, 42 permits, £20,700; One Tree Hill, 57 permits, £42,378; Parnell, 8 permits, £4,800; Remuera, 120 permits, 70,621. In all 841 permits, aggregating £556,410, and when to this is added the £500,000 now in hand, the whole reaches the huge figure of over a million pounds.

CANTERBURY.

Tenders will shortly be called for the Timaru High School. It is to be a two-storied building, with a main entrance hall, on one side of which will be the agricultural headquarters, on the other the headmaster's room. There will be a large central hall 50ft. x 42ft., with ante-rooms on the ground floor. Upstairs is another large hall 50ft. x 42ft., with three galleries round it and four class rooms leading out of same, with other small rooms.

The building permits issued by the City Council during the year ended 31st March last numbered 576, the buildings being valued at £265,300. The previous year's figures were 470 permits; value of buildings, £209,040. During 1910-11 permits for buildings valued at £99,260 were issued in the Central Ward; and £18,575 in the Linwood Ward; £99,135 in the St. Albans Ward; £48,330 in the Sydenham Ward.

Tenders have recently been accepted for the following at Christchurch:—House at Rowallan Down, Mr. Homebush; Collins & Harman, architects. Buildings, etc., on the A. & P. Association Showgrounds; A. W. Fielder, architect.

We are pleased to learn that Mr. J. S. Turnbull, of Timaru, has been selected by the Dunedin Technical School Board of Managers to design the new school buildings, at a cost of £20,000. He was selected from amongst 12 competitors with an independent architect on the committee, and has left for Dunedin to make preliminary arrangements.

OTAGO.

Tenders have been accepted quite recently for the following:—New school at Waronui. Two-storey residence at Dunoftar, Dunedin; H. Mandeno, architect. Shops and offices in Stuart Street, Dunedin; Mason & Wales, architects. Residence at Balclutha, Dunedin; Mason & Wales architects. Residence in Cargill Street, Dunedin; B. B. Hooper, architect.

Timber from Japan

The time may yet come when New Zealand, like Australia, will be importing timber from Japan. During the last few years the enterprising Japanese have been building up an export timber trade of considerable dimensions, and they have found in Australia a ready market for fairly substantial shipments. In 1909 the Commonwealth received from Japan nearly seven million superficial feet of timber, valued at £28,723, and the importations are increasing. A few days ago a Japanese vessel arrived at Sydney with 2,500,000ft. of hewn and sawn timber, comprising pine, oak, and ash. The timber industry of Japan flourishes in the northern island of Yezo, which is covered with dense forests. The main island of Japan has been almost denuded of timber, but planting is being pursued vigorously, and Yezo will provide all the timber that is required until the new plantations reach their full development. The work of felling trees is carried on in the winter, and while the snow is on the ground huge logs from the forests are conveyed to the coasts by sledges or floated down the rivers. Great rafts of timber are built, and are towed to the open ports to be picked up by ocean steamers. The timber is distributed to Europe, America, the China Coast, and Australia, and it has been stated that considerable quantities of Japanese oak and ash are imported every year by the United States and sent abroad as the product of American forests. While the foreign trade is extensive, there is a very strong demand for timber in Japan and Korea, where the majority of the buildings are of wood. Large quantities of timber are required also for making furniture and for the manufacture of matches, which is one of the most important industries in Japan.

Safe Method of Painting over Cement Surface

Those who know say it is never safe to paint over the surface of cement until it has stood several months, unless the surface is first sized with acid water to kill the alkali. Even then, they say, it is very likely there will be danger of bad results. A method, however, which has the sanction of many good painters is pointed out by a writer in "The Master Painter," who describes the way he goes about it as follows:—

Slack ½ bushel of fresh stone lime in a barrel and add in all 25 gals. of water; when slacked and cold, add 6 gallons of the best cider vinegar and 5lbs. of the best dry Venetian red. Mix well and then strain through a fine wire strainer. Use it when about the consistency of cream. Give the cement surface a coat of this and after standing a day or so apply a coat of red lead and linseed oil paint. After this has dried you may paint the surface any colour you wish.

Some jobs require two coats of paint over the red lead paint. In this case make the second coat of paint serve as a filler and paint both. This second coat may be made with plaster of paris and oil of the consistency of buttermilk. Then break up some white lead and oil to make a paint the same consistency as the plaster paint. Now take equal parts of each of the two mixtures and "box" them together, and thin to a working consistency with turpentine. This second coat should be applied as heavy as possible, or as heavy as you can spread it well. After this coat is dry apply your next and finishing coat of paint, which should be quite glossy, or about as you would for the last coat on woodwork outside. The object in giving it this plaster paint is to prevent the running and wrinkling of the paint where considerable paint is to be applied to the surface. And it must be made to dry quickly.

Recognition of the advantages of concrete by factory owners as an economical building material has led the editor of "Castings" to make some investigations into the subject of painting. He says: With the rapid increase in the use of reinforced concrete in the construction of factories, and particularly in the construction of foundries, many questions arise as to what can be done to finish or decorate rooms whose walls are of concrete. In many foundries, the offices and laboratory are a portion of the foundry structure, and both the outside and the interior walls are of reinforced concrete, the ceiling being of the same material.

Attempts have been made to paint newly erected concrete structures, but in many cases the paint has not adhered satisfactorily, and we have received many inquiries as to how this can be prevented. Most cement has more or less free lime, and therefore the surface contains alkalies which, if brought in contact with oil paints, will tend to saponify the oil and destroy the paint. In order to make paint stick to concrete, and also to make sure that the paint will retain its colour, it is necessary to neutralise the alkali on the surface of the concrete. That may be done by applying a solution of zinc sulphate. This solution is made by taking approximately equal parts by weight of soft water and zinc sulphate and then applying the material with a bristle brush. The zinc sulphate, which is the same gypsum and also oxide of zinc; the oxide of zinc being in hydrated form. Both the zinc and the calcium sulphate are neutral on their behaviour toward oil, hence after the surface has thoroughly dried it is ready to be coated with ordinary oil paint. It is best to allow the surface to dry for several days after the application of the zinc sulphate solution. If a concrete structure is allowed to stand exposed to the weather for several years, the free lime near the surface will have bleached out, so that the paint will adhere without difficulty, but new structures should always be treated as stated above.

NOTICE TO YACHTSMEN AND OTHERS

(In the Estate of F. W. Thorp, of Motueka, deceased).

The Modern Auxiliary Motor Yacht

"NGARU"

equipped with 21h.p. Heavy Duty, Slow Speed, Jersey Standard Marine Engine

IS OFFERED FOR SALE

by Messrs. FELL & ATKINSON, of Nelson, Solicitors to the Executors. The Price is Five Hundred and Seventy-Five Pounds

£575

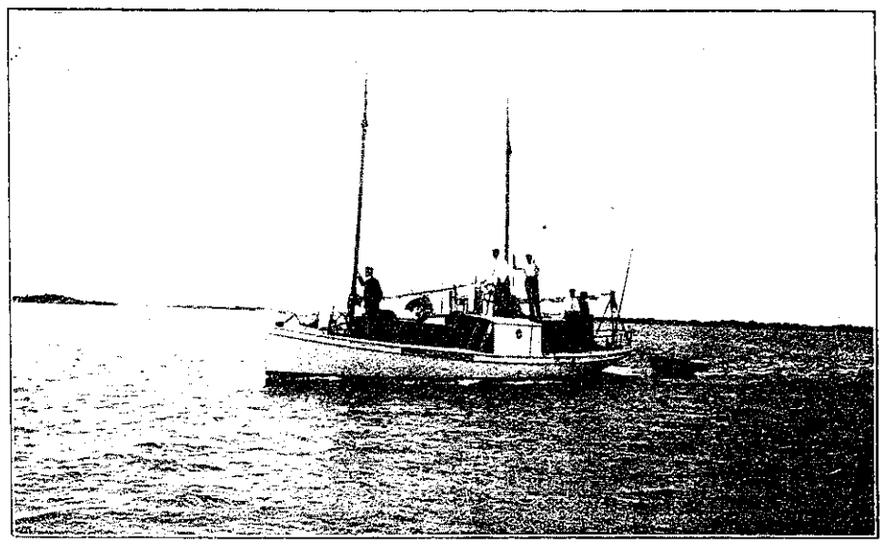
delivered at Motueka, near Nelson

Extract from the Register of the Royal New Zealand Yacht Squadron

Tons, Customs and Thames	Length B.P.	Beam	Depth	Builders and Designers	Where Built	L.O.A.	Draft
15½	42' 0"	9' 0"	5' 0"	Logan Bros.	Auckland, 1897	45' 0"	5' 6"

Description

The "Ngaru" was built and designed by Logan Brothers, who are probably the best yacht builders in the Southern Hemisphere, and no expense was spared in her construction to make her thoroughly staunch and seaworthy, while due regard was had for designing at the same time a beautiful and easily driven vessel. The hull is built with diagonal and fore and aft skins of heart of kauri. The stringers, of which there are an ample number, and the decking and deck beams, are of the same faithful timber, which, given ordinary care, will be in as good condition in thirty years as it is now. The stem is from a natural grown crook of Pohutukawa, and grown crooks have been fitted at every point where strength is needed and consistent with the best naval practice. "Ngaru" is copper fastened throughout, and is perfectly sound and tight. She has numerous cruises to her credit, since she came down from Auckland shortly after she was built, and everyone who has cruised in her in heavy weather is enthusiastic as to her seagoing abilities, while her ample deck space and commodious cabins make her an ideal vessel for entertaining a party in fine weather.



The name of her engine, Jersey Standard, stands for all that is best in high-grade heavy duty marine engines. The Jersey is about the highest priced American marine engine, and has shown itself to be the most enduring. Last year, Berneyo won the 1100 mile Philadelphia to Habana Race with a 25 h.p. Elmo II., with a 12 h.p. won the New York to Marblehead, New York-Block Island and New York-Albany Races, and to come nearer home Glengarry, with a 12 h.p., won the Sydney to Newcastle Race. Higher testimonials than these for speed, reliability and service cannot be shown for any make of engine, and "Ngaru's" is one of these famous machines. It is only a little over two years old, and has had the very best of care and attention, as the late Mr. Thorp was a skilled and careful engineer.

The test card shows 21 horse power developed at 300 revolutions. At a pinch the revolutions could quite safely be speeded up to 350, with an approximate increase of power to 25 h.p.

"Ngaru's" exact speed cannot be given, as she has never been hard pressed, but it would be somewhere in the neighbourhood of 10 knots under full power and sail.

She is very powerful on the end of a towline, and has towed a hundred foot schooner of about 200 tons nearly seven statute miles per hour in smooth water.

The inventory is most complete, and has always been well maintained. It comprises: 8-foot dinghy, oars and rowlocks, 3 anchors and chain cables, and warps, foresail, mainsail and mizzen, running and standing gear, windlass and steering gear, and all the other accessories above and below decks usually found in a boat of this class. There are two comfortable cabins, separate from the engine-room, which is situated below the bridge deck.

The man at the wheel up on the bridge has an uninterrupted view all round the horizon, and is above any heavy seas which may be shipped in bad weather, at the same time having the engine under his control.

Her draught is now probably slightly less than that shown in the Register, as Mr. Thorp made some alteration in her trim.

While she is suited to almost any kind of service where extreme light draft is not essential, "Ngaru" is particularly well suited for Cook's Strait and cruising in the Sounds. Her powerful engine would drive her with the greatest ease against the strongest tides experienced in this locality.

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