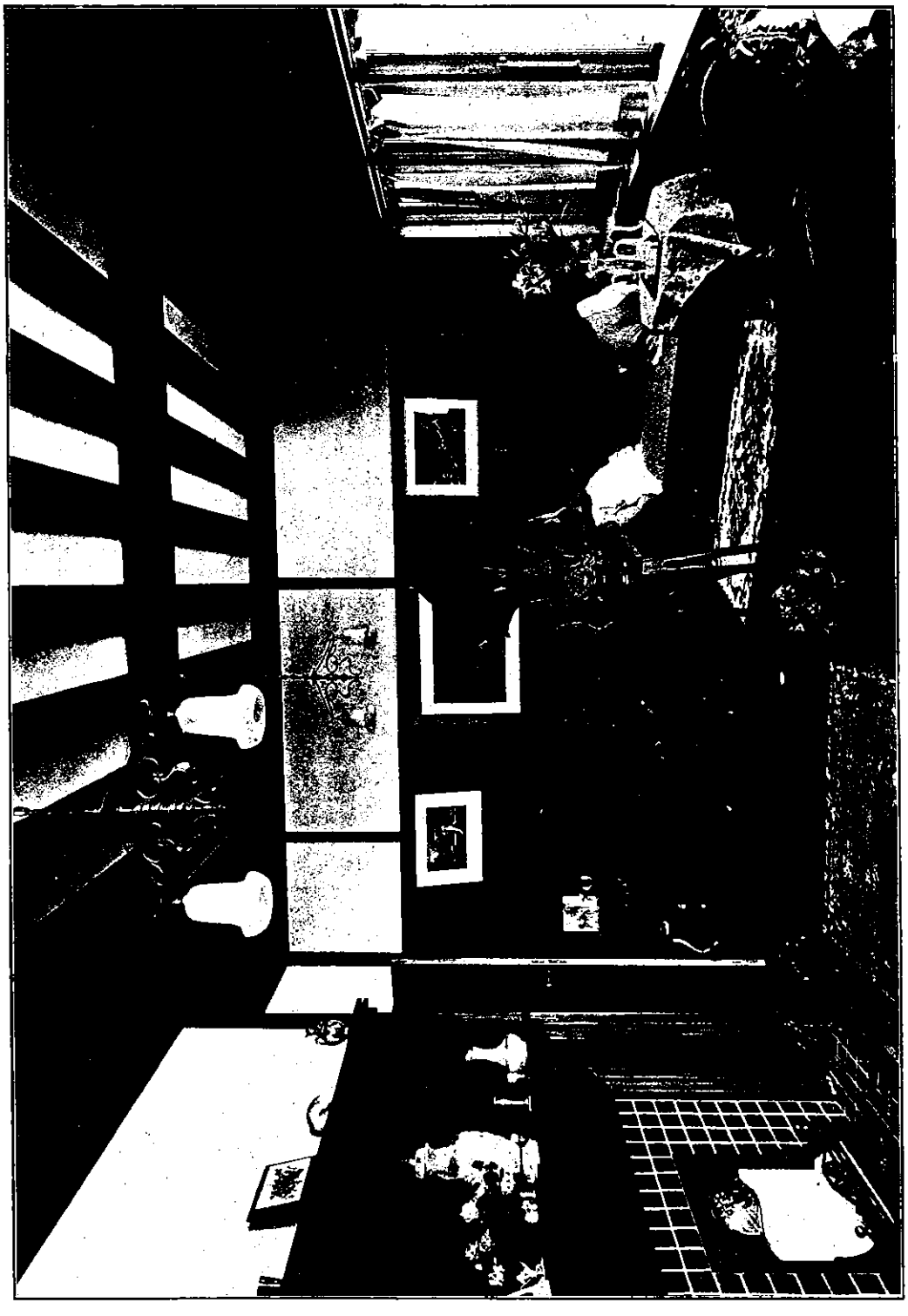


Owner: Mr. F. Evans, LYALL BAY

WALLS AND CEILINGS LINED WITH "POILITE" SHEETS

Architect: C. Mitchell
Builder: R. Ockenden

N.Z. BUILDING PROGRESS.

DIRECTORY

OF SUPPLIERS OF MATERIALS, &c., &c.

We frequently get enquiries from Architects, Builders, Engineers, &c., asking for names and addresses of suppliers of specialities connected with the various trades. Suppliers frequently assume that because they send out a printed circular or make a call now and then on users, that they have done all that is necessary to "keep the users' memory green." This is quite a mistake. The User must have **instant and ready means of reference** to some reliable source of information that he sees regularly.

This is why we have started this **"Directory"** to which hundreds of our clients refer almost daily. If you are a regular advertiser with us, your name goes into the Directory **free of charge.** If not, write us for terms which are nominal.

Architectural Works—

"Progress" Publishing Dept., 10 Willis Street

Baths—

Hargreaves, Jas., Auckland

Bricks—

Glenmore Brick Yards, Hillsborough, Christchurch

Building Stone—

Wilson, J. & A., Ltd., Buckle Street, Wellington

Buying Agents (English)—

Wm. Wilson & Sons, Abchurch Lane, London, E.C

Cement Pipes—

Cement Pipe Co., Masterton

Cement—

Craig, J. J., Ltd., 100 Queen Street, Auckland
Golden Bay Cement Coy., Nathans' Buildings, Wellington
Reese Bros., Christchurch.
Choate, W. A., Farish Street, Wellington
Milburn Lime and Cement Co., Ltd.

Coal Gas—

Christchurch Gas Coal and Coke Coy., Worcester Street

Concrete Paint—

Holmes, Francis, Woodward Street, Wellington; Lichfield Street, Christchurch

Directory—

H. J. Clark, 46 Morgan St., Petersham, Sydney, Australia

Fire Bricks—

Tyneside Proprietary, Ltd. Customhouse Quay, Wellington

Hotels—

McCarthy's Family Hotel, Taupo Quay, Wanganui

Illustration Blocks—

Nicklin, Chas. J., Cuba Street, Wellington

Incandescent Lighting Plants—

"Wizard" Lighting, Cuddon & Jameson, Manchester Street, Christchurch
W. G. Wilson, Stuart Street and Octagon Dunedin

Leadlights—

Bradley Bros., 782 Columbo Street, Christchurch

Marine Engines—

Bailey, Chas., Junr., Freeman's Bay, Auckland

Metal Ceilings—

Wilson & Shaw, Victoria Street, Wellington

Mirrors—

The Auckland Glass Coy. Ltd., 112 Hobson Street

Patent Agents—

Baldwin & Rayward, Auckland, Wellington, Christchurch and Dunedin

Photographers—

Bartlett, W. H., 10 Willis Street, Wellington, and Queen Street, Auckland

Plaster and Cement—

Carson, A. A., 30 Hunter Street, Wellington

Roofing Tiles and Slates—

Brisene and Co., Ltd., Auckland, Wellington, Christchurch, Dunedin and Invercargill
Chambers, John & Son, Ltd., Auckland, Wellington, Gisborne, Christchurch and Dunedin
Gaulter, Aubrey & Co., Featherston Street, Wellington
Lorimer, James and Co., Christchurch.
Redpath and Sons, Ltd., Christchurch, Wellington, Auckland

Timber Merchants—

Leyland O'Brien, & Coy., Auckland

N.Z. BUILDING PROGRESS

Published Monthly by the Proprietors, Harry H. Tombs Ltd.

8 Farish Street ——— Wellington, New Zealand

TELEPHONE 1651 P.O. BOX 481.

Annual Subscriptions:—To any address 7/6 post free. Note: 1/- will be allowed on this account if paid in advance.

Remittances should be made by Post Office or Money Order. All cheques, plus exchange, to be made payable to Harry H. Tombs Ltd., and sent direct to P.O. Box 481, Wellington.

All communications to be addressed to "The Proprietors, 'Progress,' Box 481, Wellington."

Advertising Rates will be sent on application. The value of "Progress" as an advertising medium is rapidly becoming recognized by advertisers. Circulation considered it is the cheapest advertising medium of its kind in the Dominion.

To Our Advertisers—All copy for advertising matter must be in our hands by the 1st of the month preceding publication, otherwise no responsibility with regard to insertion will be undertaken.

The Editor will at all times be glad to receive Illustrated Articles on subjects of interest for consideration, provided the articles are short and to the point, and the facts authentic.

Should subscribers continue to receive copies of this journal after expiry of current year, it will be accepted as an intimation that they are desirous of subscribing for a further period of twelve months.

In case of change of address, or irregularity of this paper's delivery, subscribers should send immediate notice.

Publisher's Announcements.

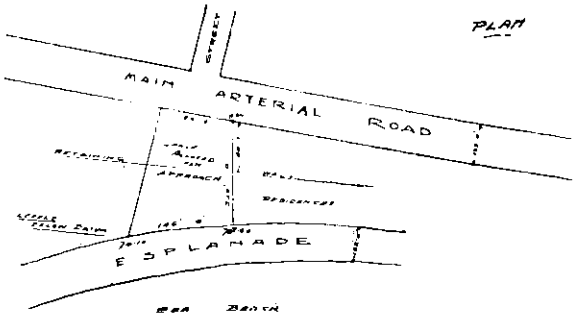
Our 53rd Competition

We offer a prize of £1 1s. 0d. for the design adjudged the best for an

Improvement Scheme for a Seaside Town

in accordance with the following conditions:—

The levels of the Main arterial road and the esplanade are shewn on the plan: It is suggested that the space allotted to the approach be laid out as a public reserve with easy approach to esplanade. It is left entirely to the competitor whether the approach is by means of steps or an incline, or a combination of the foregoing; it is not suggested that the approach be for vehicular traffic.



Drawings to be executed in black and white or monochrome, and to comprise lay-out plan, section, and elevation of Esplanade. Scale 1/16-in. Birds-eye view is optional.

Messrs Chilwell and Trevithick of Auckland have kindly set this subject.

Designs must be sent in, finished as above, under a nom-de-plume, addressed to **Progress**, 8 Farish Street, Wellington, and marked clearly "Fifty-third Prize Competition" on outside with a covering letter giving competitor's name, and address of employer. Designs to be sent in by May 21st, 1917.

Our 54th Competition

We offer a prize of £1 1s. 0d. for the design adjudged to be the best for

A Soldier's Club

in accordance with the following conditions: -It is to be erected on the Domain of a prosperous Provincial town. Cost notan item of importance. General accomodation to be as follows:—General lounge hall about 1000 super feet, billiard room reading and writing room, cafe and board room each about 600 super feet. Ample sanitary conveniences including bath rooms etc., for men. Caretaker's rooms (4) kitchen of same being situated so as to be convenient to cafe.

The building to be constructed generally of fire-resisting materials. Good lighting and ventilation and heating to be carefully considered. The style of architecture to be Neo-Greek. Drawings to be to scale of 1/8-ins to one foot. Sufficient plans, elevations and sections to explain the design. Detail of front entrance to ¾-in scale. Drawings to be indian ink and monotint shading. Perspective optional.

Messrs Vautier & Anderson, Architects, of Hamilton, have kindly set this subject.

Designs must be sent in, in black and white under a nom-de-plume, addressed to **Progress,** 8 Farish Street, Wellington, and marked clearly "Fifty-fofirth Prize Competition" on outside with a covering letter giving competitor's name, and address of employer. Designs to be sent in by June 21st, 1917.

Our 55th Competition

We offer a prize of £1 1s. 0d. for the design adjudged to be the best for a

Pavilion Club

in accordance with the following conditions;—The site is level. Aspect:—North-East. Materials:—Wooden frame covered with weather-boards, or rough-cast. Brick base. Roof, tiles or slates. Accommodation allowed for 50 members. The following rooms, etc., are required:—A room each for men and women with lockers, showers, and lavatories. Small tool room, scullery, a large open room, and verandah. Drawings to consist of plans, four elevations, and section. All drawings to be 1/8-in. scale, finished in black and white, and all on one sheet of paper.

Mr. Gerald E. Jones, Lic., R.I.B.A., of Auckland has kindly set this subject.

Designs must be sent in finished as above, under a nom-de-plume, addressed to **Progress,** 8 Farish Street, Wellington, and marked clearly "Fifty-fifth Prize Competition" on outside with a covering letter giving competitor's name, and address of employer. Designs to be sent in by July 21st, 1917.

Conditions of "Progress" Competitions

The Editor reserves the right of publishing any or all the designs submitted, and while every care will be taken of drawings, no responsibility is accepted should any loss or damage be sustained. Those desiring their designs returned must send postage to cover cost of same. No award will be made unless at least three designs are sent in for any one competition. Unless otherwise stated drawings are to be in black and white only.

Vol. XII. No. 7. Monthly

REGISTERED AS A NEWSPAPER

N.Z. BUILDING PROGRESS

(With which is incorporated "The Scientific New Zealander")

A Journal for Progressive men interested in the development of New Zealand's Architecture, Building, Engineering and Industries

Editor: Chas. E. Wheeler.

Incorporating the Journal of the New Zealand Institute of Architects.

PRICE 6d. per Copy; 7s. 6d. per annum post free. (Note: 1s. Discount allowed if paid in advance).

WELLINGTON, AUCKLAND, CHRISTCHURCH, AND DUNEDIN, NEW ZEALAND, MARCH, 1917.

Contents for March

Editorial Comment

Chair of Architecture

We have made excellent strides in the elevation of the profession of architecture in New Zealand, and the impetus given to this excellent movement by the Architects Institute Act has not by any means lost its strength. Auckland's well-managed School of Art is shortly to have allied with it a special school of architecture, which will be recognised by the University Senate. Two lecturers have been appointed one for architectural, the other for mechanical instruction. At the last meeting of the Auckland University Council, Professor Seager mentioned that the Senate had urged the necessity of the school being carried on with immediately, otherwise there was a possibility of Canterbury getting in on Auckland on the proposal. He thought there should be no delay, or the chance would be lost. Several members made some comment upon the wisdom of proceeding with the setting up of the school now, but Professor Seager's latest remarks on the subject had the effect of creating a more optimistic and hopeful attitude towards the project amongst these members. It was mentioned that the Architect's Institute had suggested salaries of £200 and £100 respectively for lecturers, and this had been approved by the Architecture Committee. It was resolved to refer the matter to the Architecture Committee with power to act.

What New South Wales has Done

A chair of architecture has already been established the Sydney University, and is endowed to the extent of £2000 annually. This is unique in the way of endowments. Law, medicine and the other endowed professions are supported from a general approbation. A special sum has been passed for architecture. The question has arisen as to the appointment of a professor. A temporary appointment is favoured in some quarters. It is maintained that the field will not be clear for the selection

of a suitable professor until the end of the war. The Senate, however, believes that the man must make the position; and he should be there from the outset. We have pleasure in giving particulars in our news columns of the course which is proposed in connection with the Sydney project. It is believed that the £2000 endowment will suffice for all expenses, as the estimated cost of the establishment of a Professional Chair of Architecture is:—one professor, £1100 per annum; one assistant, £250 per annum; apparatus £650 per annum. Total, £2000 per year.

Competition for Public Buildings

The time is opportune to revive the agitation in favour of throwing open for public competition all plans for Government buildings costing say £5000 or over. Police stations and secondary post offices in New Zealand appear to be planned on standard lines, which at any rate makes for economy, though the perpetration of those hideously-coloured post offices throughout the country—"blood and bile" effects, a caustic critic has dubbed them—should be vetoed firmly. Concrete work will never deceive the observer into thinking it is brick by the amateurish device of dabbing it with red stain, so the Public Works Department should adopt a colour scheme which is less of a sham, and not so bizarre. As in the chair of architecture, Australia appears to have got ahead of us in this respect. The Federal Government having agreed to submit to public competition the design of buildings costing £20,000 and over, the Sydney City Council has adopted a similar policy, even agreeing to the author of the premiated design carrying out the work. With these worthy examples of an enlightened official opinion, it is hoped that the policy of public competitions will become general. Our public buildings should be products of the best brains available, and they cannot be while their design is restricted to departmental limits. There are very capable men in the various departments; but their particular worth does not affect the principle of public competitions.

Common-sense Scientists

We have been disposed to ridicule the inadequacy of the grant for scientific research approved by Parliament, and £250 certainly seems to bear an amusingly small proportion to the magnitude of the business. However New Zealand scientists have faced the position in so common-sense a manner that we shall see results for the money, and Parliament when it next meets, ought to be impressed with the utility of such grants. A good deal of experimental work has been done voluntarily before the £250 came into the question. Part of this money has been used up to pay the out of pocket expenses of those who had been willing to sacrifice their money as well as their brains to the somewhat unfashionable hobby of research. So some results which the man in the street can appreciate are already in evidence. We have been in touch with a few leading spirits in the movement, and they do not share our disappointment at the smallness of the initial grant. Scientific research in New Zealand, they say, has not been organised yet on expansive lines, so that the giving of a grant of thousands might have led to the buying of extravagant equipment and the adoption of showy, but ill-considered schemes. They prefer to "make haste slowly," and we are thankful to find this business-like spirit prevailing amongst them. In England, there is in existence what is known as the Conjoint Body of Scientific Societies. Lord Crewe, who is president of the Committee of the Privy Council on Scientific and Industrial Research, recently received a deputation from the new organisation which is intended to promote co-operation between those engaged in pure science, and those occupied in the industrial applications of science.

Close Co-operation with the Factory

The points made by the deputation have a good deal of bearing on the New Zealand situation. For instance, Sir Joseph Thomson, F.R.S., strongly urged one of our own imperative needs, the proper equipment of experimental laboritories in the universities, and the adequate payment of those engaged in experimental work. This vital need has certainly not been recognised here, where experimental work has been done, either at the expense of the "bread-and-butter" activities of the scientist, or the neglect of his important class work. Lord Crewe, in the course of his reply, referred to the necessity of drawing some portion of the funds for research from those who directly benefit -the manufacturers in England, and the farmers principally, in our case. He mentioned that the Chancellor of the Exchequer, who took a big interest in the subject, proposed to advise the Government to make an exception in this matter, and to devote a very large sum generally estimated to meet the needs in view for the period of the next five years, on a scale which would enable the expenditure to be four or five times as much as had been already spent for the whole purpose of research hitherto. In order, however, to bring about adequate co-operation between the Government and private firms in this matter, the Government desired to see either the creation of new, or the adoption of existing, trade association on a large scale, which would be able to assist the provision which any particular industry would be able to make towards this systematic research. Some of these associations, it was hoped, would be specially formed for the purpose, whilst in other cases where great commercial associations for particular industries already existed, a branch of the association might eiasly be appointed specially devoted to the subject. In the case of the engineering industries, where there were a great variety of applications, it would probably be found possible to form a series of distinct associations for research purposes, and in that case an individual firm having various activities could select the association to which it would contribute in respect of any particular class of research at any given time. Thus it will be seen that English leaders are wide awake to that importance of the subject. Never again will we let the alien profit by our brains, because he has had the capacity for industriously turning to account the results of laboratory experiment. An acute American observer admits that the Old Country is wide awake. Its slothfulness has been shed, and allied to the typically British thoroughness he finds a new spirit of American push and adaptiveness which will put a keen edge on the future operations of British manufacturers.

According to a neutral who was, up to quite recently in Germany, the Germans are even now making all sorts of goods (when their plants are not too busy making military equipment,) for dumping on to neutral markets as soon as peace is declared, and it is to be hoped that England will see to it that some form of reference is extended to our Allies to prevent this taking place.

The Quality of Fitness in Architecture.

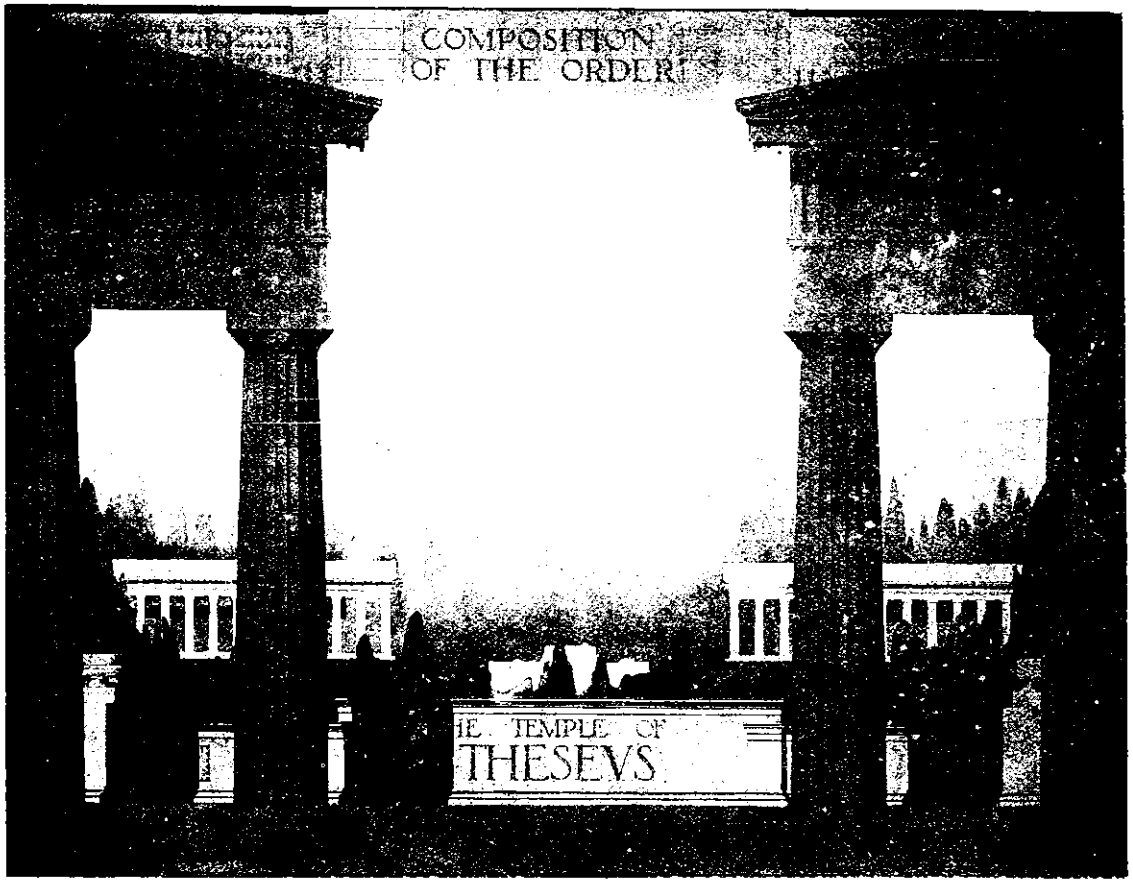
By J. F. WARD.

This Essay won our Fiftieth Prize Competition set by Mr. Basil Hooper, of Dunedin, whose Criticism appears on another page of this issue.

In analysing works of Architecture, with a view of distinguishing between the gold and the dross it is necessary to first place the whole subject under several broad headings. Thus one appreciates Architectural works from the standpoint of their beauty, usefulness, strength, repose and such-like qualities. To pass the test or standard, an Architectural creation should possess amongst other qualities, that of fitness. The quality of fitness in Architecture may be best described as being "the right thing in the right place." To satisfy this requirement it is not sufficient for a building to be beautiful in form and design, and structurally sound. The design and construction of the work must also be in keeping with the purposes to which the building is to be placed; the decorative details must also be appropriate to the materials used; and the complete building be in harmony with its natural surroundings and local tradition. Briefly, to fulfil the quality of fitness a work of Architecture should be true to its purpose, materials of construction and locality.

Dealing first with the functions of a building, it is not only necessary that the structure *be* actually suitable; it must also have the *appearance* of being so. For instance a wooden bank building, with a properly constructed strong-room, is quite a safe place in which to deposit valuables; but a bank with brick or stone exterior would appear to offer more security. Accordingly most of our bank buildings are designed with a heavy classical "motif"—not in the style of say a tea-kiosk.

A fine example of this sense of fitness was old Newgate Prison, expressing severity and justice in every great block of which it was built. Dance, the architect, might have designed, in the style of a Florentine palace, a building—quite strong enough to hold any number of criminals—but which for all its elegance, would not have satisfied the eye as to its fitness for the task. Restraint characterised the whole building; its simple mouldings, lack of ornament, severely designed openings and general sombre appearance—all combined to give one the impression of its fitness as a prison.

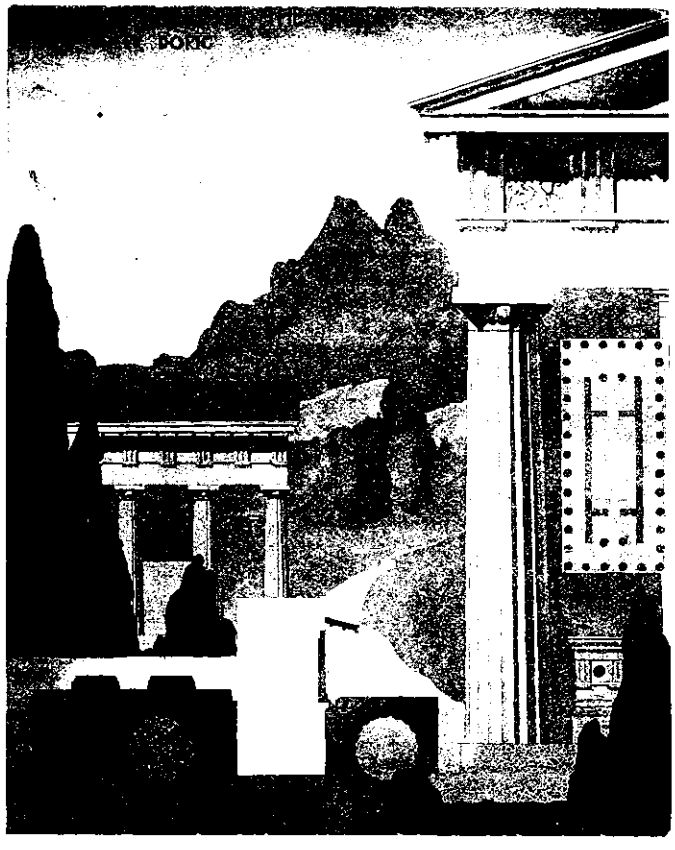


¹Auckland Students' Association.—Design by H. Hyland. (First Mention). Subject: "A Composition of the Greek Doric Order.

Bearing in mind the function of a monumental building where beauty and grandeur are the prime considerations, our sense of fitness is not disturbed when we observe practical convenience sacrificed to appearance. On the other hand, in a commercial structure, such a subordination of utility to appearance would offend, because in this latter building the function is that of use. When it is considered that the home is the life-long shelter of the family, the pranks of design committed by architects of the eighteenth century cannot be tolerated. With them, convenience and homeliness gave way to effect and symmetry; bedrooms went windowless so as to fit in with the grand fenestration schemes of the front, and to obtain symmetry of masses, kitchens were separated by the length of the house from the dining rooms. In endeavouring to impart a monumental character to homes, they failed to bear in mind the whole fitness of purpose in domestic Architecture.

Coming now to the second requirement in judging Architecture from the standpoint of fitness, one is impressed with the great influence exerted by the nature of the setting. How perfectly, for instance, does the rambling country house nestle into the expanse of surrounding country! In the town, where every inch counts, its rambling restful appearance is not suitable to the busy confined space. On the other hand it cannot be denied that many of London's mansions, designed in keeping with their narrow frontages, are gems of Architecture. But the question of site is so important that, placed in a rural setting, these flats would appear altogether stiff and cramped and totally unsuited to the surroundings.

Going further afield we find latitude and climate considerable factors in deciding the quality of fitness. It is hard to imagine that the broad simple designs of the Greeks could have evolved in Northern Europe, where the temperate sun would never have modelled them. The Parthenon seen on an average English day could never seem that same Parthenon which originated in sunny Greece. Bearing this in mind, we might have a partial explanation of the cold and cheerless appearance of many of London's classic buildings. It would be hard to realise how say Salis-



Auckland Students' Association.—Design by N. Garlick. (First Mention).
Subject: "A Composition of the Greek Doric Order."

bury Cathedral could have arisen in Greece where the powerful sunlight would reduce the intricate Gothic detail to a meaningless jumble of dark and harsh shadows. Even the beautiful Greek mouldings were found rather unsuitable to the low-altitude rays of the northern sun, which did not give a sufficient shadow to model the flat refined curves. And so in Gothic detail we find deep undercut moulds so suitable to the casting of deep shadows.

In bygone days owing to lack of transport and intercourse, local building materials had perforce to be used. As a result types of buildings became indigenous to their districts. This explains half the charm and sense of fitness in England's rural

domestic Architecture. In Somersetshire where stone abounds, one finds stone walls and roofs; in Hampshire a combination of brick and timber with tiled roofs; while in wooded Herefordshire, timber framing with wattle-dab filling is the prevailing material. Now in days of increased facility of manufacture and transport, it is often cheaper to build with imported materials. Remembering that local materials are more fitting to the site, it becomes increasingly difficult to choose from these foreign materials, just those that will not clash with the natural surroundings of the site.

Among the considerations of fitness that influence the use of building materials are the texture, grain, naturalstrength and origin of the particular material and the tools used to fashion it. Some materials seem naturally fitted for certain positions. The half-timbered stories of an Elizabethan manor seem to sit quite naturally on the lower storey of brick. Brick having the greater compressive strength is appropriately employed to support the lighter construction of wood and plaster. Then among varieties of stone granite to the eye excels as a base for softer stones or brick. Why? Because we know and see that the characteristic qualities of granite are great compressive strength and durability. Knowing the hardness and coarseness of grain of granite we do not look for delicate carvings and mouldings—rather for a bold treatment. On the other hand we have in marble, a stone which is fine in texture, takes a high polish and is appropriate to fine carving. But there are marbles and marbles. Thus one is satisfied to see a large plain surface of figured marble which if carved as white marble frequently is, would lose half its splendour, beautiful as the carving may be.

Colour and texture play a by no means insignificant part in deciding the appropriateness of building materials in certain places. Coarse surfaced and roughly treated materials seem fitted to act as foundation to the lighter and finer grained varieties. How beautifully is this principle applied in the facade of the Palazzo Reeardi, Florence! On the ground floor are great quarry-faced stones with deeply recessed channelled joints, which support a storey of smaller dressed blocks and less pronounced channels, on top of which rest still smaller stones with fine joints. Thus the wall treatment satisfies the requirements of fitness, which demands that where compression is greatest the texture shall indicate the material with greatest compressive strength. Though quite capable of forming the base, how incongruous it would appear to us, to see the finely worked ashlar as the foundation of the great hewn blocks of granite

Considering the use of colour in Architecture we should take a lesson from nature In nature the vivid tints are not too prominent, but are confined to small patches which nestle amongst large quantities of more restful and sombre hues. To obtain successful and appropriate colour schemes it should first be decided whether the general effect is to be light or dark, and then accordingly the smaller colours should be grouped about the points of interest and importance. What could be more interesting and fitting than the white stone entrance and white window sashes of a building with wall expanses of brick; or say the red brick capping of a white stuccoed chimney. Although a brick chimney may be admired of itself, placed in a roof of brick coloured tiles, it loses its charm. The colour scheme should also be in keeping with the purpose of the structure. For while it is proper to employ strong and lively colours on a place of amusement, such gaiety would seem strange and out of place on a church, prison, or monumental building.

One of the commonest violations against the quality of fitness is that of imitating in a material, the characteristic decorations of another material. Even the great Grinling Gibbons carved stone in imitation of forms more suitable to wood. Taken away from the carving of wood, he indulged in deep undercutting, with the result that many of his stone carvings break away and have to be renewed. How often is wrought-iron work copied in cast iron! A founder seeing a beautiful wrought-iron gate, endeavours to imitate it in cast iron, and fails to produce a thing of beauty or utility. The long attenuated forms of the wrought iron are unsuitable to cast iron, which has not the tensile strength of the former. This does not mean that cast-ironwork may not be just as beautiful and useful as wrought iron productions. Designed with a knowledge of its deficiencies, many a cast iron gate or railing is to be seen, which could not be surpassed by any wrought iron creation.

The quality of fitness is not transgressed when plaster or stucco is used to cover materials, structurally strong enough, but inferior in appearance. When however we mark off stucco in imitation of courses of stone, we are imitating another material, and using cement in a manner unfitted to its nature. Again while there is nothing to be said against the use of corrugated iron as a roof covering, it is wrong to manufacture tin in the form of tiles or slates. Then iron is often made into sheets, stamped and painted to imitate a plastered ceiling. In this case one material is making a poor pretence at being another material, when it is unsuitable to the use and moulding of the original - and the artifice is revealed when the paint wears off.

Another violation of the quality of fitness is the placing, in our commercial buildings, of whole facades of brick and stone, apparently on a foundation of plate glass. Anyone knows that no glass could be made which would bear this weight, but even the fact that the concealed steel columns do the work, does not remove the sense of unfitness. A recent instance occurred in a local draper's shop, where the steel columns were actually encased on all four sides with glass mirrors.

A striking lack of fitness has been displayed in our domestic Architecture, which up till recent years, has consisted of attempts to embody on a small scale the "features" of the English Georgian style. Amongst the legacies left by that ponderous style, were the paper-marble dados which appeared almost genuine until they peeled off! Then there were the imitation plaster cornices, in cardboard, and externally such atrocities as wooden quoinstones, battlemented parapets, etc. All sense of fitness seemed to have been lost. Our houses were no longer homes, but museums. In keeping with this struggle after the ostentatious, every little villa (no matter how

small) had its useless drawing room, more useless reception hall and so on, through the whole category.

Having once perceived that there was a sense of fitness about simplicity and repose in domestic Architecture, we have thrown most shams overboard, and are now content to build homes, not exhibitions —of what we have or have not. Following in the wake of this revulsion, has come the simple cottage and bungalow design, the plain but good mission furniture, with its natural wood finish; more money is being spent on the kitchen and less on the front elevation, so that our houses no longer merit the title of "Queen Anne fronts and Mary Ann backs." This new conception of domestic Architecture, with all its faults, is thoroughly in keeping with the repose and simple dignity of home life.

In the development of a truer sense of fitness in modern Architecture there awaits a great problem. Until our architects are given a more thorough training in the right use of materials, and a little less time on the "orders," one may not look for much improvement. All the great advances made in machinery, cheapness of transport and production of new materials cannot be ignored. To keep in touch with them, Architects must adapt themselves to new conditions, and the general fitness of modern work. For a sense of fitness in Architecture can only be developed on a basis of a real knowledge of modern materials and methods, their uses and deficiencies.

Encroachment of Land.

Judgment was given by the Chief Justice, Sir Robert Stout, at the Supreme Court Auckland, last month, in the case in which a claim was made for damages and compensation for encroachment on land by the erection of a building in King street, Pukekohe, says the "Herald." The plaintiff was Robert Fulton (Mr. E. J. Prendergast), farmer, of Puni, and the defendants James Roulston and Duncan Roulston (Mr. R. McVeagh), butchers, of Pukekohe.

The plaintiff asserted that his section of land had been either wrongfully, intentionally, or negligently, encroached upon by the defendants when erecting a new concrete building. The encroachment extended for a length of 14-ft. and in width 4-in. or 5-in. at the greatest point, decreasing until the encroachment ceased. He claimed a sum of £7 10s. per annum for the period of the encroachment, £25 alleged damages, and an injunction restraining the defendants from continuing the encroachment. In the alternative the plaintiff claimed, if the injunction could not be granted, a sum of £7 10s. per annum for the period during which the encroachment continued.

His Honor held that the boundary was a straight line from the surveyor's peg in the street to the peg at the back of the property, and that the building had encroached on the plaintiff's land to a very slight extent. Under the powers conferred by the Judicature Act, he fixed the boundaries in the future as running from the two pegs agreed upon by the surveyors, except where the building encroached upon plaintiff's land, in which portion the boundary was to follow the outer wall of the building. The defendants are to remove a down-pipe, which over-runs the plaintiff's land.

His Honor fixed the compensation in respect of the encroachment at £5.

American Timber Imports.

An interesting table has been compiled from latest information showing the amount of American timber imported into this country during the year 1916. It is as follows:—

Auckland imported	22,500 ft.
Napier imported	230,707 ,,
Wellington imported	420,448 ,,
Lyttelton imported	979,675 ,,
Dunedin imported	3,087,231 ,,
New Zealand (unspecified Port)	669,349 ,,
Total ..	5,409,910 ,,

For many years timber millers of the west coast of America have made efforts to form an organisation controlling Oregon, and this has been achieved recently. Latest advices state that the combination includes 94 per cent. of those engaged in the industry.

Fears of a substantial increase in the price to importing countries have now been realised, advances being as much as 6 dollars 50 cents (£1 7s. 1d.) on the f.o.b. price. While immediately prior to the initiation of the combine from 8 dollars 50 cents (£1 15s. 1d.) to 9 dollars 50 cents (£1 19s. 3d.) f.o.b. was asked, July-October shipments are now quoted at 12 dollars (£2 10s.), with 50 cents (or 2s. 1d.) more for October-December shipments, and in some cases 15 dollars £3 2s. 6d.) is wanted. Sydney merchants carry fair stocks, and with cargoes afloat sufficient Oregon will be available for some time to come, especially in existing quiet building conditions.

Supervision of Town Lots.

The need for supervision of the cutting-up of lands in town lots in the neighbourhood of Auckland is being recognized by the local office of the Survey Department. With the object of securing subdivision on such lines as shall make for healthy conditions, steps are being taken to ensure that owners of land in areas outside of boroughs or town districts shall conform to certain regulations. These include frontages to sections of over 40-ft., proper road access and the setting aside in each subdivided estate of a public reserve. The Department has no jurisdiction in cases where the land is situated in boroughs or town districts, and it is regarded as desirable that the authorities in either of the latter should adopt the same policy and insist upon similar provisions for guarding against overcrowding.

Architecture and Building

[Note The Articles appearing on pages 895 to 902 are published by arrangement with the New Zealand Institute of Architects.]

Brickwork—from the Aesthetic point of view, and the lines of its possible development in N.Z.

By C. H. Mitchell, A.R.I.B.A., Wellington

Introduction.

THE object of this article is to suggest lines of probable progress of the future development of brickwork in New Zealand, and as the majority of colonial students either study in England or America I think that the movement towards artistic brick designs will be on similar lines to those of the countries mentioned. The subject seems naturally to arrange itself under the following headings:—

Part I.—A brief historical survey of the older work in the two countries, and

Part II.—An analysis of the factors which tend to satisfactory results in the use of brickwork with examples of present day work taken from both England and America.

Stone is accorded the first place as a building material, and is freely used in localities where it can be economically obtained and prepared. It is in those areas where this does not apply and where good material for making bricks is found, that brickwork will predominate and the art become strongly developed.

In New Zealand building stone becomes expensive if used at any distance from its quarry, and is therefore out of reach of the majority of business people, who decline to go to the expense of using stone when they can obtain a cheaper substitute. This substitute up to the present time has been brick and as a good brick clay is procurable in almost any part of the Dominion bricks are manufactured in nearly all places.

The finished brick possesses very good qualities, and from a constructional point of view is badly in need of a "standardization," as not only does the size of the brick vary for each of the main centres of the Dominion, but the sizes adopted by each of the manufacturers in a town sometimes differ. The difference in sizes of bricks may not be very great, but to obtain a good finished brick effect, one must have suitable materials to work with. Certainly the majority of the city buildings are built in brick, but in most cases the whole is totally spoiled by the use of stucco all over in imitation of stone, or is made to look fussy and disjointed by the indiscriminate tacking on of plaster patches. In some cases a brick building is faced with brickwork, but no attempt is made to work in any design into the plain brick face, which is more often than not spoiled by tuck pointing.

This was the way that brick design was treated until a few years ago, when some more progressive minds introduced diaper pattern design in brick building, and later brickwork was altogether more pleasing and some architects no longer cover their buildings up with stucco, but adopt a brick design.

As a result of this, brickwork now receives more of the attention that it deserves, and some well-designed buildings have been erected, among which is the church at Invercargill, by John T. Mair, A.R.I.B.A., which has some very interesting brick work, as will be seen from the illustration.

Until the present time timber construction has been used for domestic work, but now there is very little difference in cost between brickwork and timber, and within a year or so brickwork may be the cheaper, when it will be the more popular among clients, and will therefore require more study in domestic work by the architect.

Although brick architecture has been adopted here by some, and has advanced during later years, it still requires a lot more study before it is up to the standard of modern work both in England and America.

Part I.—Historical Survey.

ENGLISH BRICKWORK

England has always been noted for excellence in the manufacture and use of brick, and thus the history of English brickwork can be written almost without a break from the building of the Roman wall, which used to surround London in the far distant past, to the late Mr. Bentley's magnificent Westminster Cathedral, or some of the more recent work including that of Mr. Lutyens.

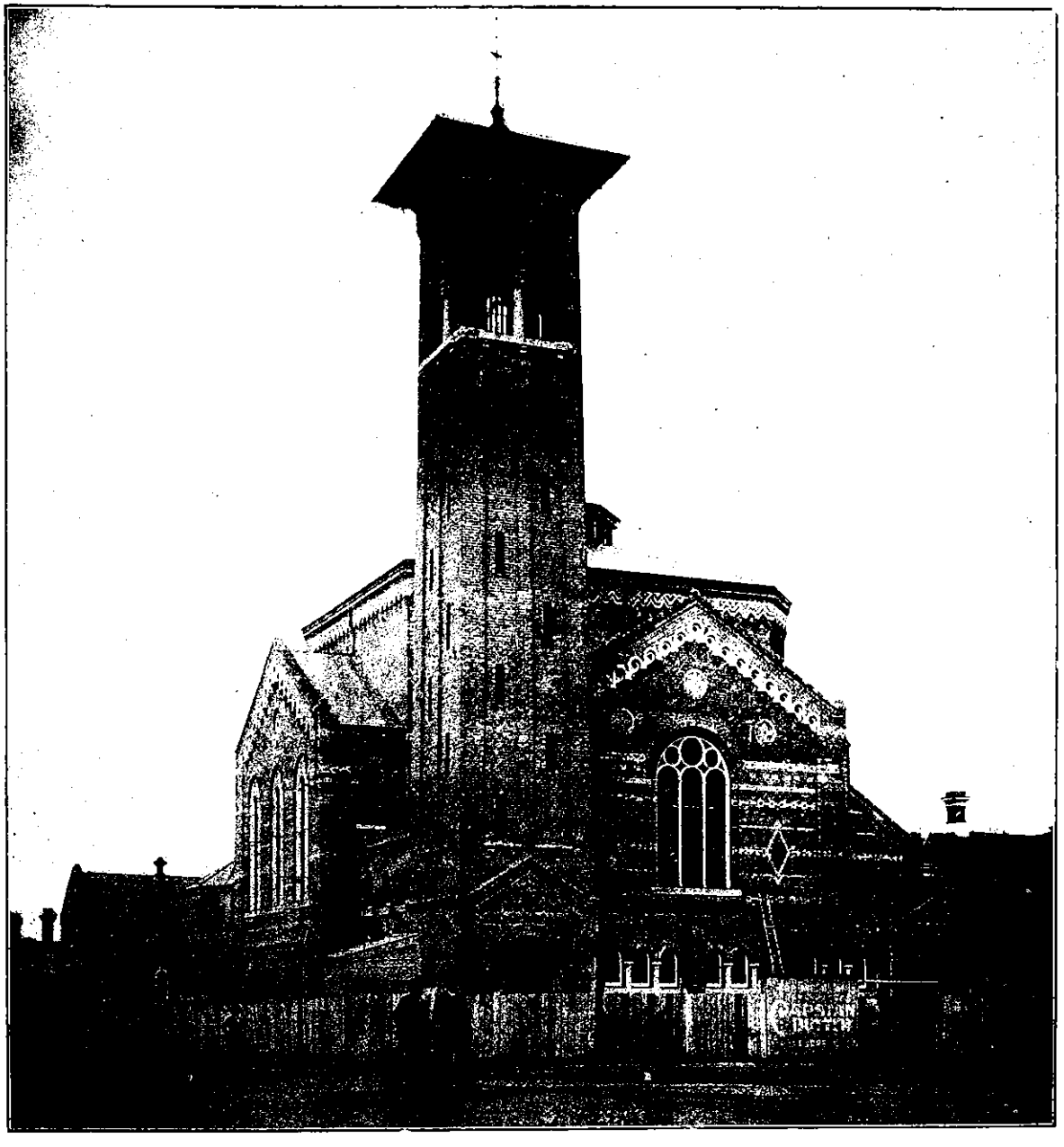
Although English brick architecture never reached that high point of art attained in Italy, it never suffered degeneration, adapting itself to every change in style, and always preserved its admirable qualities.

NOTE

The following survey of English brickwork has been compiled from a prize essay by Mr. H. F. Murrell on "The Development of English Brickwork," which appeared in the Journal of the Architectural Association, London, a few years ago, and an abstract of which was published in the "American Brickbuilder" a few months later.

ROMAN BRICKWORK

The Roman brickmaking and brickbuilding in England was similar to that done all over the Roman Empire. The most important British-Roman brickwork is to be found at Dover in the Pharos Tower, and at St. Mary-in-the-Castle. In the walls of the



Some interesting Brick Work has been introduced by the Architect in this Church, recently erected in Invercargill.

former are the usual bonding courses of flat bricks, some of which have ledges for keying purposes.

SAXON BRICKWORK

The Saxons discontinued brickmaking, but used ready made materials, using sometimes the bricks the Romans made.

The church of Holy Trinity, Colchester, possesses a fine late Saxon tower, showing throughout a consistently intelligent use of Roman bricks adapted to essentially Saxon forms.

NORMAN BRICKWORK

Norman builders, having acquired a developed masonry among the fine French building stones, did not largely adopt brickwork, but, if they were given Roman bricks, as at Colchester, could put them together with far more skill and interest than their Saxon predecessor.

EARLY ENGLISH BRICKWORK

Evidence will not justify the assertion that no bricks were burnt in England from the time of the Roman evacuation in the year 420 A.D. until 1260

A.D., the date of the construction of Little Wenham Hall in Suffolk, but it is certain that brick-making as an industry, and brick-building as an art, did not exist during that period. Shortage in quantity, or inferiority in quality in local building-stone was met by the early English builders, not by the recourse of Roman brick fields, but by the importation of Caen stone from France. It is evident that the first cause of the re-use of brick was the growing scarcity, not only of stone, but of timber, and the constant destruction of timber buildings by fire must also have caused the introduction of a more resisting material. This movement manifested itself first in the Eastern counties.

EARLY TUDOR BRICKWORK

Although the use of brick in church buildings was fragmentary and incidental in housework, its possibilities were grasped, and a style developed which is most typical of English domestic methods. In cottages and smaller houses, brick was early discovered to be a suitable filling for half timber framing, a fine example is "West Stow Hall," Suffolk, where every pattern of brick bonding seems to have been exploited.

Another characteristic of Tudor brickwork is the introduction of diaper patterns, originating in the accidental effects of vitrified headers. Corbelling is also a marked feature of this period, and retained a strong Gothic tradition till well into the sixteenth century, as at Layer Marney, in Essex, and was at its finest in such early work as Rye House, Hertfordshire. Chimneys were also a great feature, and were a comparatively new thought to the early Tudor Architect.

The brick newel stairs of the period also form an interesting study, and the typical stair of Wayneflete's Tower at Esher Place, Surrey, which was built about 1500 A.D., the newel, vault, handrails and treads are brick throughout.

RENAISSANCE BRICKWORK

Geographically, the use of brick during this period was more widespread than during the Tudor. The most characteristic feature of Renaissance brickwork was the flat rubbed brick arch. In brick, as in stone, the Orders formed the great decorative resource of the Renaissance architects. A survey of brickwork of this period is perhaps best studied by analysing the characteristic work of prominent architects than by a general description. For this reason I have selected the following men and will employ their work as examples.

INIGO JONES' BRICKWORK

Inigo Jones, like his master Palladio, was by no means adverse to brick, though using it little in his more important works. West Woodhay Manor House, an apparently authentic design by Inigo Jones, shows an early use of rubbed brick in its window architraves. St. Paul's Church, Covent Garden, London, was probably the first use of brick in Renaissance church building in London.

SIR CHRISTOPHER WREN'S BRICKWORK

Wren's use of brick is characteristic of his natural strength and decision. In church work he evidently preferred stone, employing brick only for constructive utility as in the cone of St. Paul's Cathedral, or for an economical facing as at St. James', Piccadilly, and St. Bennets, Upper Thames Street, London. In domestic work he used brick indiscriminately, considering it to be as suitable for a palace as for a house. He appears to have carefully considered the colour of his brickwork, and for almost the first time introduced yellow stocks.

The quality of Wren's brickwork was as excellent as his design. The Bluecoat School, Westminster, is perhaps the most careful and consistent of his brick building, but some others that are quite as interesting are:—Christ's Hospital, London, (lately demolished), Chelsea Hospital, Kensington Palace and Hampton Court Palace.

The climax of Renaissance brickwork was followed by a decline, hastened by the general introduction of stucco in the late eighteenth century. The revivals of the nineteenth century induced from necessity a renewed vigor of brick practice. Impelled by economic considerations to build in brick the Gothic Revivalists employed that material with architectural enthusiasm for all but their most important works.

Of the brickwork that has been done in England since the Gothic Revival, it is impossible now to give a survey, as apart from the invidiousness of differentiating between the work of recent architects, the survey would require too much space, but an outline of the main factors of an artistic design will be given in the concluding part of this article.

AMERICAN BRICKWORK

Turning now to the subject of brick architecture in the United States, it must be stated that up to some years ago there was nothing worthy of the name, if we except the architecture of the Colonial period, which was in some way an echo of that of the Georgian period in England. In the best of this work the bricks came from England and Holland in the holds of returning vessels, where they served as ballast for the relatively unladen part of the voyage.

America owes a debt to Richardson, who performed useful service in laying his transforming touch upon the brickwork of his day, and since then it has progressed rapidly, and to-day America contains many fine examples of brickwork. The personality of the Americans is clearly shown in the execution of their brick designs, and under a later heading I will endeavour to describe the chief characteristics.

(To be continued.)

"In architecture, the creative power of nature herself is the model imitated. It is an art which appeals directly to the understanding, and has not the means of flattering the senses in the same way as her sister arts: hence her productions are not universally appreciated: in truth, they are rarely understood, except by those whose education and acquirements have qualified them to judge."*Gwilt.*

* * * *

"Repose is based upon quiet strength and an assured position."—*Belcher.*

Recent Developments in the Theory of Ventilation

By CHAS. L. HUBBARD, in the "Architectural Record"

The term, recent, as used above, has a somewhat broader meaning than is usually given to it, as the developments referred to had their beginning some ten or twelve years ago. However, it is only within the past three years or so that a general discussion of the matter has appeared to any extent in the technical journals, and at the present time investigations are still being carried on to reduce these theories to a practical working basis.

It is proposed in the present article to review the matter in a simple manner, giving what seems to be the general opinion of a majority of those who have made a special study of the subject and who should be able to give reliable information to those interested. As these new developments, when finally worked out, are likely to call for more or less change in building construction, as regards the ventilating arrangements, it would seem that the matter should have an especial interest for the architect.

Air has two principal functions: a chemical and a physical; it aerates the blood and absorbs the body heat. In order to perform the first of these it must contain a sufficient amount of oxygen and a minimum of harmful gases. Absorption of bodily heat depends upon the temperature, humidity and motion of the air. If the air of a room is not renewed its oxygen is gradually consumed and it becomes laden with heat and moisture from the bodies of the occupants.

Until within a comparatively short time all efforts toward better ventilation have been directed to chemical improvement instead of physical.

The theory upon which all systems of ventilation were formerly designed was that the percentage of oxygen must be maintained as nearly as possible to correspond with that of outside country air and that the proportion of carbon dioxide, or carbon acid gas, must be kept below a certain maximum. The method employed for obtaining this condition was that of dilution or the supplying of large volumes of fresh air at the room temperature or higher, depending upon the the system of heating employed. Normal outside air contains approximately 21 per cent. of oxygen and from 3 to 5 parts of carbon dioxide in 10,000 parts of air. It has been assumed, arbitrarily, that the carbon dioxide should not be allowed to rise above 10 parts in 10,000, and for the best results 6 to 7 parts have been considered the limit.

The harmful results of an insufficient air supply were supposed to come principally from the poisonous effects of the carbon dioxide coupled with the corresponding diminution of oxygen. Later it was thought the effect of poor ventilation was due, not only to the presence of carbon dioxide, but to certain harmful gasses and organisms which were given off in the process of respiration. As these substances were supposed to exist in a fixed proportion to the carbon dioxide, the latter was still considered to indicate the quality of the air, although in itself it was thought to be less harmful, especially in small quantities.

The common allowance of 30 cubic feet of air per occupant per hour is based on an increase of carbon dioxide from 4 parts in 10,000 of air to slightly less than 7 parts. A maximum of 6 parts in 10,000 calls for a supply of 50 cubic feet per minute under the same conditions. As already stated, the sole object of ventilation was one of dilution, so as to keep the carbon dioxide content and its accompanying products of respiration below a certain percentage. While this has been the accepted theory of the heating engineer and the general public until a comparatively recent date, there has been some doubt among those engaged in laboratory research as to the importance of the chemical purity of the air to the exclusion of its physical characteristics, and it was only with the advent of the air washer that we began to learn of the advantages of air "conditioning."

The perfection of the air washer was the outgrowth of the demand for a filter which would be more effective and more nearly automatic in its action than the older forms of dry filter, which were extremely bulky when made of the proper proportions and required frequent removal for cleaning in order to limit the resistance to air flow. While the primary use of the air washer was for the removal of dust and soot from city air, its field was soon extended to air moistening, cooling, and the removal of some of the products of respiration.

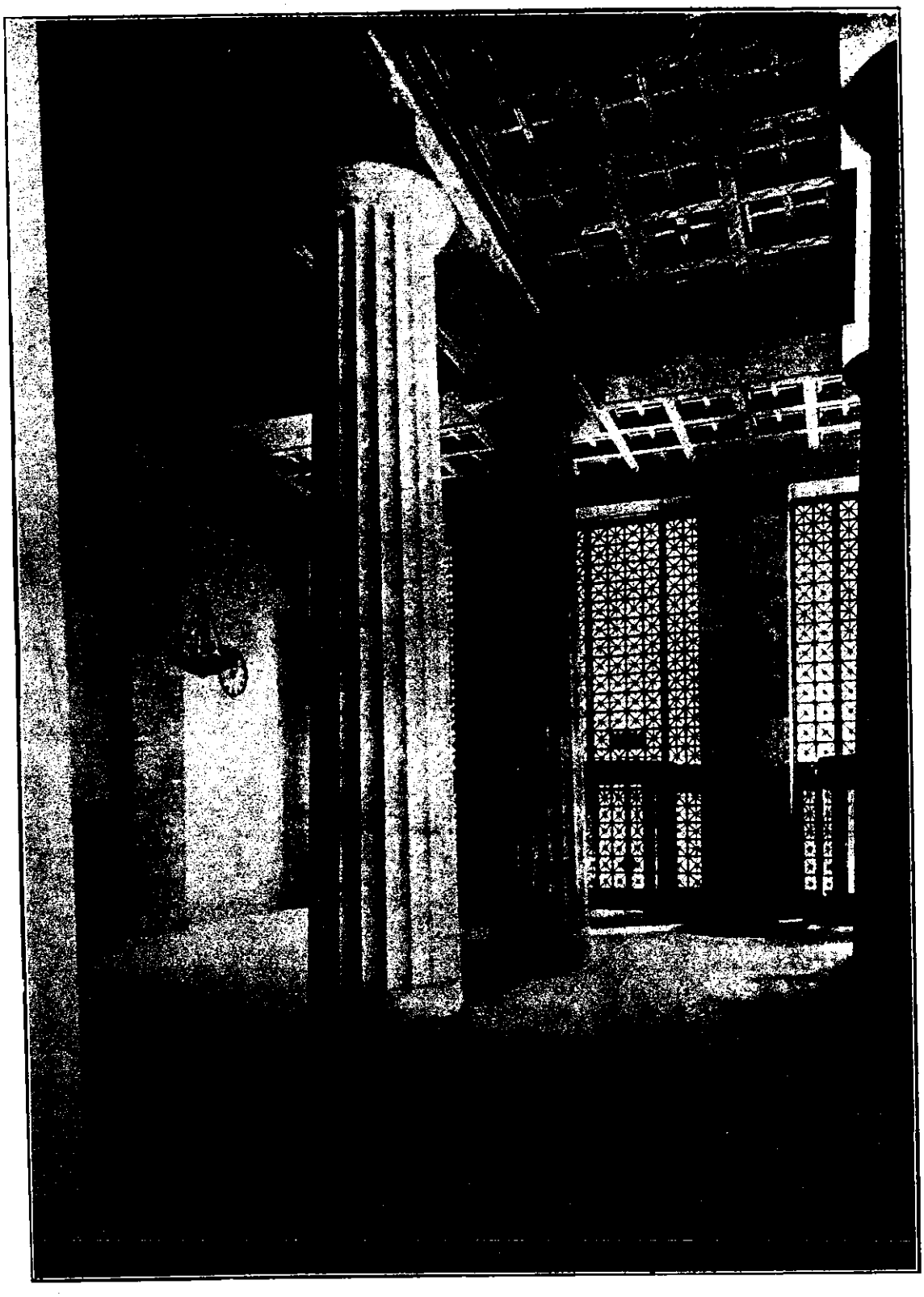
Although most of the ventilating systems at the present time are designed along the same general lines as in the past (with the exception of air washing in large city buildings), the *theory* of ventilation, as accepted by many of the leading authorities at home and abroad, has radically changed, the idea being that the physical characteristics of the air we breathe are of much greater importance than chemical purity.

While there are still some who give considerable importance to the chemical theory, a majority of those who have made an exhaustive study of the matter seem to have discarded the older theory and recommend that future development in the design of ventilating equipment be along the line of improvement in temperature and humidity control and in air movement.

Briefly stated, the chemical composition of the air, as regards contamination through respiration under ordinary conditions, is negligible, as compared with the removal of bodily heat and moisture. It will be interesting at this point, before considering the physical effects of air, to examine briefly into the reasons for this change in theory in regard to the chemical characteristics, as related to bodily health and comfort.

In order to show the relative importance of changes in the percentage of oxygen and carbon dioxide in the air for breathing, it is necessary to have a clear understanding of the process of respiration and the changes which take place in the air within the passages of the respiratory tract. At the beginning, it should be clearly understood that the lungs are never filled with *pure* air, even under the most favourable conditions, because breathing is only a frequently repeated slight dilution of the air remaining in the throat and larger bronchial tubes after expiration.

So far as its chemical composition is concerned, this is air which has passed out of the lungs, and after



Entrance Lobby to Telephone and Telegraph Building, New York.

being mixed with a certain proportion of outside air, during the next breath, is again drawn into the lungs as a mixture which does not even remotely approach chemically pure air. This results in making respiration a continuous instead of an intermittent process, and so provides for a constant supply of oxygen which is necessary to the life of the tissues.

Thus we see that any changes in the proportion of oxygen and carbon dioxide, which are likely to occur in the air of a poorly ventilated room, will have no appreciable effect upon the air within the lungs.

As previously stated, pure outside air contains about 21 per cent. of oxygen, and this hardly ever falls below 20 per cent. in the poorest ventilated room. As the air in the lungs contains but 16 per cent. under normal conditions, it is evident that any changes which may take place in the oxygen content of the surrounding air will have but slight effect internally. Furthermore, the supply of oxygen in the lungs is not dependent upon the outside conditions, but is regulated by the amount of carbon dioxide dissolved in the blood, and this, in turn, acts upon certain nerve centers which control the depth and rate of breathing. If the carbon dioxide falls too low, stimulation of the nerve centers ceases, and the process of respiration does not take place until the proper proportion has again been accumulated. The normal proportion of carbon dioxide in the air of the lungs is about 5 per cent., and is kept at this point automatically by the action of respiration. Under these conditions the only effect of breathing in an excess of this gas with the surrounding air is an unnoticable increase in the action of the lungs through faster and deeper breathing.

Thus we see that the amount of carbon dioxide remaining in the blood depends entirely upon internal conditions rather than external, and is entirely automatic in its action—the rate of ventilation of the lungs being the means by which a proper balance is maintained between the oxygen and carbon dioxide.

It is also evident that our chief safeguard against a want of oxygen by the body tissues is a definite accumulation of carbon dioxide, and this is maintained by rebreathing the "dead-space" air, so called, contained in the throat and larger bronchial tubes.

Besides the necessary reinspiration of the dead-space air, it is also known that one usually takes in again a part of the breath entirely expelled from the body during the preceding expiration. When standing alone in a room a person will rebreathe from 1 to 2 per cent. of the air he has just exhaled. When lying in bed he will rebreathe from 2 to 6 per cent. or more, depending upon his position, and even in the open, if there is a shield to break the wind, a small proportion is taken back with nearly every breath.

While the above seems to prove the fallacy of the older method of reasoning it is interesting to note the results of certain experiments which have been carried out from time to time. Although a large amount of investigation has been done in this direction, space allows the mention of only a few results.

As far back as 1842 Leblanc found that an animal could survive exposure to atmosphere containing 30 per cent. of carbon dioxide, provided the proportion of oxygen was 70 per cent., and recover quickly from the depression produced by this mixture.

Pettenkofer, in 1849, demonstrated that the symptoms produced in crowded places were due neither to an excess of carbon dioxide nor a deficiency of oxygen. He also found that air containing 1 per cent. (100 parts in 10,000) of carbon dioxide could be breathed for hours without discomfort, and laid down the doctrine, accepted by sanitarians, that the percentage of carbon dioxide was only a guide to the other harmful properties contained in the atmosphere.

Later tests in an English brewery, where carbonic acid gas was compressed and bottled, showed the air of the workroom to contain from 0.14 to 0.93 per cent. of this gas (14 to 93 parts in 10,000). Work was carried on continuously in 12-hour shifts, the men having their meals in the room. Some, it is stated, had followed this employment for eighteen years without detriment to health.

Other experiments have shown that the air may contain from 3 to 4 per cent. (300 to 400 parts in 10,000) of carbon dioxide before increased respiration will be noticed by an individual at rest, but percentages over 1 per cent. (100 parts in 10,000) diminish the power to do muscular work.

The widespread belief in the presence of organic poisons in the expired air is mainly based on the statements of Brown-Séquard and D'Arsonval, and it has been assumed by sanitarians that the carbon dioxide must be kept below 10 parts in 10,000 of air to prevent harmful results from this condition, the percentage of carbon dioxide being taken as an index of their amount.

The evil smell of crowded rooms has long been accepted as a proof of the existence of such poisons. As a matter of fact, such odors come from secretions of the skin; from food eaten, such as onions and garlic; decayed teeth; the bad breath of dyspepsia; soiled clothes, etc., etc. While such a mixture of odors is offensive and disgusting, it has been proved to be harmless, so far as its direct effect upon health is concerned.

The theory of the Brown-Séquard and D'Arsonval was based on three series of tests, as follows: In the first case, water with which they had repeatedly washed out the air tubes of a dog, was injected into the blood-vessels of a rabbit. In the second, they injected the water condensed from the exhaled breath of a man; and in the third, the water condensed from the breath of a dog. The principal symptoms recorded were dilation of the pupil, acceleration of the heart, and paralysis of the lower limbs. The larger doses caused, as a rule, labored breathing, retching and contracted pupils.

Extensive investigations carried out along this same line more recently have proved this theory at fault and seem to show that the results were due to the injection of comparatively large quantities of water, or to its containing infectious bacteria, rather than to any harmful organic matter.

For example, an experiment was arranged where the breath of one dog was exhaled directly into the lungs of another continuously for nearly seven hours without harmful results.

In other cases the exhaled breath of human beings was condensed, then dried, sterilized, mixed with distilled water, and injected beneath the skin of rabbits and mice. Here, as before, no sign of disturbance was shown. In comparison with this, both rabbits and a puppy were killed by injecting sufficient quantities of pure distilled water.

A considerable portion of the above data has been obtained from the Smithsonian Miscellaneous Collections, Volume 60, No. 23, which gives a large number of other tests along similar lines.

Having shown, in a general way, the course of reasoning followed in discrediting the older theory of ventilation, let us now see what has been advanced to take its place.

More than thirty years ago Hermans suggested that the results of poor ventilation might be due, in some way, to heat rather than the chemical condition of the air, and recent investigations have been carried out along this line.

Experiments show that an ordinary adult will produce, and must be relieved of, sufficient heat in the course of an hour to raise the temperature of 1,000 cubic feet of air 15 or 20 degrees. In addition to this, a considerable amount of moisture is given off, partly by perspiration and partly as vapor in the air exhaled from the lungs.

Unless this heat and moisture are promptly removed the body becomes surrounded by an envelope of stagnant air, having the same effect as an oppressive day in the summer, with a high temperature and excessive humidity.

The remedy for this condition is evidently suitable temperature and humidity regulation and air movement, which combination forms the basis of design for the latest systems of ventilation.

The physiological effect upon the human body of overheating is a derangement of the vaso motor system, that is, the nerves which regulates the circulation through the blood-vessels, other than the action of the heart. For example, a cool wind striking the skin, stimulates, through the sensory nerves, the vaso motor constrictors, which causes the small vessels near the surface to contract and drives the blood deeper in the tissues and so preserves the bodily heat. A warm wind, or other source of external heat, causes the superficial vessels to dilate and draws the blood to the surface, thus cooling it more rapidly and maintaining the normal bodily temperature. Health, and life itself, depends upon a uniform temperature of the blood, the usual sunstroke of heat prostration being the result of a very slight rise in temperature. When the heat regulating functions of the body are interfered with by an envelope of still air, at a high degree of temperature and humidity, the usual discomforts of a sultry day or a badly ventilated room are experienced.

Briefly stated, living beings constantly produce and give off to their surroundings an excess of bodily heat. This heat must be disposed of, and is constantly carried away from the body, partly in the air exhaled from the lungs, but chiefly through the skin by radiation and conduction assisted by the evaporation of perspiration. It is evident that the prompt removal of this heat will depend upon a surrounding atmosphere neither too hot nor too moist, and furthermore that the process will be hastened if the air is in motion.

Either too high a temperature or too much moisture in the air will retard the cooling of the body, and when these two conditions occur at the same time, as is usually the case in a poorly ventilated room, the result is doubly harmful.

According to this conception, the problem of ventilation is one of physics and not of chemistry. It seems strange that although more than thirty years have elapsed since this doctrine was first advanced, so little has been known of it outside of laboratories, and that the theory of an excess of carbon dioxide and a mysterious organic poison has prevailed so persistently until the present time.

An interesting coincidence which may be mentioned at this point is, that the usual allowance of thirty cubic feet of air per occupant per minute, based on the amount of dilution to maintain a certain standard of chemical purity, is also the amount of air which is required to remove the heat and moisture given off by one person when introducing it into the room at a temperature 10 degrees less than the room temperature, which is about as low as is possible without causing drafts or chilling the occupants.

This fact is not only of general interest, but serves to show that our modern ventilating systems, while designed upon a wrong assumption, may be made to fulfill the requirements of our later ideas, pending future developments in the way of greater efficiency and effectiveness.

Thus far the new theory of ventilation has been stated as a fact without giving any of the reasons leading up to its adoption.

Investigations in this direction have been under way for a number of years and are quite fully reported in the publication of the Smithsonian Institution previously referred to. Only a few of the simpler experiments will be mentioned in the present article.

In a series of tests at the Institute of Hygiene in Breslau, and reported in 1905, normal individuals were placed in a cabinet of about 80 cubic feet capacity and confined for periods up to five hours until the carbon dioxide rose to 100 to 150 parts in 10,000. No symptoms of illness or discomfort were felt, and the chemical impurity of the air had no effect upon the mental activity of the occupant so long as the temperature and humidity of the air were kept moderately low. Raising the temperature to 75 degrees and the humidity to 89 per cent., with the carbon dioxide at 120 parts in 10,000, caused much discomfort. Breathing outside air through a tube gave no relief under these conditions, while breathing air from the cabinet by those outside caused no discomfort.

Circulating the air within the cabinet, by means of a fan, without changes in temperature, humidity, or chemical composition, removed the disagreeable symptoms experienced by the occupants. When the chamber was cooled to 62 degrees there was no feeling of discomfort, although the carbon dioxide rose to 160 parts in 10,000.

Recent investigations have also been carried out along a similar line in the Physiological Laboratory

of the London Hospital Medical College with practically the same results.

In this case the chamber was of wood made air tight with suitable insulation, and equipped with an electric heater, a coil through which cold water could be circulated, humidifying apparatus, and two electric fans for circulating the air within the chamber. Without going into details, the results showed that decreased oxygen and an increase in carbon dioxide up to 200 to 500 parts in 10,000 had little effect upon the pulse, while the temperature and humidity had a profound effect. The feelings of discomfort which were produced depended upon the excessive heat and humidity and were relieved by cooling and stirring the air by means of the water coil and fans. The carbon dioxide could be suddenly raised to 200 parts in 10,000 without the occupants becoming aware of it. Those outside the chamber could breathe air from within, through a tube, without experiencing any of the discomfort felt by those inside when the temperature and humidity were high, while the breathing of outside air by those within the chamber brought no relief.

A series of tests carried out some time ago by the Chicago Commission of Ventilation seemed to show that there was a temperature and humidity range within which the occupants of a room were comfortable, and this range has given rise to what is called the "comfort zone." This means that there is a maximum temperature with a minimum relative humidity, and a minimum temperature with a corresponding maximum relative humidity, between the limits of which the occupants of a room are comfortable. In other words, there seems to be no *best* temperature or *best* relative humidity: but the maximum temperature at which one is comfortable will be associated with a minimum relative humidity and the minimum temperature for comfort will have associated with it a maximum relative humidity.

Under the conditions of the tests made, it was found that a temperature of 64 to 70 degrees with a corresponding relative humidity of 55 to 30 per cent. seemed to be the limit: that is, the comfort zone was between 64 degrees with 55 per cent. humidity, and 70 degrees with 30 per cent. humidity.

We have heard much recently of the necessity of more humidity in the air we breathe, the atmosphere of our dwellings and public buildings being likened to that of an arid desert.

While a certain amount of moisture adds to our comfort, too much is injurious to health, as shown by the experiments just described. Taken alone, a certain degree of humidity does not signify very much, within certain limits, but must be considered in connection with the existing temperature: the combination being what produces comfort or discomfort. It is probably safe to say, where no special provision is made for humidity control, that during the winter our dwellings are too dry and our audience halls and theatres too moist. This is due to the proportion of cubic space per occupant, being large in the former and small in the latter case.

While much has been said of the harmfulness of too dry an atmosphere and its effect upon the mucous membrane of the respiratory passages, there seems to be some reason to doubt that lack of moisture, within practical limits, has any particular effect in this direction.

The membranes of the throat and nose are kept moist by the secretions from certain glands provided for this purpose and not by the moisture in the air which we inhale. Of course the drier the air the greater will be the tax upon these glands, but the surfaces themselves will remain moist so long as the function of the glands is not overtaxed. It seems more likely that the sensation of smarting in the throat and nose, which is often experienced in a dry atmosphere, is due to dust rather than a low degree of humidity.

While dry air does not necessarily contain more dust than moist air, a low humidity tends to extract moisture from the floors, furniture, and other objects and thus liberates a certain amount of dust which is readily picked up by the moving air. It is probable that one of the most important beneficial effects of outdoor sleeping is breathing a comparatively dust free air. The relative humidity is higher at night and the amount of dust in the air consequently low.

The most extensive investigations in both theoretical and practical ventilation are being carried out in this country by the Chicago Commission on Ventilation and the New York State Commission on Ventilation.

The former was organized in February, 1910, and has done a large amount of practical work along the line of ventilation as related to schools, churches, theatres, industrial buildings of various kinds, and street cars. The work is carried on partly in laboratories, especially equipped for this purpose, and partly in buildings in actual operation, where tests are conducted under practical working conditions.

The New York Commission was organized in June, 1913, and began its actual work in December of the same year.

The phases of the problem which have been given special study may be classified as follows:

Chemistry of the Air—Oxygen, carbon dioxide, organic matter, odors, ozone.

Air Conditioning—Temperature, humidity, dust.

Mechanics of Ventilation—Air volume, air movement, heating of air, cooling, recirculation, natural and artificial ventilation.

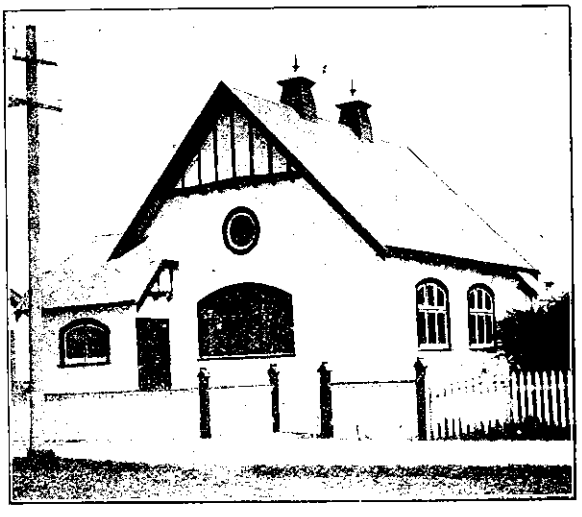
Efficiency of installation and operation. Ventilating apparatus.

The laboratory is equipped with a ventilation chamber having a capacity of 1,150 cubic feet, which is provided with apparatus by which the air of the chamber may be confined and rebreathed, or renewed at any desired rate, may be maintained at any desired temperature and humidity, may be kept quiet or in motion, may be removed, washed and recirculated, and may be given any desired chemical composition.

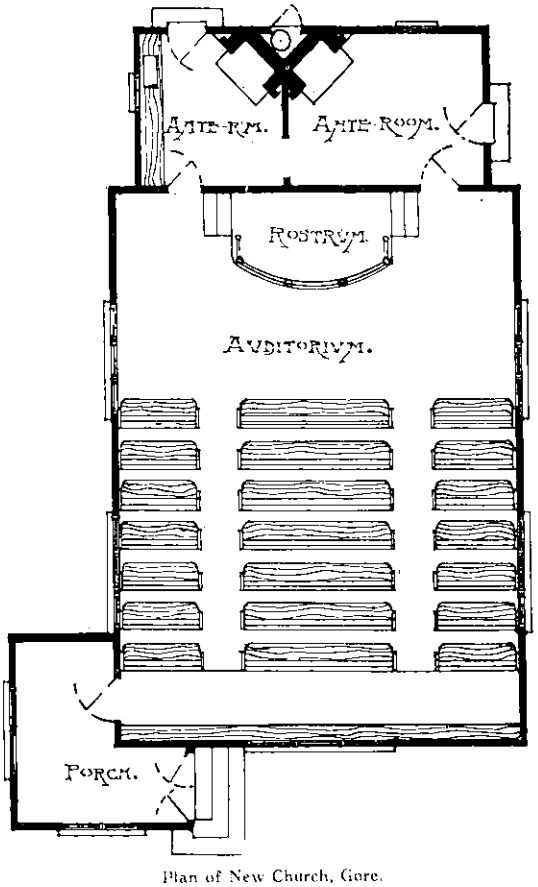
In this chamber from one to six persons may be confined for any length of time. On certain days they may engage in definite mental tasks, while on other days they perform a definite amount of physical work under a given combination of air conditions. By the quantitative study of a considerable number of bodily functions, such as temperature, sensitiveness of the skin, blood-pressure and pulse rate, respiratory exchange, the production of heat, duration of digestion, various changes in the urine, etc., an endeavour is being made to learn in what respects, if any, the physical and mental efficiency are altered by changes in air conditions.

New Baptist Church at Gore

The church illustrated on this page recently erected at Gore, consists of an auditorium measuring 36 ft. by 28 ft., a porch 10 ft. square, and two ante-rooms 12 ft. by 14 ft. It is situated in Ardwick street, Gore. The framework is of timber and rests on a solid concrete foundation, the walls both internally and externally being lined with Bell's British *"Poilite"* asbestos cement sheeting. The whole of the exterior walls are finished in rough cast and the interior walls are battened out with figured rimu battens. The ceilings are of tongued and grooved lining, that of the auditorium being fitted with mock beams. There is a diagonal dado of T. & G. in both porch and auditorium and handsome lead light windows are fitted throughout, the front window in particular being in memory of the Revd. Decimus Dolamore, the pioneer Baptist Church minister in New Zealand. The auditorium is fitted with up-to-date pews and the system of ventilation is simple and natural. The roof is of blue *"Poilite"* tiles supplied and laid by Messrs. John Chambers & Son Ltd., Dunedin, and contrasts very pleasantly with the cream rough cast of the walls. In one of the ante-rooms there is a built-in sink with hot and cold water laid on for the convenience of the ladies, and provision has also been made for heating the water for the Baptistry. The Baptistry, which is of concrete, is placed under the pastor's rostrum and is waterproofed with "Trus-con" waterproofing paste. The building is lit throughout with electricity and cost about £750. The building contractor was Mr. W. Shore of Gore, and the building is to the design of Mr. Arthur R. Dawson, architect, of Invercargill.



Baptist Church, Gore.



Plan of New Church, Gore.

Our 50th Competition

Essay on the Quality of Fitness in Architecture

Only two competitors sent in essays on the subject set by Mr. Basil Hooper, A.R.I.B.A., of Dunedin, viz.: "Heureka," by J. F. Ward, with Mr. C. R. Ford, Architect, of Wanganui; and "Ascot," by Angus Wilson, with Mr. P. A. Doherty, Auckland. According to the terms of the Competition no prize is awarded unless there are at least three competitors, but the judge advises us that the essay by "Heureka" is worthy of some reward. We are therefore making a special prize of 10/6 for "Heureka's" essay which is published in this issue. The judge's report runs as follows:—"It is disappointing that only two entries were received for the essay on this subject, as it is one that well repays study and investigation. The matter is all so close to hand, and immediately under one's observation, that it should not be much labour to write about it. However, the two essays received are really admirable the one by "Heureka," placed first, being specially so. Indeed, it is hard to find any fault with it, the expression, style, and spelling, being perfectly correct, and the matter also being quite relevant. That being so, I cannot do better than let the essay speak for itself, though I will refer to one or two points in it. In speaking of the use of corrugated iron as a roof covering, "Heureka" writes "there is nothing to be said against" its use. I think this might be qualified slightly by adding "where nothing else can be procured or afforded." Also immediately following is the remark about facades "on top of plate glass." Unfortunately this is true, and architects have to bow before commercialism in this particular, but for all that, it is

usually quite possible to bring the vertical lines right down to the ground in most cases, and not place the supports in the haphazard fashion one so often sees. Then the author is hardly fair to the "Georgian Style," in calling it "ponderous," as the Georgian, in its purity, is usually regarded as one of the best legacies of the past, and in fact many of the leading architects of the present day are now designing in that style. Probably the "Early Victorian" is what "Heureka" is referring to. Again, the "Mission" furniture, no doubt is truthful, but it has become affectedly natural, so to speak, and a revulsion has come in favour of more graceful forms and varied woods, even though veneered.

Taking the second essay, by "Ascot," there is not anything very debateable in it, but I think, speaking generally, that it errs on the side of being rather too "high-flown" in its language. An essay on an architectural subject, and of a practical nature, is better written in a quieter and more practical way, and greater attention given to the subject than to high sounding phrases.

In conclusion, I am glad to see that Belcher's "Essentials in Architecture" has been carefully studied (by "Heureka" at any rate,) as it is a book full of pregant interest, and valuable suggestions."

BASIL HOOPER, A.R.I.B.A.

"How important it is that, where small figures are introduced in illustration of some subject apart from the building, they should be framed or set in a panel."—*Belcher.*

Auckland Architectural Students' Association

In spite of the war and the absence of many members at the front, the Association has had a most successful year, and a large amount of very useful work has been done.

During the year we lost one of our most prominent members in Mr. H. L. Massey, who is now in training at Trentham. Mr. Massey was on of the early Students to start the Association, and it is chiefly to his hard work that the Association owes its present sound position.

At the beginning of the year it was decided not to have a Club Room, and as a consequence there was an absence of Esquisse Esquisse subjects. However, interesting lectures were delivered by a number of prominent Architects and several competitions set. The membership now stands at 27. Mr. N. Walnutt, is the Honorary Secretary.

AUCKLAND ARCHITECTURAL STUDENTS' ASSOCIATION, 1916.

STANDING (from left to right)—E. Small, R. Ash, G. E. Downer, L. H. Harris, C. N. Wallnutt, G. Tole, E. Wiseman, T. G. Kissling, L. Skipwith, H. L. White, G. P. Peek, S. Wright.

SEATED—E. Phillips, H. L. Massey, Mr. G. Jones, Mr. A. Hunter, Mr. F. W. Bamford, Mr. W. H. Gummer, N. Garlick, H. Hyland.

"Architecture"—A New Australian Journal

With its December issue, "The Salon" ceased to exist. It was a well conducted organ of the Australian Institutes of Architects, and did valuable work in raising the tone and standard of the profession, encouraging talent effectively, and setting before Australian architects the highest ideals.

In its place rises "Architecture," which is evidently intended to have a more direct and exclusive interest in the subject. "Architecture" is the Official Journal of Institutes of Architects in the States of New South Wales. Queensland, Tasmania, South Australia and West Australia. It was founded to make the Architects of Australia an articulate force in the body national; to acquaint the members of each Institute with what action the other Institutes are taking on all public and professional questions which have to do in any shape or form with the art and craft of Architecture; to foster the development of a distinctive Australian National style of Architecture; to encourage as far as possible the utilisation of Australian materials in building, and thereby stimulate the development of the Continent; to obliterate slums and "jerry buildings" and improve the health of the people; and to interest public and Governments in the Home Beautiful, the Civic Palace Splendid, and the City Magnificent. It will represent the ideals of the Architects of Australia and their Institutes, and fight for them. It will strive to be an educative power, and to foster ideals of Beauty, Health and Utility.

In spite of war's handicaps on the printer, the new monthly is highly creditable, the illustrations being produced well, though we believe that a finer half tone screen would work equally well on the quality of paper used, with the result that better gradation of tones would be secured. The scope and interest of the number is exemplied by the titles of some leading features: "An Australian Type of Architecture"; "Sir Baldwin Spencer's Collection of Australian Pictures"; "Thoughts on the Trend of Australian Architecture"; and "Obligations of the University Towards Art." The many examples of architecture illustrated in the number show that the profession in Australia is virile and adaptive.

Interior Decoration of an American Home.

Bad Ventilation

In the Supreme Court at Hamilton Mr. Justice Cooper gave judgment in a case in which Lillie Marian Parr claimed from Frederick C. Daniel, architect, of Hamilton, £156 17s. 6d. damages for alleged negligence in constructing a concrete house. The alleged negligence consisted in failing to make proper provision for

ventilation, in consequence of which a considerable portion of the timber comprising the flooring of the house became rotten and had to be renewed. The damages claimed included the cost of subsoil drainage, £20 for injury to linoleums, and £50 general damages.

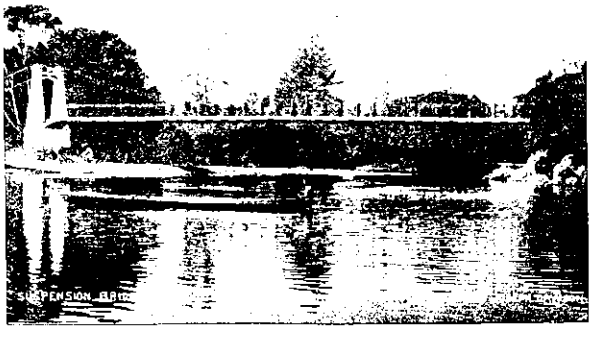
His Honor went exhaustively into the question of dry rot, and expressed the opinion that the system of ventilation adopted by defendant had not been reasonably sufficient, this being the cause of the dry rot in the rooms affected by it. The plaintiff, in His Honor's opinion, was entitled to recover the amount she had had to expend in replacing the floors and remedying the defective ventilation. Defendant could not be held responsible for the cost of the subsoil drainage.

Judgment was therefor given for the plaintiff for £122 17s. 6d., with costs on the lower scale.

New Suspension Bridge

Upper Hutt, Wellington

A new bridge has recently been completed across the Upper Hutt river at Maori Bank, Haukaratu Estate, which is illustrated on this page. The bridge

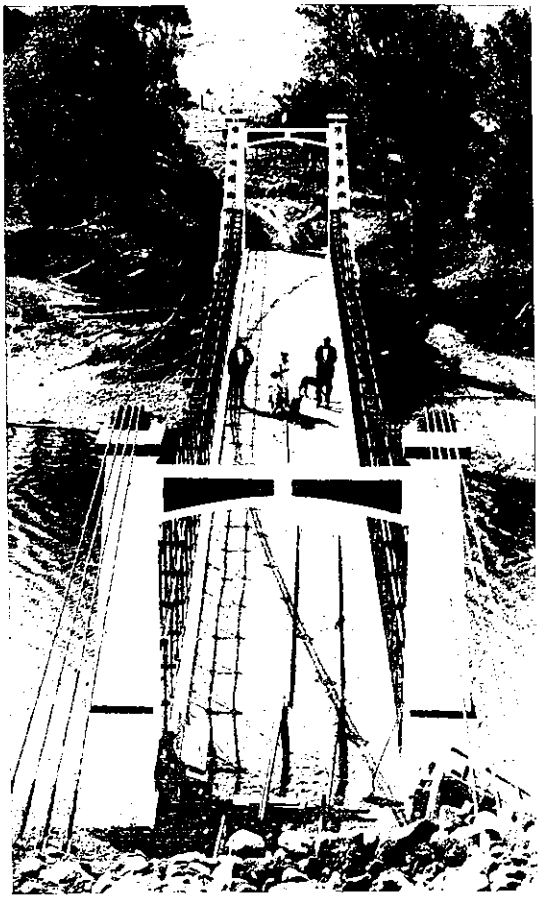


View from the water level.

was designed by Mr. J. Dawson of Pahiatua, and was built for Messrs Whiteman and Cottle property owners in the district.

The bridge is of ferro-concerte construction, 120 feet long. On either bank are two white painted towers of reinforced concrete and connected together by means of a graceful arch. On top of the towers are massive iron castings with twelve iron wheels on each tower to support the cables. The anchor rods are 16 in number of 2-in. iron, connected to the anchors with large iron washers. The eight cables have each a breaking strain of 75 tons, or a total strain of 600 tons. There are 62 suspension rods, attached to the cables with reinforced concrete clips at intervals of five feet. The girders are of trussed railway iron, spaced at five feet centres, with curved corrugated iron between to support the concrete flooring. The total weight of the bridge on the cables is 50 tons. The finished cost of the whole structure is in the vicinity of £1,400.

At the opening ceremony Mr J. P. Luke, Mayor of Wellington said that as a professional engineer he had thoroughly inspected the bridge, and, in his opinion, it was one of the best examples of suspen-



End View, showing arrangement of Cables.

Upper Hutt Suspension Bridge.

sion bridge architecture he had seen in New Zealand. It was strong and well-finished, and he took this opportunity of congratulating Mr. Dawson on his latest achievement.

Chair of Architecture, Sydney

The University of Sydney proposes to adopt the following course in connection with the newly-endowed Chair of Architecture:—

Examination of leaving certificate of High Schools in the following subjects:—Mathematics (trigonometry plane), algebra (bi-nominal theorem, geometry), English, French, or German, ancient and modern history, elementary plane and solid geometry, elementary physics, elementary chemistry, elementary freehand and model drawing.

The subjects for the course in architecture should be—First year: Architectural drawing, freehand drawing, elements of architecture, elements of design, descriptive geometry, shades and shadows, perspective, physics (light, heat, electricity), inorganic chemistry (quantitative), mathematics, geology, construction.

Second Year—Architectural design, freehand drawing (antique), water-colour drawing, architectural history, construction, mathematics, petrology.

Third Year—Freehand drawing from life, architectural history, architectural design, historic ornament, construction (including graphic statics), water colour, sanitary science, mathematics.

Fourth Year—Design, freehand (life in colour), water colour, pen and ink rendering, history of sculpture, history of painting, professional practice (including ethics, jurisprudence, and business), special lectures (including town planning).

Recent Building Patents

Flushing Cistern.—A patent, No. 2,195, has been taken out by C. Hodges and H. Jackson. To minimize noise and avoid the use of valves, the inlet cock is placed near the bottom of the cistern and the syphon bell is connected by a pipe to a push button which releases the air lock to start the action. The inlet cock 3 is closed by the ball float 4 when the water flows over the weir 6 and fills the chamber 5. A pressure on

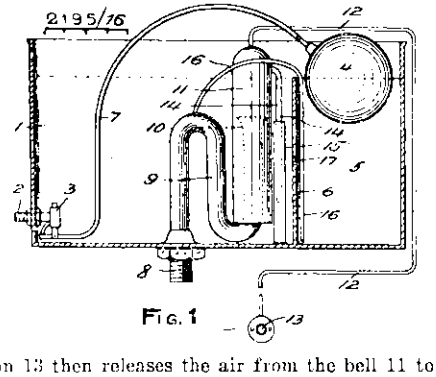


Fig. 1

the button 13 then releases the air from the bell 11 to start the syphon, the water being drawn from the chamber 5 through the pipe 16. An orifice 17 controls the depth of water which can be drawn from the chamber 5, and a pipe 14 admits air to the bell to stop the syphon when the water in the cistern falls below the required level.

Angle Cover Plates.—A patent, No. 1,970, has been taken out by J. Rose, of Victoria. To replace the usual staff stops for internal or external angles of weatherboard structures a cover-plate is creased longitudinally and provided with upper and lower wings. For re-entrant angles the sides of the plate form an obtuse angle, and for exterior angles an acute

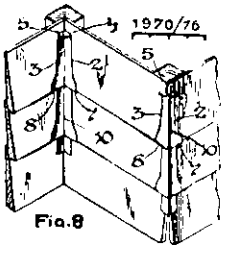
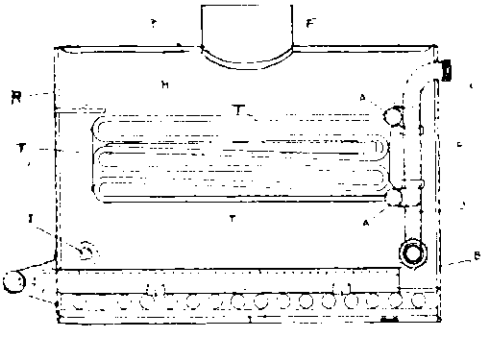
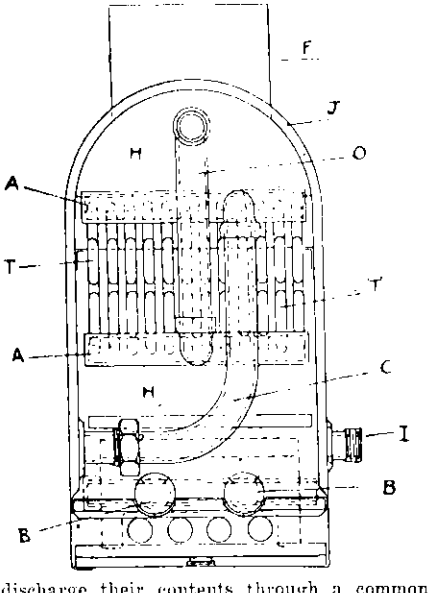


Fig. 8

angle. The lower wings 7, 8 of a cover are placed under the upper wings 4, 5 of the lower cover and nailed to the board.

Water Heater.—A patent No. 38,113, has been taken out by Jas. Lowe, Engineer of Auckland. The heater is formed with a water-container forming the sides and top of the combustion-chamber, in which and above the heat-generating means are a number of approximately horizontal water-tubes. The water-container is provided with an inlet, and a connection communicating with the approximately horizontal tubes, all

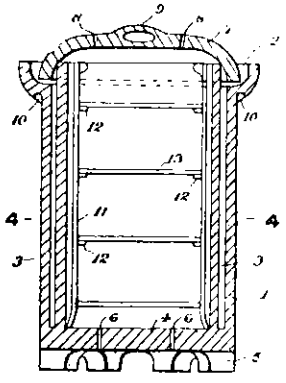




of which discharge their contents through a common water-outlet pipe. Any suitable form of burner may be employed, and removable end cover-plates are fitted to the device. A suitable outlet-flue is provided, either through the top of the water-container or through the top of the cover when same is employed.

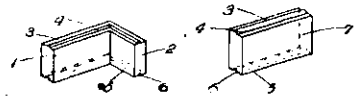
Cooler.—A patent, No. 38229, has been taken out by T. Coulthard Mullions, Architect of Auckland. It consists of pumice concrete, reinforced or otherwise, and has a dished lid, the rim of which dips into an annular well, from which passages extend to the bottom of the vessel. The bottom of the vessel

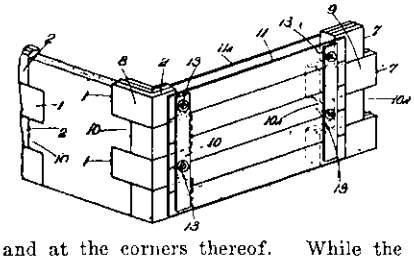
has a scalloped flange, and the bottom and lid are perforated for passage of air. A frame or cylinder in the interior of the



vessel has shelves for holding articles or produce which it is desired to keep in a fresh state.

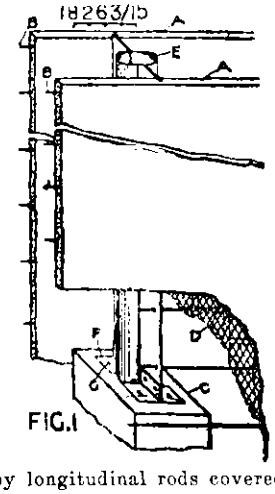
Concrete Wall Construction.—A patent, No. 18,208, has been taken out by John O'Driscoll, builder, of Lauder, Otago. It comprises collapsible boxing adapted to engage with and cover the ends of staggered blocks first erected as columns in





the wall and at the corners thereof. While the said boxing does not extend to the inner corners of the wall, it may be filled with and retain concrete for a sufficient distance and depth to complete that section of the wall between the columns engaged by the boxing.

Reinforced Concrete Wall.—A Patent No. 18,263 has been taken out by A. J. McKee of New South Wales. This invention is to facilitate the construction of walls sheet metal standards are erected on concrete or bricks piers, and

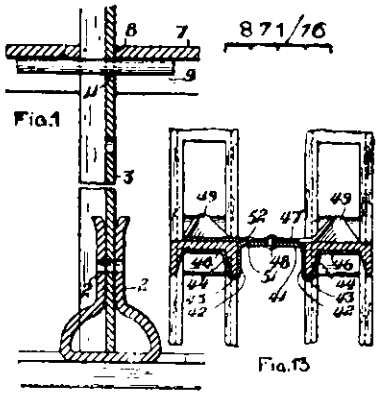


are connected by longitudinal rods covered with corrugated wire netting.

Angle pieces **F** are riveted to the standards **E** and have perforated flanges to receive the longitudinal rods **B**.

Metallic Wall Framing.—A patent No. 871 Class 81.2 has been granted to W. D. Henderson of Cal. U.S.A. This invention relates to a framework for partitions, &c., in which lugs 2, formed by cutting the channel iron bearers 1, are riveted to the web of the standard 3.

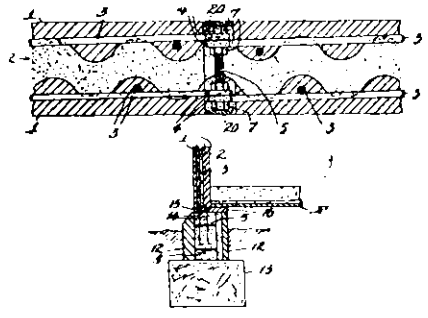
A lateral brace 7 supported by a pin 9 has an aperture 8 to receive the standard 3, and the bearers are nailed to the floor and ceiling structures.



In a modification L-section bearers are provided with interlocking lugs on the over-lapping flanges. A further modification describes clips bent to embrace transverse channel iron.

In a further modification twin standards are held by clamps 41 having a pivoted blockplate 47 which has thumb-pieces 49 and a locking projection 52.

Concrete Building Construction.—A patent, No. 38,082 has been taken out by John Knowlson, Sanitary Plumber, of Miller street, West Melbourne, Victoria. According to this invention, hollow concrete walls and the like are formed by means of moulds constructed of reinforced-concrete slabs or sheets connected at their contiguous sides and erected in two (or more) parallel sections, spaced a predetermined distance apart, the joints being sealed with cement or concrete, and the cavities finally filled in with liquid cement, liquid concrete of fine gauge, or plastic concrete according to the width



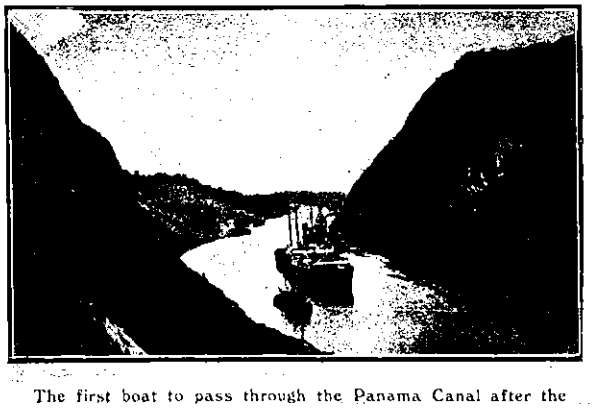
of the cavity, to form a solid united construction, said moulds forming a permanent part of the wall. The ceilings, which may be made strong enough to be used as floors for a superstructure, are each formed of similarly connected sheets or slabs, laid in a single section on and fixed to the inner mould-sections of the walls or partitions, the liquid or plastic concrete, finished with a cement surface if desired, being laid on the sheets to the desired depth and so as to unite preferably with the concrete or cement in the wall or partition cavities. The ground floor may be somewhat similarly constructed, and

the walls, footings, floors, and ceilings of concrete united in a solid construction. The invention also includes an improved means of connecting the reinforced concrete sheets to form butt-joints, and furthermore means for bracing and plumbing the spaced sections and adjusting the width of the cavity between same. The cheapness and expedition in construction will be evident, as the sheets may be made at the factory and only require to be transported to the work and coupled together in position, which work does not necessitate special skilled labour. The sheets, by reason of their somewhat coarse surfaces, enable finishing coats of plaster or the like for interior wall-surfaces to be applied and keyed without preparatory rendering or cementing, while the exterior surfaces are readily adapted for spraying or splashing with a finishing coat of cement, liquid cement, concrete, or rough-cast mixture.

Building Notes

AUCKLAND.

The question of concrete roads occupied the City Council's attention last month when a Councillor stated that concrete roads in Auckland did not seem to be a success in that something else had to be put on top of the concrete. That had been the case in Little Queen Street, for instance. In America there were hundreds of miles of concrete roads on which the traffic ran on the actual concrete surface. How this was done did not seem to be known in New Zealand. The city engineer in reply, explained the policy he had recommended in regard to road paving. He said that in 1910 he reported on the alternative systems of stone setts, asphalt, wood blocks, and concrete. At that time the council was indisposed to experiment with concrete to any extent, and preferred wood paving. Certain streets were paved with jarrah blocks, and red birch blocks. Wherever jarrah had been used it had been found necessary to use some protective covering, so as to give a good foothold to horses, and also to prevent damp getting between the joints of the blocks. It was clearly waste of money to lay down wood blocks and afterwards have to cover them every 12 months. If a suitable covering could be applied to concrete, it would give a road as good as one with wood blocks at less than half the cost of jarrah. An experiment had been tried in Little Queen Street with union asphalt, and had proved a success. The covering had two great advantages—that the street traffic was made practically noiseless, and that the strain on the eyes from white concrete was relieved. In America, where concrete had been more widely used for road making, it was recognised that if a suitable protective coating could be found, the problem of concrete paving would be solved. Here the climatic conditions seemed to favour such a covering in a way that the American climate did not. The result of the experiment was that the council now had a good road at about half the cost that had been anticipated. Park Road is to be concreted, and a permanent pavement in concrete will be carried across Grafton Road from the bridge and through to



The first boat to pass through the Panama Canal after the last slip.

the city boundary. Another concrete work the Council have in hand is the paving of Quay Street.

The new Presbyterian church, which is being erected at the corner of Mount Eden Road and Windmill Road, is expected to be ready for opening shortly. The structure itself, which is of ferro-concrete, with a tiled roof, is already complete, and good progress is being made with the internal fittings. The church will be capable of seating about 300 persons.

It was decided at a recent meeting of the Auckland College Council to appoint two lecturers in architecture at the University, one to take the mechanical and the other the artistic side of the subject.

The erection of the Epsom Girls' Grammar School has now been completed. The building, erected to relieve the congestion at the Girls' Grammar School, in Howe Street, contains four class rooms, a well-equipped laboratory, and cloak-room. Adjoining the main building are the staff quarters, containing the teachers' rooms and two class rooms.

The erection of No. 4 unit of the Tokanui Mental Hospital, near Kihikihi, is now going forward, the foundations being completed. The Tokanui Mental Hospital scheme provides for extra accommodation being built as need arises, and No. 4 unit will provide for about fifty patients. Each unit is self-contained, while the central building provides a common dining-room. Owing to the scarcity of local carpenters, several have gone from Auckland to carry on the work, which is expected to take about nine months.

A proposed city by-law, which provided that no new building should be occupied until a certificate is obtained from the city engineer, gave rise to some discussion at a recent meeting of the City Council. Mr. G. Baildon said that builders and owners were subject already to inspections, not only by the architects, but also by building, scaffolding, sanitary and labour inspectors, and he thought the proposed additional regulation was carrying matters to an unnecessary length. Mr. P. McElwain characterised the proposal as "most absurd." It was agreed to delete the clause.

The timber industry along the Main Trunk is reported to be slackening down somewhat, says the Auckland "Star." The conscription of men has reduced the number of builders very considerably, and the scarcity of tradesmen, combined with the heavy increases in building material, has had the effect in causing moneyed men to slow down in the building of houses for speculative purposes. The mills have been very active during the past year owing to erection of new freezing works, and big extensions to others, including Taihape and Feilding. The only new works in course of erection now are those being constructed at Kakariki, near Marton, for the Wellington Meat Export Company. Under the circumstances, therefore, a reduced output is forecasted.

CHRISTCHURCH.

During December the following permits were issued:—Central Ward (inner) 3, value £2750; (outer) 3, value £1950; St. Albans 13, value £5300; Linwood 3, value £1350; Sydenham 5, value £2250; Richmond 4, value £900. Total 31 permits, value £14,500.

WELLINGTON.

The Commonwealth and Dominion Steamship Co., in conjunction with the N.Z. Shipping Co., are going to put up a large building at the corner of Customhouse Quay and Ballance Street, Wellington. This position should be a valuable one if the Government sticks to its present intention of placing the projected new railway station nearly opposite this section.

The construction of the new hospital at Featherston Camp will be commenced almost at once. The building will be similar in design to the hospital now being completed at Trentham Camp. It is intended specially to provide for measles cases, and it will have an annexe for the reception of cerebrospinal meningitis patients whom it is considered desirable to isolate. The hospital ought to be completed within three months, and will be available before the winter months produce their normal increase in the amount of sickness among the troops.

The damage done by the fire which broke out in Messrs. W. R. Cook, and Sons' sash and door factory in Main street, Palmerston North, last month, is estimated at £8000. The timber stacks were saved.

The Palmerston North Borough Council has accepted a tender for the erection of public baths, at a cost of £4239.

The Bank of New Zealand has purchased a large building, adjoining its Wellington head office in Lambton Quay, from the Wellington Investment Trustee Agency. The price is said to be about £40,000. The frontage of the property is 87ft.

The tender of Mr. J. L. McMillan has been accepted by Mr. W. Gray Young for the erection of a wool store on the corner of the Hutt road and Sar Street, for Messrs. Bourke, Wilson and Co. The building is to be erected in brick, and will be completed by the end of next May.

Notice to Subscribers

"N.Z. Building Progress" is posted each month through the G.P.O. at Wellington. If any subscriber should not get his copy, another will be sent him if we are notified in good time. The paper is supplied from year to year only, and if subscribers continue to receive the paper after expiry of the current year, we shall accept it as an intimation of their desire to continue for another twelve months. We undertake to supply the paper for such further term. Notice of discontinuance must be sent to the Manager, 8 Farish Street, Wellington in writing, as no Agent has authority to receive notice of discontinuance on our behalf. The subscription is 7/6 per annum. A discount of 1/- will be allowed off this amount if subscription is paid in advance.