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R. A. I. C.
DECEMBER 1948

HOPE of international co-operation between East and West was at a low ebb at this season last year. In fact, a tug-of-war was taking place to determine on which side the smaller powers would range themselves. During 1948 the rivalry has accelerated. Failure to agree on matters of international policy is no longer simply deplored. The situation has deteriorated to such an extent that the existence of a cold war is freely acknowledged, stock piling is under way, and re-armament is considered a reasonable precaution. Establishment of the Marshall Plan and the Cominform precipitated a train of events including the Communist Coup in Czechoslovakia, the formation of the Five Power Pact, Communist tests of strength in Italy and France, the union of the Western Occupation Zones of Germany, and most serious of all, the Berlin Blockade which has hastened negotiations for the proposed Atlantic Alliance.

A GREAT deal is heard about the air lift to Berlin, how British and American pilots, who a few short years ago risked their lives to complete its destruction, are at present risking their lives in a determined effort to insure its survival. Whether successful or not in its primary objective, the air lift to Berlin has demonstrated to all, and especially to the Germans, the extent to which the western powers are prepared to go to fulfil their humane responsibilities. At this season of Good Will, the full force of this demonstration will surely burn itself deeply into the consciousness of millions of Europeans. May it not be that this by-product of the air lift will prove, in the years to come, to have been a more compelling influence for good, than the product itself?

CAROL singing this Christmas will have a greater significance than usual. Mention of the manger theme will wing thoughts to a crib overseas where, we rejoice to know, "A Prince is Born". Once again, in spite of trials and tribulations, the "Old Country" has briefly focussed attention upon the tremendous worth of simple values.

THE year 1948 is not distinguished by being more considerate of forecasts than other years. Demand is still greater than supply for a number of strategic building materials, nor can one discern any prospect of immediate improvement for some. The promised recession, if it has occurred, has been scarcely perceptible to Architects. The physical volume of building as well as the dollar value exceeds the peak of last year. This is a welcome fact, particularly for the large number in the graduating classes of the Schools of Architecture.

TO all our readers, to all our advertisers, and to all our staff, we extend cordial season's greetings. In doing so, may we single out for special mention and congratulations, Professor Madill, his staff, and students of the School of Architecture at the University of Toronto, as they celebrate their first Christmas in their new independent status.

F. Bruce Brown, Chairman,
Editorial Board.

TWELVE YEARS IN BRITAIN

By S. T. J. FRYER

Old London's time encrusted walls
What man has fashioned for us, falls,
What God has breathed into us stands.

THESE lines of A. A. Milne come to mind when I am asked to write of Building In England and some of my experiences there during the last 12 years, for so much that Architects and Builders had fashioned I saw fall. So much of my work during five and one half years was with bomb blasted buildings in various parts of the country.

But London, or for that matter Britain, in the summer of 1936 when we landed would not have inspired Milne to the last two lines, it had not found its soul then as it did in the summer of 1940.

To Canadian eyes and ears in those uneasy appeasing years the emphasis seemed all on the "time encrusted walls", on tradition, overdone tradition, to such an extent one came to the conclusion these people were Ancestor worshippers first and anything else second.

In spite, however, of the die hard traditionalists, much new building was going up as the depression years of the twenties were being left behind. The present trend of mass and balance without symmetry was becoming more and more evident with its related details of glass and glass bricks, chrome plating, staybrite steel, plywood and strong colours in paint. Central Heat becoming more generally accepted in the larger buildings, Radiant Heat also in some. Plumbing beginning to improve in newer installations, copper pipe being used more frequently. Ribbon building, that curse to the Town and Country Planner, was unrolling for miles and miles on each side along the new Arterial Highways, Factories and small housing both adding their ugly quota to the landscape.

The flimsy semi-detached houses in their thousands were deadly in their red brick and red tile monotony. Internally hopelessly lacking in what we would consider normal modern amenities.

Your average Englishman then, and still, has a stubborn prejudice against central heat in his home. He seems to get a morbid pleasure out of being cold!

We discovered in those early years that every British building worker, yes, even the Painter carried a cold chisel, this he used continually, he at least "sounded" busy. I started spelling it Londin!

It may be of interest to mention the number of streamlined and attractive, yes, I think attractive is the right word, Hotels and Pubs being built then. Architects made the most of the opportunities in designing large airy Lounges, Buffets and other modern features to be in keeping with the respectable citizens and their equally respectable wives and sweethearts who came to sit, sup, discourse, debate and enjoy what is a pleasant social custom in England. In studying this phase of English life we found that in addition to Ye Olde Cheshire Cheese, Dirty Dicks and Regent Palace Hotel there are over 5000 such places in the County of London catering to the eight and one-half million population.

They are of all types and vintages, many worth study from the architectural angle, apart from anything else. During and since the war, I learned much of the Real England listening to and chatting with the locals in these Hotels, Inns, and Pubs, more particularly outside London, in the quiet places, the country villages and small market towns; there one sensed the England which is still a moral force in an unhappy world and because it is still a moral force will regain material strength.

Looking back, those were ominously quiet days, the lull before the storm though a domestic and imperial storm of first magnitude broke suddenly in the Abdication. I was then in the office of Sir James West, F.R.I.B.A., Chief Architect H. M. Office of works. At the time we were just getting busy on Plans for the coming Coronation. A group of some fourteen of us under direct supervision of Mr. Charles Mole, F.R.I.B.A. (now Sir Charles Mole) and Mr. C. Terry Pledge, A.R.I.B.A. designer were responsible for the Planning of the temporary Royal Annex at the West end of Westminster Abbey. All the work in the Abbey, the stands and decorations in Parliament Square, along the Mall to Buckingham Palace, and up Constitution Hill; in addition, decorations for every Government Building in Great Britain and Northern Ireland.

The Abdication staggered Britain owing to the complete censorship on what was later discovered to be common gossip abroad. During all the heat and bitterness we went diligently ahead with the Plans. One change made after the Abdication was to substitute H. M. George VI on the titles where the earlier Plans which were already out read, H. M. King Edward VIII. These earlier Plans were not changed, a bit of architectural history, on the assumption possibly that The King is dead, Long live the King.

Among the group were two young women architects and two Canadians, myself and Stanley Blackmore, A.R.I.B.A. a then recent graduate of Manitoba University under Professor Osborne. Blackmore is now an Assistant Architect in The Ministry of Works, Newcastle-on-Tyne. Of the many unusual and interesting jobs in a long and varied experience, this to me was one of the most unique and is a story in itself.

The Coronation with all its superb pageantry and color became history, and the office was busy on Wind Tunnels for the Government Research Laboratories at Twickenham and on two large Naval Training Establishments, in the West and in Scotland, the swimming pools being of reinforced concrete designed in the elliptical arch trend then coming in. Munich and the year of breathing space slipped by, September 3rd., 1939 arrived. At 11:30 a.m. the Air Raid sirens got their first full scale test—a false alarm but for 15 minutes London was completely jolted out of its sedate calm. "Moaning Minnie" the siren was to be heard hundreds and hundreds of times in the next five years till the Flying Bombs and Rockets made it superfluous The "Alert" and "All Clear" became part of a fantastic and horribly long drawn out nightmare.

That first night the lights all over Britain were "Blacked Out"; they have not all come back yet. Neon signs and shop lighting still being forbidden. All names of places were taken down or painted out. All business or other signs which incorporated the name of the town or place were blotted out. Railway Stations lost their identities. All sign posts on the roads disappeared. Concrete pill boxes and anti-tank road blocks took their place. Immediately war came all normal architectural work stopped and came off the boards.

The War Office, Woolwich Arsenal, piled in six or seven top priority rush orders for temporary ordnance factories, the sites of these, in different parts of the country comprised from 1,000 to 1,500 acres each. As the work progressed, came Dunkirk and the threat of invasion. To the First Canadian Division was delegated the post of honour guarding the S.E. invasion coast, then the Battle of Britain and the Blitz on London broke. It is very difficult to write of those tense days and unutterably wearying nights, so many memories flood back. After the first week, few in the Drafting Office bothered to go to the Air Raid Shelter in the basement of our nine storey Office Building, close to Thames House and Lambeth Bridge. Draftsmen and Draftswomen stayed on their boards even with air fights going on right overhead. After dark, many of us carried on all through the night on "Home Guard" and other duties.

From the roof I have watched and later reported up to fifteen large fires breaking out all round, the bombers droning in through the patterned sky of weaving searchlights, machines glistening silver white in a cone of lights with the orange flashes of bursting shells around them. With the morning, wearily trying to find a place to get some breakfast in, only to discover the electric, gas and water mains had all been knocked out temporarily. The ordeal of the Blitz lasted ninety days and ninety nights without cease, bombs and fires destroyed much that men had fashioned, much of history in stone and timber and perhaps more important than these, thousands of humble homes, as A. A. Milne further speaks:

"In broken homes we set our feet
And raise proud heads that all may see
Immortal in each little street
The soul and its integrity."

Yes, there was much of that quiet courage among the ordinary folk such as the housewives I saw one morning in Brixton brushing the broken glass off the front steps and walks of their small houses shortly after bombs had exploded in the immediate neighbourhood or the Policeman quietly saying, "Sorry I'll have to ask you to move along, you know there's a raid still on" . . . That was at midnight in Streatham, a few of us had stopped for some moments to watch the firemen getting after a bomb blaze in a Timber Merchant's Yard.

The people were discovering, as Winston Churchill said in a later and inspired broadcast, that —

"the destiny of mankind is not decided by material computation."

It was a chastening experience for an Architect or a Traditionalist to see how little, in the face of mortal peril, the buildings men had fashioned with great care, mattered, the people were not greatly disturbed by the bomb damage to St. Paul's, the Houses of Parliament and such like. Air Raid shelters were more important.

One felt some regret, however, that while this wrecking was going on, more of the really ugly edifices did not get blotted out. It is with regret, for instance, one has to inform Professor Arthur that Regent Quadrant did not receive any appreciable damage, it still flaunts its ostentatious façade!

I remember he once hoped something might happen to it. Savile Row just behind Regent Street, however, got what may have been near misses intended for the quadrant. It was blocked with rubble twenty feet high when I saw it shortly after.

In inspecting bombed and burned out buildings it was noted how, so often the cast iron columns remained apparently undamaged by fire and water while the mild steel beams and columns twisted and bent like candles on a hot day. Reinforced concrete stood up reaonably well to even direct hits from medium sized bombs. Sheet metal doors were of no use against bomb splinters or blast. Brick blast walls in front being necessary though even they not always proof against blast or suction twisting the door.

Waterproof paper was found useful on the ground before pouring concrete floor slab, enabled the shelter to be pushed along by blast instead of being crumpled. I saw shelter pushed three feet in this way without external damage to speak of.

So London endured till late October when the raids eased off a bit for awhile. In late November 1 was transferred to Newcastle-on-Tyne. The newly created Civil Building Control was just beginning to function. Regional Licensing Officers were appointed and Architects as Technical Officers were attached to advise and suggest on the essentiality of the Building projects and materials proposed. Particularly the essentiality to the War effort.

Newcastle-on-Tyne was headquarters for No. 1 or Northern Region, the country being divided into seven Regions.

During the earlier war years there were five Technical Officers, later cut to two, then for three years, one was left alone to hold the fort, till a young colleague, Captain W. M. Dobson returned from the 8th Army to assist during the last year and to carry on the gradual winding up, after my resignation. He and I got some satisfaction out of our work, for as Architects we could see the beginning of the end of the irksome but for the time being necessary controls.

Under Civil Building Control, practising Architects and Builders had to apply for a License to build anything costing more than $500.00. In addition they had to apply for permits for practically all or any materials. The office of Works became The Ministry of Works.

To give some idea of the scale of the work. When I found myself on Tyneside the first applications were coming in. When I left some seven years later, over 56,000 applications were on file in the Registry – not all of them approved, of course.

During those years I personally visited over 1,800 jobs in all parts of the North from Berwick on Tweed to Scarborough and across the country from Carlisle to below Windermere.

I soon found the human element could not be divorced from the work and two directives out of the scores that came up from London were my principal guides. One coming at the end of a long screed of stilted civil service verbosity said "however in all cases a common sense point of view should be taken," the other said "at all times the question of civilian morale should be borne in mind," these plus discretion in stepping over, under or around red tape, when it was honestly justified were sufficient in the great majority of cases.

Temporary repairs after Air Raid damage comprised a considerable portion of our work in the earlier war years when Raids were fairly numerous and some severe. Though Newcastle received its quota it was more fortunate than Sunderland, Middlesborough, North and South Shields and the seven miles of river to the sea from Newcastle generally known as Tyneside. Most of the towns in the North-East of England received some damage from intermittant bombing. One odd episode remembered is, the night most of the windows in the residence where I and several others had rooms were blown out. Blinds and "blackout" curtains coming down. Next morning when sorting things out I found the dark green roller blinds from my windows had stamped on the roller, "Made in Hamilton, Canada." Six years later I am writing this in Hamilton, Canada, the Hamilton I first knew in 1911.

There are many human incidents and cases one could mention but space does not permit.

A certain amount of new work was licensed, work that was essential to the war effort, also a lot of repair work to ship building yards, Engineering Works, etc. Work that had to be carried out without stopping, the twenty-four hour per day continuous drive. And this effort was being carried out in all places under "blackout" conditions, no light could be shown, at night and so no air or ventilation in the normal way or sun in the daytime. It impressed one deeply many times the dogged spirit with which men and women carried on under these conditions.

On visits to London one got caught up in later full scale raids. When Rocket batteries in Kensington Gardens and AA Guns in Hyde Park plus hundreds of others blasted the sky, while strings of bombs and incendiaries further blasted "London, Arf the Bloody World" as the Cockney put it. They put a bomb into the subway under Trafalgar Square, 30 feet from Nelson atop his column. Nelson ignored it or turned his blind eye, two of the lions shook themselves back nine inches and that was that.

The Headquarters of the Ministry of Works in Westminster got the back lash from two near misses. Blueprints stamped "secret and confidential" were scattered among the debris on the street.

Around St. Paul's the night after the Fire Blitz, I felt my way over debris and fire hoses and streets running with water, all around St. Paul's buildings still fitfully blazing, or smouldering shells. Outwardly not much to show of the damage to the Cathedral, but through the drifting smoke one saw still bravely shining the many coloured electric lights on the giant Christmas tree in the great West Portico, symbolic of the London that God had breathed into.

I felt my way back in the blackout down Ludgate Hill along Fleet Street, pausing a few moments with a knot of dark figures to watch Firemen fighting the fire in the belfry of St. Brides Church, then on past the Law Courts with the bombed and burned out shell of Wren's Church opposite, a little further on Bush House with one side torn open and at Waterloo Bridge a gaping 20 foot deep crater and a tangle of wires, pipes, sewers, etc. So along the Strand with dark figures feeling their way to the Tube shelters and somewhere in the blackness a cheery Cockney voice calling "late night final."

An eerie experience was to come into King's Cross station from the north in the middle of a raid and find two young girl ticket collectors at the barrier, cool and calm, while 700-odd passengers, men, women and children, slowly felt their way through. Not many weeks before, King's Cross had collected a direct hit on No. 8 platform.

Going north on one occasion I passed through York the day after the so-called Baedeker Raid, the station was partly destroyed, the railway sidings damaged and near misses had destroyed a number of houses close to the tracks. Later visits showed that only one church out of the many there was hit but about six pubs were knocked out and some damage to military establishments. The Cathedral was not touched. York is a Garrison City with a large permanent Barracks just as is Canterbury and Norwich, all those cities at the time were full of troops, all Britain was full of Navy, Army and Air Force men and women.

The first sight of Flying Bombs, Buzz Bombs, Doodle Bugs, they were called all these and more, was outside my Hotel in South Kensington. A dozen driving over inside 15 minutes and crash diving in the neighbourhood and beyond. The Albert Hall was damaged but not the Albert Memorial! On another occasion when passing out of Victoria Station one of them dived onto No. 1 platform. The station with its half-mile long platforms lost much of the blacked out roof glazing while windows by the score came crashing out in all directions. Flying bombs and Rockets after five years of ordinary bombs were almost more than the people could stand, coming over at all hours of the night and day, when streets were crowded and shops and offices busy.

As the sounds of war petered out, in the first flush of the spurious victory as we now find; a tremendous surge of new building developed. Houses, permanent and prefabricated, factory buildings of many types, new farm buildings, shipyard expansions. Getting rid of "Blackout" precautions, tearing down anti-invasion and other protections, de-requisitioning of thousands of Hotels, large residences, etc., taken over by the armed services meant a tremendous amount of repair and renewal work from the rough and ready way in which they'd been treated by hob nailed Army boots and their wearers!

Millions of square yards of glazing had to be stripped of blackout paint or corrugated iron, etc. Millions of square feet of glazing and other repairs were urgently necessary in the south-east and London area as a result of the Flying Bombs and Rockets. Production of materials could not keep up with the demand till factories had time to switch over from the long years of war production. Shipping was not available for bringing in sufficient timber, home grown timber had pretty well all been cut during the war.

A particularly severe winter crippled for some weeks, brick and cement production owing to difficulty in transporting coal. The government called for volunteers to help the regular staffs keep the railways clear of snow; thousands responded and spent their week ends working night and day. That passed, production of building materials and manufactured building fittings, fixtures, etc., increased.

Permanent and pre-fabricated houses were being completed in greater quantity. New factories on the large Trading Estates came more and more into operation.

To me, as an Architect, the Trading Estates and prefabricated houses were two of the most interesting developments. The pre-fab. house is based on Canadian and U.S. planning and amenities. The earlier ones being clothed in corrugated asbestos cement sheeted roofs and walls, later types being of aluminium, painted externally in various combinations of colour, whereas the asbestos cement is left in its drab greyness, though doors and windows are in bright colours.

The aluminium pre-fab. is the best I think. It is really a permanent pre-fab., well-planned and designed and completely assembled in the factory, comes in four sections, taken to the site on four flat motor trucks in convoy, swung into position on the foundation and bolted together in about an hour when Mr. and Mrs. can move the furniture in.

The Government sponsored Trading Estates established to provide diversified employment in what had been depressed areas before the War, came along with plans for scores of new Factories. In the North these estates were developing at Whitehaven, Aspatria, Sellafield in Cumberland and Westmoreland, at Blyth in Northumberland, at Gateshead, Jarrow, Sunderland, Hartlepool and Sherburn in Dudham County.

At Gateshead for instance, some 160 factories have already been built or building, most of them in operation. The estates are comprehensively planned with wide roads, grass, trees, shrubs and flower beds between road and sidewalk. Factories are set back, in many cases, lawns, flowers and shrubs laid out in front. Care of this landscaping is under the Estates Manager.

Design of Factories is given to practising Architects and kept at a high level. The standard factories range from 6,000 square feet costing $30,000. to 20,000 feet costing $100,000. A number of others much larger are also being erected costing from $250,000 to $1,000,000.

The Jarrow Estate down the River Tyne, once a scene of dejected desolation will eventually be tied up with careful landscaping to the old Abbey Church established by the Venerable Bede, 900-odd years ago. It took a year to clear and level the site.

These Trading Estates are a real effort to abolish industrial slums, to bring employment to where the people live, to decentralize from the great sprawling conglomerations of cities.

In addition, quite a number of new Factories are being created by private capital, one really fine comprehensive scheme nearing completion at Darlington is costing $9,000,000. It includes all modern recreational, feeding, training, first aid, and other facilities for employees. Painting of interiors and machinery being specially studied in the bright and variegated colours now found to improve production. A world known cigarette and tobacco firm is putting up a $2,000,000. cigarette plant in Newcastle. At West Chirton, between Newcastle and Tynemouth. A number of large modern factories and the necessary housing are under construction.

Imperial Chemical Industries have under way a project to cost $75,000,000., a new Plastics Division at Wilton Castle near Middlesborough. The old Castle, grounds, parkland and village will be undisturbed and retained as a convalescent rest area, while adjoining, a carefully town planned community of houses, etc., and the Factory group are growing amid trees and country lanes.

This spate of building is not peculiar to the North of England where I was but covers the country.

Controls on materials and licenses are easing as materials slowly become more plentiful. Steel when I left was the difficult item to obtain.

Eighteen months ago, of a list of 100 controlled materials and manufactured building goods, some 75 per cent were decontrolled.

House building, that is low cost and low rental, is now controlled by the municipalities. These houses, generally semi-detached, do not contain more than 1,000 square feet and cost not more than $5,200. Builders can erect for sale one house for every four they build for rent.

In certain cases houses for key Executives can run to 1,500 square feet at a cost of $9,500. but no luxury house building or luxury building of any kind is licensed for the time being, not until essentials have been taken care of.

Late in March I said goodbye to Tyneside and the North with its forthright folk who build ships and go down to the sea in them; who dig coal, make steel and iron, build heavy electrical equipment, make glass and paper; throughout the war all their paper was made from straw, could not get pulpwood. They farm right up to the coal Pit-heads, they fish. Newcastle is the original home of the lowly Kipper!

Then to London again for the last week before making a most comfortable and interesting fly over in the friendly care of T.C.A.

London was beginning to look a little less tired and untidy, getting spruced up with paint and soap and water, though many gaping spaces show wild flowers and even small trees growing among what were once basements and cellars. Shops, offices and houses are still boarded up waiting for glass and other repairs.

St. Paul's is being repaired, festoons of new carving standing out sharp and clear in contrast against the smoke-grimed worn carving which escaped damage. This modern carving is equally as fine as the original of Wren's time.

For nearly a year pneumatic drills have been working on the new Government Building in Whitehall between Northumberland Ave. and Scotland Yard. They are trying to get rid of seven feet of heavily reinforced concrete wartime protection over one portion of Ground Floor slab. They were still at it when I left!

However, the showpiece of wartime Architecture in my opinion, will, I imagine, stay where it is for many, many years. It's the Admiralty Citadel by Horse Guards Parade with eight-foot-thick massive reinforced concrete walls and roof. As Architecture, or perhaps more properly, Engineering Architecture, it's good, looking what it's intended to be. Virginia Creeper and ivy are beginning to soften its sombre mass.

On Easter Sunday I said good-bye to a country that has seen much, done much, given much and endured much through the centuries. Today, in the slow, sometimes irritating English way it is working itself out of present grim difficulties. It has been through worse. It is starting to build anew in a big way, towns, improving farms and building better farm workers' homes, getting rid of country slums, establishing better factories and working conditions and new schools so that coming generations can learn and live a fuller life. Time will be needed, there is so much musty mouldy dead wood and stone to clear, wood and stone whose only claim is age. Prejudice has also to be overcome.

They are a stubborn people, a paradox of sentimentalists reluctantly going forward with ever a lingering glance back at the past, but politically adult, and forward thinking as free people, setting the pattern for many others. Their heritage of the sea and world trade prevents them from becoming, as a people, narrow-minded or parochial in their outlook on the world.

In 1849 Disraeli declared "in industry, commerce and agriculture there is no hope." In my humble opinion that is no more true than when "Dizzy" moaned it; for Britain is struggling to its feet again, refined in the furnace of War. Her spirit was not and is not cowed, and with the spirit there is always hope. They are trying to live up to the words inscribed in one of their churches —

Isn't it strange that Princes and Kings,
And clowns that caper in sawdust rings,
And ordinary folk like you and me,
Are builders of Eternity.

* * * * *

To each is given a bag of tools,
An hour glass and a book of rules,
And each must build ere his time has flown,
A stumbling block or a stepping stone.

GORDON RIVER TOWNSITE

GORDON RIVER, BRITISH COLUMBIA

A RAILROAD LOGGING TOWN OWNED AND OPERATED BY THE KOERNER INTERESTS

By **ROBERT R. McKEE**, *Architect*

Location

20 miles north of Cowichan Lake on the west coast of Vancouver Island.

12 miles inland by rail extension from the Island E. & N. line.

Site Allotment

Approximately 30 acres of land cleared of virgin timber. The site rests in the fork of two small rivers. The site was chosen by the Company for the following reasons:

1. Close proximity to area to be logged (30 billion feet of timber).
2. Close proximity to fresh water.
3. Easy access by train.

Original Requirements

1. To house approximately 40 married families.
2. To house approximately 400 single workers.
3. To provide services of power, water, sewerage and heating facilities.
4. To provide recreational facilities.

Factors Involved

1. PSYCHOLOGICAL

   The remote location required a better-than-average solution to keep labour turnover at a minimum.

2. PHYSICAL

   Ground was bulldozed flat and completely cleared of any form of vegetation or trees of any kind, before the Architect was consulted.

3. ARCHITECTURAL

(a) Cost had to be kept at an absolute minimum.

(b) The Company originally planned on a huge H type of bunkhouse to accommodate all labour — this to be served by an adjoining cookhouse.

(c) Company Woods Superintendents were not anxious to depart from the accepted design for bunkhouse accommodation.

(d) Planning decisions were allocated to two Company officials— a chemical and a forestry engineer. Architect's appeals for arbitration were frequently made to the Company directorate.

(e) The Company are shingle manufacturers. Flat roofs were sold to them by calculating the actual cost of the flat compared with pitch roof. The flat was proven to be considerably cheaper and was, therefore, used.

(f) Function of the Townsite necessitated placing of the cookhouse as centrally as possible.

(g) Houses were made on a timber cradle, so that they might be split and moved to a new location.

Approach and Solution

A. BUNKHOUSES

The greatest difficulty lay in the design of individual units and particularly bunkhouses. Firstly, the idea of the H. bunkhouse was vigorously attacked. The Architect felt that, if possible, as much individual privacy as possible should be given the workers. It was eventually decided, therefore, to break the large H unit into smaller 16-man units divided as shown with eight men in each wing and two men to a room. Also, it was felt that more light and air should be provided to living rooms in order to prevent the usual stale atmosphere prevalent in most coastal camps, including the U.S.A. This was achieved by running stock size strip windows wherever possible. The bunkhouses were planned using the centralization of plumbing as a basic factor. The drying and laundry room was, therefore, backed to the washroom. Four rooms were placed either side of this centre or core to provide ease of circulation to washrooms and also provide additional privacy between groups. It will also be noticed that a lounge and card room is provided for each eight men.

B. DUPLEXES

The original plan was to build individual houses. However, it was proven that a saving could be effected by building a common wall and joining the houses. It was also possible to combine garages into units of two and thereby save.

C. COOKHOUSE

The original plan was to have a standard cookhouse layout. This was changed to cafeteria style as shown.
Triangular trusses were used in the dining room in order to take advantage of a spectacular view of rugged mountain peaks which form a permanent picture in the frame of the main facade windows.

D. OTHER BUILDINGS

The form of other buildings followed the particular function in each case.

E. SEWERAGE

Sewerage is handled by two large septic tanks, each of which is led into the secondary stream on the south.

F. WATER

Water is picked up in a concrete catch basin one and one-half miles from the site. It is run by gravity from there to the supply tank and fed by gravity to the Townsite. In case of fire auxiliary pumps would be used in the river opposite the Townsite proper.

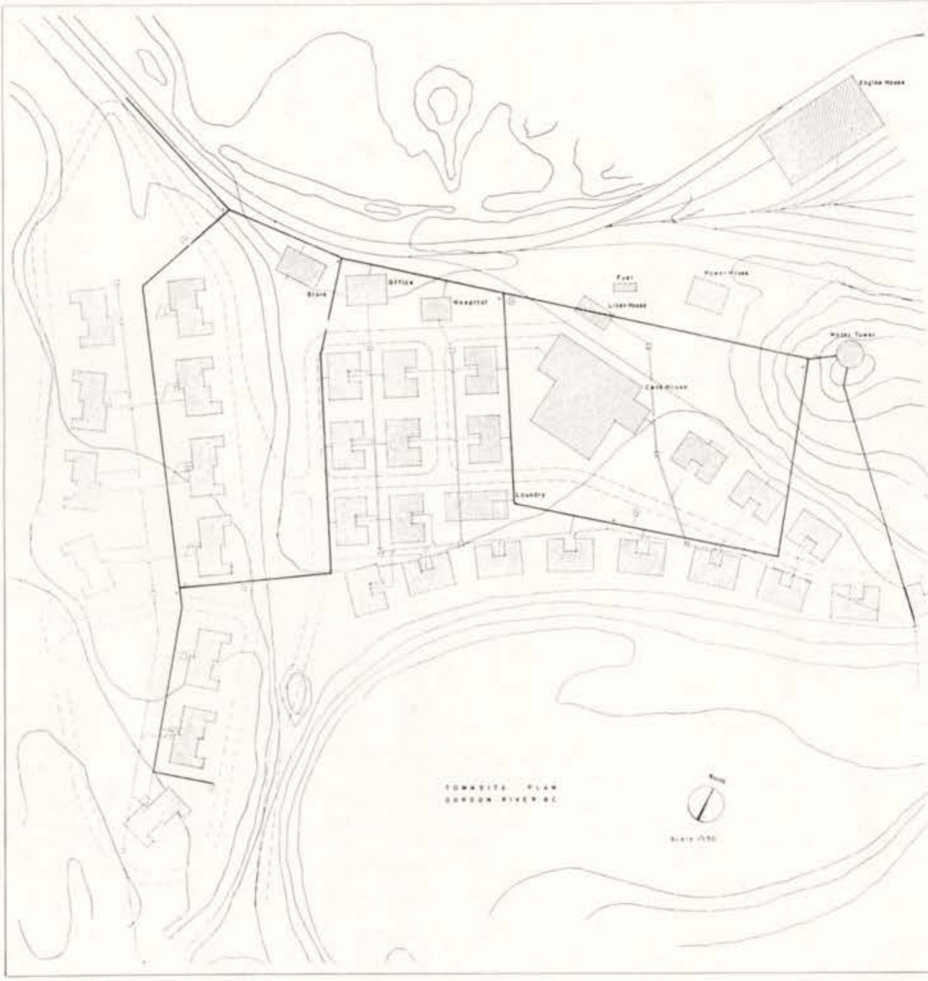
G. POWER

Electrical power is supplied by Diesel.

H. HEAT

Arrangements were made to heat buildings in groups of three. A low pressure hot water system was used. Insulated copper lines were run between buildings and pumps installed on boilers.

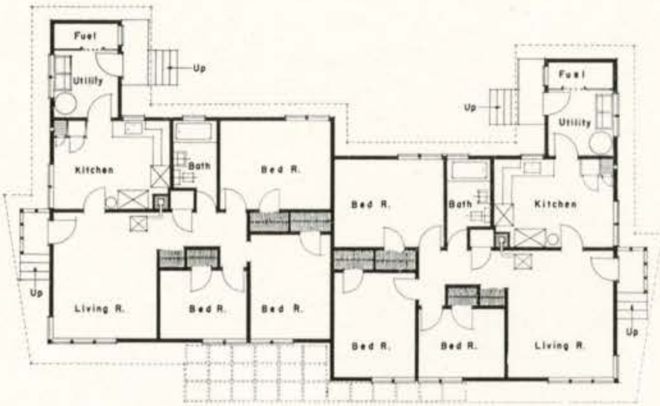
J. For layout of services, roads, etc., see plot plan.



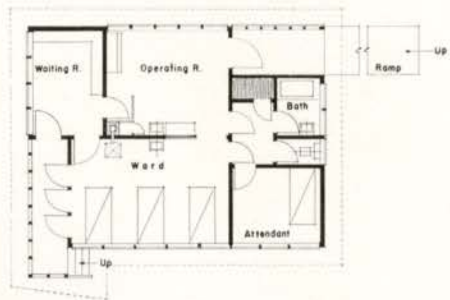
TOWNSITE PLAN

RECREATION FIELD (UNDER CLEARING)

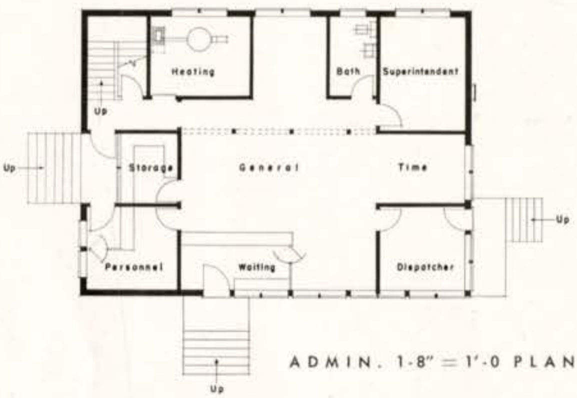
Photographs by Graham Warrington



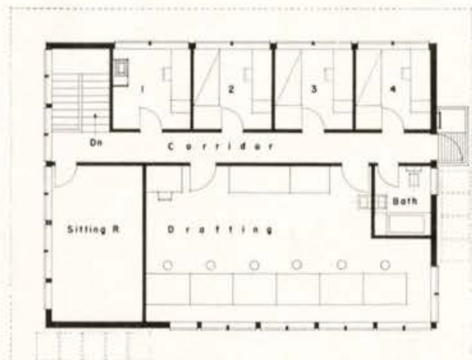
DUPLEX - 1-8" = 1'-0 PLAN



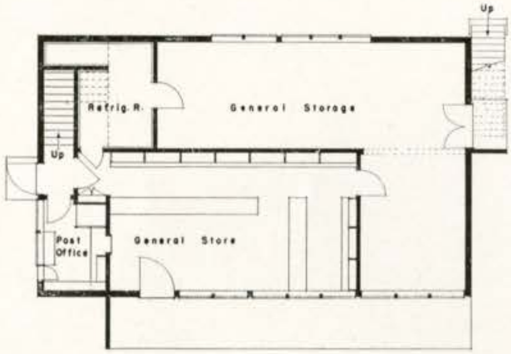
HOSPITAL - 1-8" = 1'-0 PLAN



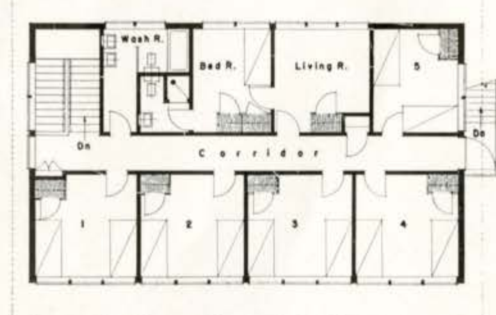
ADMIN. 1-8" = 1'-0 PLAN



ADMIN. 2ND FLOOR



STORE-GUEST HOUSE - 1-8" = 1'-0 PLAN



STORE 2ND FLOOR

ADMINISTRATION OFFICES,
DRAFTING AND ENGINEER'S QUARTERS

STORE AND POST OFFICE,
GUEST ROOMS ABOVE

FIRST AID BUILDING

DUPLEX GROUP

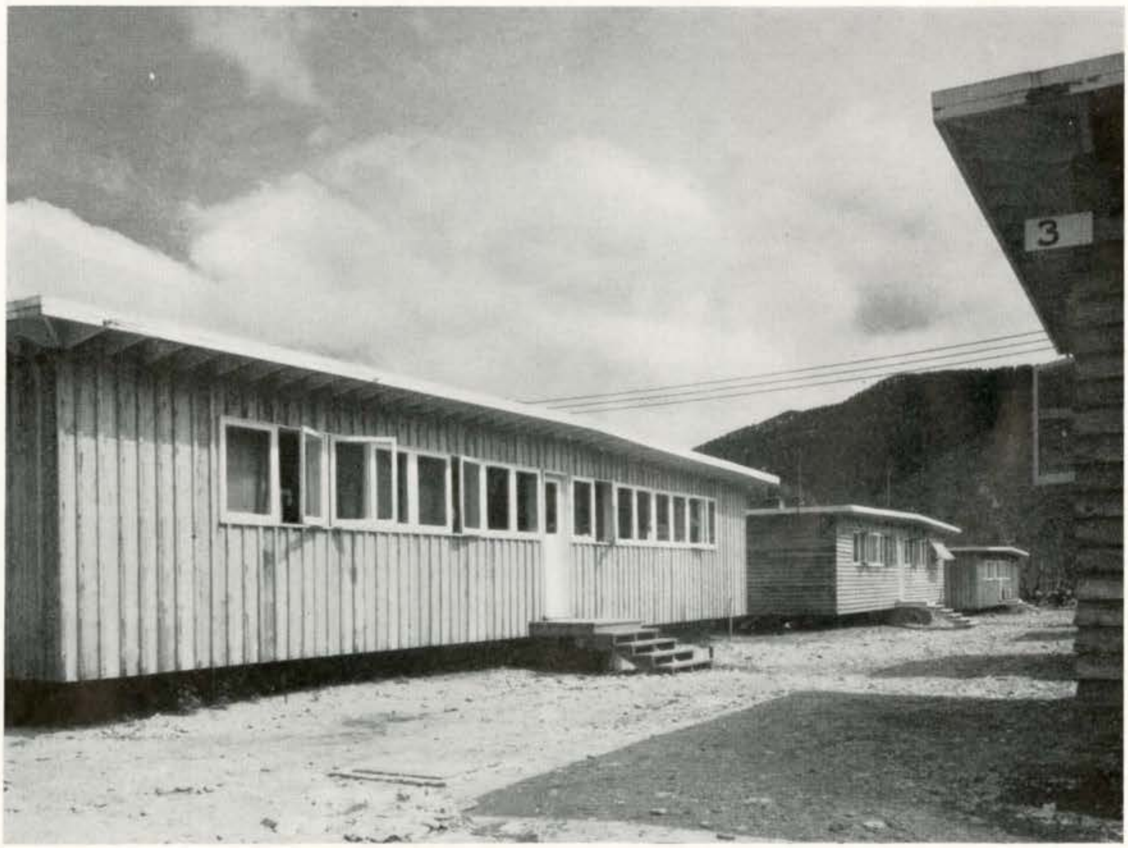
DUPLEX LIVING ROOM

DUPLEX LIVING ROOM

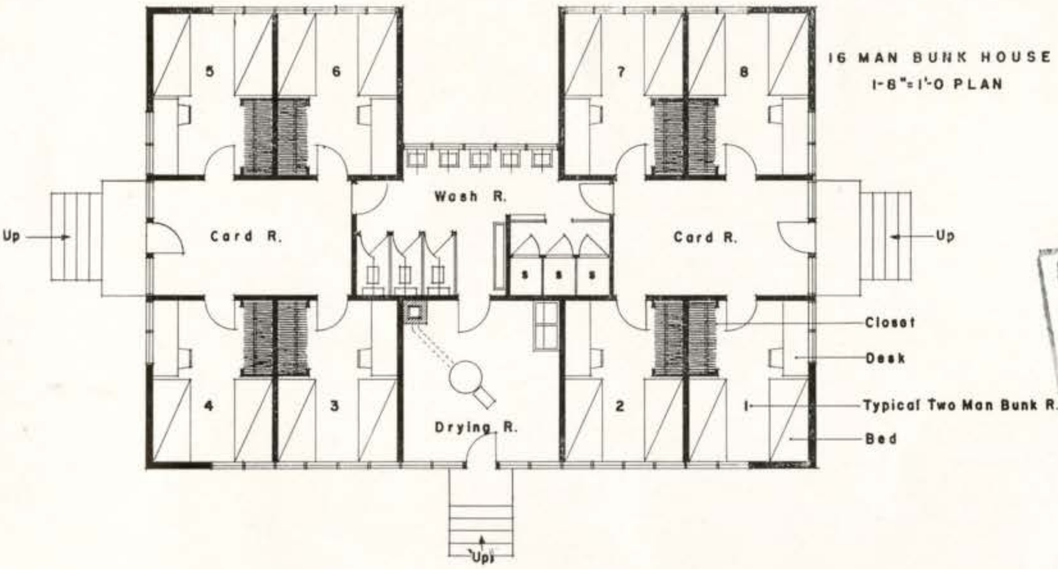
ENGINEEER'S ROOM

BUNKHOUSES

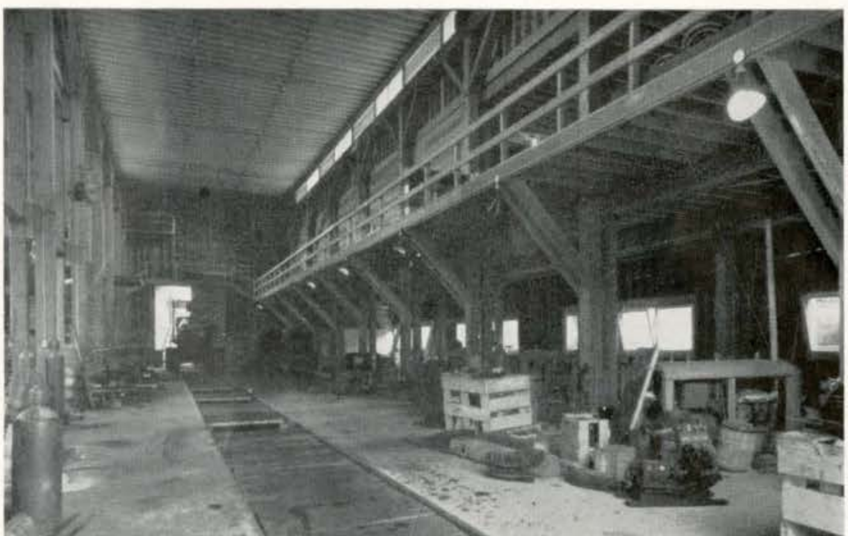
BUNKHOUSES, WEST SIDE



ENGINE SHED

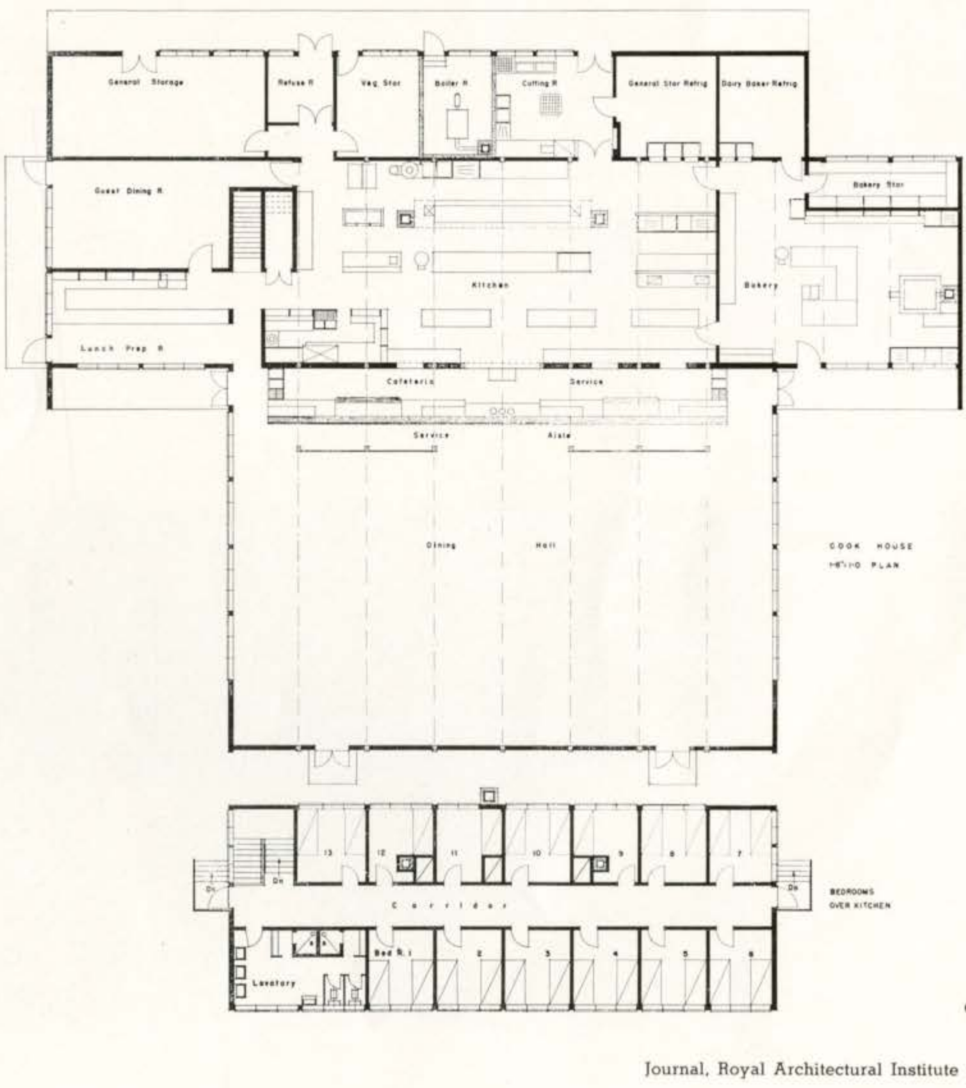


16 MAN BUNK HOUSE
1-8"=1'-0 PLAN

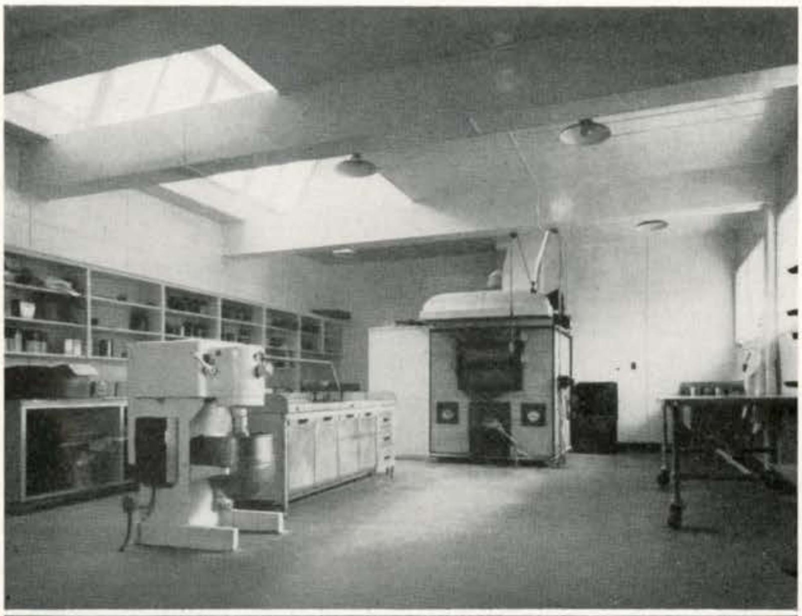


INTERIOR ENGINE SHED

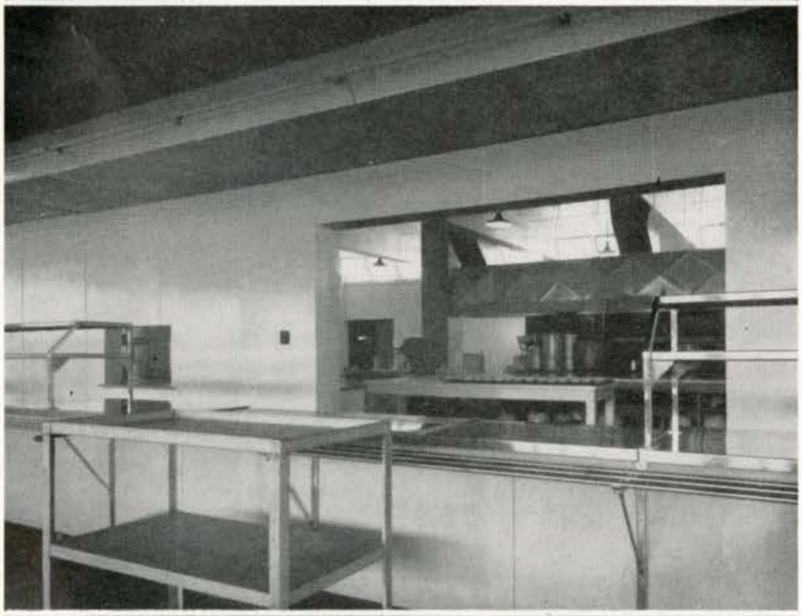
COOKHOUSE ELEVATION



COOKHOUSE PLANS



COOKHOUSE BAKERY



CAFETERIA
LOOKING INTO KITCHEN

DINING ROOM
SHOWING PIN POINT TRUSSES

THE MANUFACTURE OF VENEER AND PLYWOOD

By WM. E. WAKEFIELD

INTRODUCTION

Veneering is one of the oldest of the decorative arts employed in woodworking. It flourished as far back as the 15th Century B.C., and although the methods used were primitive, the results obtained were of such quality that the skill and craftsmanship of these ancient workers compare favourably with those of the producers of modern marquetry and veneer inlay.

The species generally used by the ancients for the preparation of veneers were hardwoods from Africa and the Middle East. Coffin cases, beds, benches, and stools inlaid with such woods as ebony, laburnum, and olive wood still exist as examples of these ancient handicrafts.

The principal tools used were the adze and the handsaw, crude planes, rubbing stones, and sand. Conversion was necessarily wasteful and very laborious. All this has changed with the introduction of machinery, and today veneers are cut more economically, more uniformly, and more rapidly than was conceivable by craftsmen of only a few decades ago.

The improvement in tool steels and in the technique of wood preparation has increased the present day production of veneer enormously, but in many cases the conversion is still very wasteful. One reason, among others, is that a large percentage of the plywood manufactured during the last few years was for military purposes, and, in consequence, standards of performance were set which did not permit the use of low-grade veneer. This has meant that until recently only the choicest logs were cut, and the veneers obtained were carefully selected. Frequently veneers containing small defects were rejected although, under normal conditions, they would have made excellent industrial plywood. This has been the case more specifically in production of high-grade birch and maple plywood for aircraft construction. Closer utilization of logs and veneers may be expected as more plywood is diverted to industrial uses. Many defects which would condemn plywood for such purposes as aircraft construction are of minor importance in structural plywood. One good face, for example, is all that is required for wall panelling. Defective veneer of inferior quality may be quite satisfactory for cores and backing of such panels, permitting the utilization of a great amount of low-grade veneer which under war conditions found its way to the refuse burner.

CONVERSION

There are two methods of producing veneer – by sawing and by shearing with a knife edge. Sawing is preferable for highly figured veneers, such as burls and crotches, as the grain of the wood is usually interlocked to such an extent that attempts to slice it frequently cause tearing and disfigurement of the veneers. Highly decorative designs may be obtained by matching the veneers in the order in which they are separated by the saw. These matched veneers are used for the higher grades of furniture, and for the decorative panels which are found in even the medium-priced furniture produced in recent years.

Veneers obtained in this way from burls and crotches have little inherent strength and, consequently, are of no interest to the structural designer. Veneers sawed from logs with little figure, however, are very strong provided the logs are straight-grained and the strength of the species is high. Such veneers make the best material for laminated veneer construction, but are more costly, as there is a considerable amount of unavoidable waste in the saw-kerf, and also in the back-board (the portion of the log or cant held on the saw table) which cannot be effectively veneered. Special saws with very thin blades are used in this method of conversion, to reduce the kerf loss as much as possible.

Sheared veneers can be subdivided into two classes. The first class of veneers is obtained by passing the log in the direction of its long axis across a fixed knife or by passing a movable knife along the face of a fixed log. The relative motion of log and knife is the same in both cases. The knife is arranged so that the plane of the cutting edge is at an angle to the axis of the log. This causes a shearing action by the knife and facilitates cutting of frail veneers. By this method, veneers of different thicknesses may be obtained by advancing the knife a given distance toward the log at the beginning of each stroke. Veneers manufactured in this manner are limited in size by the dimensions of the face of the log being sliced. The veneers sliced from straight-grained material are strong, but cannot be cut very thick. The limit of width is usually about 30 inches, and of thickness about ¼ inch in suitable species.

If an attempt is made to cut thicker veneers the wood will split ahead of the knife. The result will be a cloven veneer which will be full of inequalities on both faces. For some applications such inequalities are not important. For accurate dimension plywood, such variability in the veneers is undesirable, as it introduces difficult gluing problems which should be studiously avoided.

The second class of sheared veneer is obtained by rotating the log against a knife, the edge of which is parallel to the axis of the log. This knife is steadily advanced toward the log's axis by mechanical feeds which can be altered to suit the thickness of the veneer it is desired to manufacture. This type of veneer is most commonly used in industry; it is the basis of most commercial plywood, and is known as rotary-cut or peeled veneer.

Many species can be manufactured into veneer by sawing, including such easily damaged stock as walnut burls, crotches, and butts, numerous tropical hardwoods, wavy birch, and similar species where the grain distortion is excessive. There are, however, comparatively few native species which are suitable for manufacture into veneer by the rotary cutting or peeling method. For best results, species to be rotary-cut should be as free from defects as possible. Knots may prove to be a dominant factor in preventing rotary cutting of some species, as hard knots may cause knife breakage. The knots of some species are particularly hard, and although eventually it may be possible to find a technique whereby they may be softened sufficiently to permit their being cut satisfactorily, this is not yet possible on a commercial scale.

Heart-rot may be responsible for the rejection of logs of some species, particularly if the logs are small in diameter. One of the necessary preliminary operations in rotary cutting is holding the log so that it may be rotated against the knife. This is known as dogging. The dogs or chucks of the lathe are driven into the ends of the log and, in rotating, turn the log on its axis. Considerable power has to be transmitted through this connection, and if the wood is not sound around the pith the dogs will slip when the cutting load is applied by the knife and the log will not rotate. Sometimes logs of fairly large diameter which are hollow hearted may be salvaged by using oversized dogs, but this procedure is uneconomical with small logs.

It will be understood that other defects give similarly undesirable results, so that the use of different species is governed by their peculiarities of growth, some at the present time being considered valueless for rotary cutting. However, it is probable that, with the advance in knowledge of the techniques of manufacture, methods will be found for overcoming many of the objectionable characteristics of some of the species now considered unsuitable for the manufacture of veneer.

Slicing from the log is preferably confined to the softer species, though hard species can be sliced if properly heat treated. For example, owing to the variation in structure of springwood and summerwood, Sitka spruce does not peel very well when rotary-cut, but when sliced upon its edge-grain or radial face the veneer can be used successfully, and is desirable for some specialized parts of aircraft. Slicing can be used for making veneers from pine, spruce, poplar, yellow poplar, mahogany, oukume, and woods of a similar degree of hardness, and some of the harder and occasionally strongly figured species, such as walnut, maple, and elm. The bolts to be sliced must, of course, be prepared in much the same manner as those to be subjected to peeling. Some species can be cut without any preparation except barking. Others must be soaked in hot water or steamed to soften the wood to a suitable condition for slicing, as explained later in the description of the rotary-cutting process. The temperatures and time necessary to obtain this condition vary with the species and the size of the log. Correct timing is largely a matter of experience.

Rotary cutting is by far the most important method of veneer manufacture, and following is a description of the various stages by which veneer is produced. While the description will not be given in detail, since details vary with species, the steps described give a good general picture.

First the logs to be veneered are selected on their arrival at the plywood or veneer plant. Selection is based on such qualities as straightness; freedom from knots; roundness, i.e., freedom from flats, cat faces, butt swell or other inequalities of surface; and freedom from dote or decay, hollow heart, or other apparent fungus defects. The surface is carefully examined to ensure that no nails are imbedded in the logs, as a nail may break the peeling knife and cause very considerable damage to the lathe. While nails will be found rarely in logs taken from the forest, farmers' logs may have fence staples and old spikes in the butt logs, so extra care must be taken in inspection of the log when it is known to have come from a farm woodlot.

After selection the logs must be kept wet, either by storing them in water in a log pond, or by stacking them and keeping them constantly sprayed with water, so that checking and splitting, caused by the shrinkage that takes place when wood dries, cannot occur. Keeping the logs soaked also inhibits the growth of wood-destroying fungi.

The logs, before veneering, are cut into bolts of a length equal to or less than the distance between the chucks of the lathe, depending on the requirements of the plywood that is being made. After bolting, the bark should be removed from those species not requiring heat treatment. For other species this operation is delayed until removal of the bolts from the steaming or cooking pits takes place, as this process loosens the bark and permits its removal more easily.

The softening process consists of steaming the bolts in a pit or oven, or heating them in a vat. Steaming is preferred by some operators, who claim quicker heat transfer from steam than from direct contact with hot water. Some prefer to cover the logs with sawdust during steaming. Nevertheless much of the wood veneered is prepared satisfactorily by heating in hot water. The time of this cooking or softening is usually about five or six hours, but may be as long as twenty-four hours; the longer period is generally preferred. The time of treatment, as previously mentioned, varies with species and size of log. Certain species can be veneered satisfactory without any heat treatment. Care must be taken in heating that thermal shock does not crack the log. Gradual application of heat from temperatures lower than 100-105°F. to the required temperature is generally considered preferable to sudden immersion in high-temperature water or steam, although some operators claim that rapid heating is best.

The logs are taken from the cooking pits or vats to the peeling floor, where the bark is removed. In some plants a preliminary treatment removes the bark and rough-turns the log, with a view to removing excess material on eccentric logs and excessive log taper. The log, now roughly cylindrical, is lifted by means of a hoist and, by the use of grab hooks inserted in the end faces, is lowered into the lathe until the ends are centred with the lathe chuck-dogs. The chuck-dogs are driven into the log and the lathe knife advanced to take the initial cut as the log rotates. Spurs or spur knives are fixed ahead of the lathe knife, which can be moved in or out to regulate the length[1] of the sheet being cut from the log. These are necessary to ensure that doty wood, end checks, and other defects associated with the end of the log are removed as early as possible in the conversion process. The pressure bar slightly compresses the log surface immediately ahead of the knife. This assists in maintaining the gauge of the veneer and also reduces the tendency of the veneer to split. Some lathes are equipped with a roller which replaces the pressure bar, but acts in the same manner. The initial cut removes the excess material due to log taper where this has not been previously removed. The triangular pieces cut at this stage, known as fish-tails, can be used for making small plywood panels although they are frequently discarded for hogging into fuel. When the knife is cutting the full length of the log, the sheet of veneer is led out onto a castered table, and is broken off into widths[1] by hand. The veneer breaks easily along the grain, i.e., across the sheet. A number of widths are piled one on another until the log has become so small that further peeling is mechanically impossible, or until the operator decides that further peeling is uneconomical owing to the presence of knots, cracks, checks or other defects, which are exposed as the log is turned down. The pile of sheets is brought to the clipper where it is cut, by means of a mechanical shear, to the approximate finished size, allowance being made for the shrinkage which occurs during drying. Automatic clippers are now being used which clip out defects and cut the veneer to the required width as it leaves the lathe. An alternative method frequently used when cutting thin veneers is to roll the veneer around a drum or spool as it is peeled from the log. This reduces breakage since the veneer can be handled more carefully at the clipper, and can be cut to width without such loss as occurs when the veneer is broken by hand as it comes from the lathe. In certain plants the clipper is placed at some distance from the delivery side of the lathe. A system of conveyor belts carries the veneer, as it is peeled from the log, to the clipper. This conveyor system consists of live belts which carry the veneer forward in continuous sheets of considerable length and deliver them as required by the operator at the clipper. As each belt is filled the veneer is broken off and the veneer coming from the lathe is directed onto another empty conveyor belt. These belts are arranged to run at different levels one above the other, and may be filled in succession so that there is slight possibility of congestion occurring at either lathe or clipper, and no delay when the lathe is idle while the core is being removed and a new log inserted. This tends to produce smoother operation of the plant.

When the first method is used the veneer is frequently broken in the centre of a stretch of clear stock which is desirable for face veneers. This causes an unnecessary loss of the more valuable veneer. The other methods tend to conserve the better quality veneer since there is less frequent breaking and more opportunity to arrange for the break to be made at some place where the quality of the veneer is low. The core remaining is removed from the lathe and is discarded for fuel-wood or is sent to the sawmill for conversion into dimension stock, railroad ties, planks for flooring, or other uses such as crating stock, depending upon its size and quality. The cores obtained from some species are suitable for conversion into pulp chips and are sent to the chipper and thence to a paper mill.

A method of veneer manufacture which may be considered as a combination of peeling and slicing is frequently employed when special figure is required from species such as oak, where radial cutting produces the most marked medullary figure and consequently more desirable decorative veneers. This is known as the stay-log method. The logs to be cut into veneers are first manufactured into cants by sawing lengthwise through the pith and re-sawing the half logs so that the best figure can be cut by the lathe. The cants are bolted with lag screws to a frame which rotates between the lathe centres. The cant is thus rotated some considerable distance off the lathe centre and either radial, diagonal, or tangential faces are presented to the knife, whichever produces the best figures, at the discretion of the lathe operator. As the cant rotates, a slice of veneer is cut each time it passes over the knife. Each sheet of veneer as it is cut is piled in the order of its production. In this way the veneers can be closely matched to produce decorative panels in the manner described under sawn veneers.

Stay-log veneering is more economical of timber than sawing, since there is practically no loss due to saw kerf, but a disproportionate amount of timber is lost in the initial trimming of the log and in the back-board which is screwed to the stay-log frame. It is usually less economical of timber than rotary-cut veneer, although this is not true of all species, since some timbers are so full of defects in the vicinity of the pith that it is not good practice to cut the core to too small a diameter. Further, in the greater thicknesses, the curvature of the veneer produced by peeling becomes so great as the core diameter is reduced that flattening and drying may cause

[1] It should be remembered that in the sheet of veneer coming from the lathe the grain or length of the veneer is across the sheet and that the long dimension of the sheet is actually the width of the veneer.

the face of the veneer nearest to the core to check badly, thus considerably reducing its value.

DRYING

After clipping, the sheets of veneer are dried prior to manufacture into plywood, or, in the case of decorative veneers, before shipping to furniture manufacturers. Drying is effected by one of three methods. The cheapest but longest and least effective is by loft drying. This method is the one most commonly employed for drying the sawed or sliced burls and crotches mentioned previously, as the veneers are too fragile to be handled by the other methods. Rotary-cut veneers are rarely dried by this means, but when it is used the veneers are placed on edge in fingered racks or hung from overhead wires by means of friction clips or spring hook devices. These lofts or drying-rooms are kept at a temperature of 90° to 100°F. and are held at a relative humidity of 60 to 70 per cent. This is about the limit of heat and humidity that workmen are capable of withstanding for any length of time. Lower humidities cause crinkled stock and considerable reduction in the grade of veneer obtained. Higher humidities unnecessarily prolong the drying time, and may encourage mildew staining.

An alternative to loft drying is the method of progressive drying. This consists of piling the veneer on castered trucks or kiln cars, the sheets of veneer being separated by stickers or crossers of narrow strips of wood to permit the free circulation of air. The cars are moved progressively forward through a tunnel or drying chamber in which graduated temperature and humidity conditions are maintained.

A similar type of dryer consists of a series of chain belts which hold single sheets of the veneer flat while passing through a chamber or tunnel heated and ventilated in a manner similar to that mentioned in the preceding paragraph.

The third method is by heating the veneer between platens. Single sheets of the veneer are placed between them and dried under pressure. A more modern development of this method of drying is the progressive platen dryer in which the sheets of veneer are fed between steam-heated platens. These platens iron the veneer for a few seconds and then release it, the heat of the platens causing the escape of moisture from the veneer as steam. A series of moving rollers advances the veneer to a second set of platens, then to a third, and so on until the veneer reaches the required degree of dryness. During the drying the veneer is subjected to intermittant pressure and as a consequence is delivered both dry and flat at the end of the process. It differs from the ordinary platen dryer in that the alternate pressing and releasing cycle permits normal shrinkage to take place and prevents cracking and splitting of the veneer.

Frequently the veneer contains small defects such as resin pockets, knot holes, or bark inclusions which mar the appearance of what would otherwise be excellent face veneer. To improve such veneers, special equipment is used which cuts out the defect and inserts and glues in position a piece of veneer matching as closely as possible the grain and colour of the veneer surrounding the defect. Such patched veneers are not generally considered suitable for a stain and varnish finish (unless the matching has been carefully carried out, as is required for certain grades of softwood and hardwood plywoods), but are acceptable for painted finishes. Lenticular cut-outs are plainly visible in the sheet in the hands of the first operator. Shaped pieces of various grains and colours are visible in tray at the head level of the second operator, who is gluing the pieces with an electrically operated shoe. Sometimes it is necessary to glue in strips of veneer to fill splits or cracks in like manner.

EDGE JOINTING

Frequently the veneers are cut in strips which are not wide enough for the face of the finished plywood sheet. In the better grades of plywood these narrow strips are edge-glued to form sheets wide enough to make complete faces. This operation is performed by taping or by a tapeless jointer. Cores and cross-bands are frequently left unglued, but when such joints are taped the edges are brought together and a strip of thin paper tape is glued along the joint to hold the strips together during the operation of pressing. In cheaper grades of plywood the tape is left in place, as its presence has little effect on the strength of the panel. Frequently the paper tape used is punctured to permit the glue to pass through it to the core ply and thus improve what might otherwise be a doubtful joint between the face and the core.

Taping of the exterior veneers is frequently resorted to in the best grades of plywood. When the bonding adhesive is liquified during the pressing operation some of it flows between the edges of the taped veneers and, in setting, glues them firmly together. The tape is then removed by wetting.

Instead of taping, a machine called a tapeless jointer is often used. This operates as follows: two strips of veneer whose edges have been trued so that they make contact along the whole of their length when placed side by side are treated with animal glue and fed into the machine. Small wheels, which are slightly inclined in the direction of the joint, squeeze the sheets from opposite directions so that the edges are forced into close contact. A thin disc dips in a cup of formaldehyde and wets both edges before they are pressed together, and the veneers are carried along under a heated shoe which sets the glue very rapidly. An alternative method is to omit the gluing of the edges with animal glue after jointing and to substitute resin glue for the formaldehyde in the cup of the tapeless jointer. The glue is applied to the edges of the veneers by the disc which normally spreads the formaldehyde mentioned above. This resin is of the cold-setting type to which zinc stearate or some similar lubricant has been added to prevent fouling.

When heated during its passage under the shoe it sets almost instantaneously. On leaving the machine the two strips are firmly glued into one sheet and are ready for further gluing, preparatory to their inclusion in the stack of veneers to be pressed into plywood.

PLYWOOD MANUFACTURE

Plywood consists of a number of veneers glued together under pressure. The veneers or plies are usually laid at an angle to each other so that differences in longitudinal and transverse strength may be equalized to some degree. It is usual to place the veneers at right angles to each other, i.e., the usual construction of three-ply consists of one veneer placed with its longitudinal grain at right angles to the second veneer and a third with its longitudinal grain at right angles to that of the second ply and parallel to the first. In five-ply, seven-ply, or multi-ply construction, the arrangement of the veneers is carried out in a similar manner, the longitudinal grain direction alternating in successive veneers.

In three-ply construction, if the centre ply is made equal in thickness to the combined thickness of the two outer plies (which will normally be of equal thickness) balance of construction is obtained, and the plywood will have approximately the same tensile strength in the longitudinal and transverse directions. In bending, however, the plywood is stiffer when the bending stress is applied normal to the surface and with the span length parallel to the face plies.

In plywood generally, the central ply is known as the core, and the outer plies are known as the face; where more than three plies are used, those lying between the faces and the core are designated the cross-banding.

For aircraft skins and some structural uses it is customary to make the veneers of three-ply of equal thickness. As a consequence, the plywood has directional strength, i.e., it is appreciably stronger in the direction of the face plies than in the transverse direction.

One advantage of making all three plies of equal thickness is the increase in flexibility obtained transverse to the grain of the outer plies. This increase permits the plywood to be bent to fit curved surfaces without unduly stressing the sheet, which would possibly crack if made by balanced construction.

Occasionally plywood is made by using four veneers of the same thickness. Two of these are glued together to make the core. The grain of these two veneers is parallel and the two outer face veneers are glued to them as in the production of normal plywood. While this method consumes fifty per cent more glue it is sometimes economical, as all the veneers, both faces and core, have the same thickness and, consequently, can be cut by one setting of the veneer lathe. It also economizes in storage space as one size of veneers only is stocked instead of two.

ADHESIVES

Plywood is prepared to meet special use conditions. For interiors, protected from the elements, where there is little change in moisture content, adhesives which have considerable strength but little water-resistance can be used satisfactorily. Where there is damp, water-resistant glues should be used, and if the plywood is to be exposed to direct contact with the weather, only waterproof glues should be used.

In the manufacture of box and crate plywood, the adhesive used is of the cheapest type. Starch glues or silicate of soda are sufficiently strong for the purpose, although starch glues have no water-resistance and break down rapidly in a damp atmosphere. Silicate of soda or water-glass is water-resistant for some time, but eventually disintegrates under oxidation by the atmosphere. Where the boxes have to meet extreme conditions of temperature and humidity, adhesives of the resinous type should be used, preferably those based on phenol or resorcinol.

For plywood panels to be used in interiors, such as panelled room or in furniture, animal glue, usually a good quality hide glue, is frequently employed. Animal glue is not waterproof, nor has it been successfully waterproofed by the addition of chemical tanning agents such as formaldehyde or chrome salts. Moreover, under the influence of dry heat it will break down or craze if its moisture content is reduced to a low level. This action is particularly apparent if low-grade bone glues are used. The use of animal glue, requiring heat for proper application and provision for cooling and drying the panels before removal from the press, is giving way to adhesives such as casein glues and extended urea and phenol-formaldehyde resins which will set with heat, permitting the removal of the panels from the press while still hot.

Casein glue is water-resistant and is used either alone or in conjunction with blood albumen for the production of fairly waterproof plywood. While water-resistant, pure casein glues are not waterproof, although some recent formulations almost deserve such a description.

Vegetable proteins manufactured from the proteinic content of oil seeds such as soy beans have been successfully prepared, and are largely used in the production of some commercial grades of plywood. Blood albumen, frequently used in Europe for plywood manufacture of good water-resistant quality, is used as an extender for these proteinic vegetable glues, and it adds considerably to the water-resistance of the plywood. It is also used in conjunction with phenol-formaldehyde resin glues, not to improve the water-resistance of the glue-line, but to reduce costs by replacing a percentage of the more expensive phenolic resin. It also assists in controlling the resin flow during the pressing operation.

Cold-setting blood glues have been prepared recently and are being used successfully for the production of plywood having considerable water resistance.

Thermosetting resin glues used in plywood manufacture are of two types. One type is a liquid suspension of resin and hardener in water, or alcohol, the other a film type in which resin and catalyst are carried by a very fine tissue film and dried without curing. The gluing with the former type of glues may be done in one of two ways, depending on the characteristics of the glue: cold-pressing by using a special catalyst, which by chemical means causes the polymerization of the resin at room temperature, or hot-pressing, by which the polymerization or setting of the resin is effected by applied heat.

Film glues, generally phenolic in character, will keep for reasonably long periods if they are protected from excessive heat. When they are used in the manufacture of plywood, the sheets of veneer are interleaved with glue film and the whole is pressed in a hot press. The resin film is fused and polymerized by the heat and an irreversible gel is formed. This gel is not affected by water and acts as an effective adhesive.

Glues of the first type may be supplied as liquids or as powders to which hardeners or so-called catalysts must be added before application. Alternatively, some powdered glues are supplied with a hardener incorporated and only require the addition of water to prepare them for application.

EXTENDERS

In addition to the use of dried or liquid blood as an extender of phenol resin glues, as previously mentioned, experience has shown that other materials may be used to reduce materially the cost of bonding plywood. For example, starch from wheat or rye can be added to reduce the cost of urea resin bonds. Strong bonds can be made with urea resin extended with twice its weight of rye or wheat flour. Such bonds, however, suffer in water-resistance, and where this is a factor of importance extension should be very moderate – not more than forty per cent.

Walnut shell flour is frequently added to resin glues of the phenol type, not so much to reduce the cost of the glue line as to help control the rate of flow of the adhesive during the pressing operation.

Some glue formulas call for the use of other fillers or extenders, such as wood flour, to stabilize the flow of the resin. Small percentages for this purpose are frequently already incorporated in the glue when supplied by the manufacturer.

PLYWOOD GLUING

In the manufacture of plywood with liquid glues the veneers are coated with glue by means of a mechanical spreader. This machine consists of two grooved steel or rubber rollers placed one above the other to which glue is fed by two chromium-plated steel ductor rollers in much the same way that ink is spread on the rollers and type of a printing press. The veneer is fed into the machine, and the rolls conveying the glue carry the veneer forward and spread an even predetermined thickness of glue over one or both faces, as may be required. It is usual practice to apply glue to the core only in three-ply construction and to the cross bands in five-ply. In multi-ply each alternate ply is glued on both sides, the core and face plies not having glue applied to them by the spreader. In some cases of double spreading the face plies are placed face to face and passed through the spreader in pairs so that one face of each ply only is glued. Occasionally where only one face is to be glued the top roll is not supplied with glue, the bottom roll of the spreader only being used. The veneers are then assembled into bundles ready for pressing.

PLYWOOD PRESSING

Pressing plywood is an operation which depends upon the type of glue used. Plywood made with glues of the cold-setting type may be made in bundles and pressed in a hydraulic press without the application of external heat. Casein, starch, vegetable protein, silicate of soda, and cold-setting resin glue may be treated in this manner. In order that full advantage may be taken of the equipment, it is essential that some means of keeping pressure on the plywood be arranged for until the glue has set. This is usually accomplished by placing a number of steel I beams above and below the stack of plywood and using screwed rods fitted with turn-buckles to hold the pressure once it has been applied by the press. The screwed rods have clips on either end which engage with the flanges of the I beams, and they are tightened when the full hydraulic load is on the plywood. The pressure from the press is released, the bundle removed to storage to dry, and a new pack of plywood placed in the press. In this manner the cycle can be continued indefinitely and the press output correspondingly increased. A large percentage of box plywood is made in this manner.

In hot-pressing, the required number of glued veneers is fed into a loader – a machine used to transfer the veneer packs into the hot-press in the shortest possible time. The platens in the modern plywood press may exceed twenty-five in number, and these start opening from the top. When the press is fully open, and all the previous charge of plywood has been removed, the operator starts to close the press, the bottom pair of platens coming together first. The veneer packs must be rapidly transferred, otherwise the glue will be heated in the packs first put in before the pressure can be applied. Full pressure can only be applied after all the veneer packs are in place and the platens closed.

The heating of the glue before pressure is applied will cause partial setting and result in poor bonding. This applies particularly in cases in which glue film is used instead of liquid resins, and has been a frequent cause of rejection of what would otherwise have been very high-grade plywood. To slow up heat transfer and prevent pre-setting of the glue before pressure is applied, wood or metal sheets called cauls are placed above and below the plywood packs when they are loaded into the press. These serve as temporary insulators and, upon removal from the press, should be cooled, after the pressing cycle is completed, before being used again.

Control of moisture content in veneer is another important item in plywood manufacture. The synthetic resin glues manufactured from urea, melamine, phenol, or resorcinol, are very selective. Many of them will operate satisfactorily only if the moisture content of the veneers lies within a comparatively small range. Small percentage variations above or below the optimum moisture content will frequently cause the resin to polymerize without the necessary adhesion, or else the adhesive will penetrate very deeply into the veneer, leaving a starved glue line, and the plywood will be inferior in strength.

During the pressing cycle the moisture distribution in the plywood has been disturbed. Near the glue lines, moisture produced by the chemical reactions that have taken place in the glue are absorbed by the veneer. The application of heat through the face veneers has raised the temperature of the wood above the boiling point of water, and as a consequence some of the moisture originally in the veneers is dissipated as steam when the pressure of the platens is released. This redistribution of moisture balance in hardwood plywood frequently causes considerable strains to be set up owing to high shrinkage factors peculiar to the heavier woods which, in some instances, have proved sufficiently severe to cause cracking and splitting of the face veneers. In other cases the panels are cockled or buckled. It is, therefore, necessary to treat some hardwood plywood in particular by a re-seasoning process, by adding surface moisture and allowing time for the moisture locked up near the glue line to re-diffuse. The sheets of plywood taken from the press are usually sprayed or dipped in a vat of water for a few seconds and then close-piled – one sheet on top of another – to permit them to pick up and diffuse enough moisture to ease the strains imposed by the pressing temperatures, and so minimize any tendency to warp. The plywood is then carefully dried either by re-stacking on stickers or by passing through a kiln whereby excess moisture can be removed and the sheets brought into equilibrium with the surrounding atmosphere. The careful control of this conditioning process will prevent trouble with the plywood at later stages of utilization.

After conditioning, where such is necessary, the next step is cutting or sanding; if the panel is to be sawed to size the sanding is usually carried out first. In some operations, particularly with soft-woods, the panels are taken directly from the press to the saws and trimmed to the dimensions of the nearest standard size panel; they are then sanded to the sizes required, and finally sawed prior to shipment to the customer.

CONSTRUCTION OF PLYWOOD

In discussing manufacture of plywood reference was made to various types such as three-ply, five-ply, and multi-ply. No mention was made of the thickness of veneers or the number required for plywood of commercial sizes. The reason for this omission is that the make-up varies with use and the sizes of veneers employed are more or less arbitrary, and are selected according to the purchasers' specifications. For example, plywood for use in aircraft structures is designed for specific purposes. Some is made of three veneers of equal thickness of maximum stress-carrying capacity compatible with minimum weight; some is more lightly stressed and more latitude can be permitted in veneer selection. For commercial applications appearance may be a controlling factor or stress-carrying capacity may influence the make-up of the boards. It can be easily understood that with so many varying criteria it is nearly always necessary to specify requirements with the order for plywood, so that the most economical combination of veneers may be obtained.

STANDARD CONSTRUCTIONS

In production of Douglas fir plywood for the domestic market in the United States certain standards have been set up by the industry under United States Commercial Standard CS 45-47. These standards have been promulgated by the Douglas Fir Plywood Association of Tacoma, Washington, and cover both manufacturing and utilization requirements to be met by certain grades of commercial plywoods.

SIZE TOLERANCES

A tolerance of 1/64" over or under the specified thickness shall be allowed on sanded panels and a tolerance of 1/32" on unsanded panels.

A tolerance of 1/32" over or under the specified length and for width shall be allowed, but all panels shall be square within 1/8".

In Canada, no official standards are in use for softwood plywoods, each producer having set up grades which conform in some degree with those accepted in the United States. Table 3 shows, under the heading "Item," the principal United States exterior grades. These grades are manufactured with phenolic based waterproof resins, as are the corresponding Canadian exterior grades of plywood.

None of the manufacturers produces all the grades listed in Table 3, but most of them have a selected list which conforms to certain of the grades.

Water-resistant types of plywood manufactured in the United States have their counterpart in Canadian production, and the obtainable grades are similarly specified. The bond in these panel items is made from flour-extended urea-formaldehyde resin or a similar type of extended synthetic resin based on urea, or, in cases in which high temperature and extended immersion are likely, on melamime formaldehyde resins or combinations of urea with melamime resins. Some water-resistant plywood is bonded with casein and vegetable protein glues, some of which are extended with blood. These latter glues, however, are not suitable for use in exposed positions or where they are subjected to moisture. The proteinic nature of these glues provides nutriment for moulds and bacteria which will eventually destroy the glue-line unless it is kept dry or is protected by means of fungicides and bactericides included in the glue mixture.

Table 1 shows the nominal veneer thicknesses and weights of different types of plywood manufactured from Douglas fir:

Table 1

(12" Width)s

Plywood Thickness (Net)	No. of Plies	Veneer Thickness (Nominal) in inches			Weight lbs. per 1000 sq. ft. (approx.) (As shipped from mill)
		Faces*	Centers	Crossband	
1/8" -R[1]	3	1/24	1/24		490
1/8" -S[2]	3	1/16	1/16		490
3/16"-R	3	1/16	1/16		640
3/16"-S	3	1/12	1/12		640
1/4" -R	3	1/12	1/12		790
1/4" -S	3	1/9	1/9		790
5/16"-R	3	1/10*	1/10*		950
5/16"-S	3	1/8	1/8		950
3/8" -R	3	1/8	1/8		1125
3/8" -S	3	1/8	3/16		1125
3/8" -S	5	1/10	1/12	2@1/12	1125
7/16"-R	3	1/8	3/16		1300
7/16"-R	5	1/10	1/12	2@1/12	1125
7/16"-S	5	1/10	1/10	2@1/10	1300
1/2" -R	5	1/10	1/10	2@1/10	1525
1/2" -S	5	1/8	1/8	2@1/10	1525
9/16"-R	5	1/8	1/8	2@1/10	1675
9/16"-S	5	1/8	1/8	2@1/8	1675
5/8" -R	5	1/8	1/8	2@1/8	1825
5/8" -S	5	1/8	3/16	2@1/8	1825
11/16"-R	5	1/8	3/16	2@1/8	2000
11/16"-S	5	1/8	1/8	2@3/16	2000
3/4" -R	5	1/8	1/8	2@3/16	2225
3/4" -S	5	1/8	3/16	2@3/16	2225
3/4" -S	7	1/8	2@1/12	3@1/8	2225
13/16"-R	5	1/8	3/16	2@3/16	2375
13/16"-R	7	1/8	2@1/12	3@1/8	2225
13/16"-S	7	1/8	2@1/8	3@1/8	2375
7/8" -R	7	1/8	2@1/8	3@1/8	2600
7/8" -S	7	1/8	2@5/32	3@1/8	2600
15/16"-R	7	1/8	2@5/32	3@1/8	2800
15/16"-S	7	1/8	2@3/16	3@1/8	2800
1" -R	7	1/8	2@3/16	3@1/8	3000
1" -S	7	1/8	2@1/8	3@3/16	3000
1 1/16"-R	7	1/8	2@1/8	3@3/16	3175
1 1/16"-S	7	1/8	2@1/6	3@3/16	3175
1 1/8" -R	7	1/8	2@1/6	3@3/16	3350
1 1/8" -S	7	1/8	2@3/16	3@3/16	3350
1 3/16"-R	7	1/8	2@3/16	3@3/16	3525
1 3/16"-S	7	1/8	2@7/32	3@3/16	3525

[1]Rough; [2]Sanded; *For sanded panels, thickness is before sanding.

Data from Douglas Fir Plywood Association publication "Technical Data on Plywood".

Standard Construction of American Plywoods other than Douglas Fir

While the sizes and arrangements of veneers shown in Table 4 are accepted trade standards, some freedom is permitted in the selection of veneer thicknesses, particularly as regards front and back veneers; when 1/28" veneer is used, the cores are usually cut rather plump.

Table 4

Standard Construction of American Plywoods other than Douglas Fir

	Faces and Back Before Sanding	Core	Cross-banding
1/8" 3-ply Rotary veneer core	1/20" to 1/28"	1/28"	—
3/16" 3-ply Rotary veneer core	1/20"	1/8"	—
1/4" 3-ply Rotary veneer core	1/20"	3/16"	—
3/8" 5-ply Rotary veneer core	1/20"	1/8"	1/12"
1/2" 5-ply Rotary veneer core	1/20"	3/16"	1/8"
5/8" 5-ply Rotary veneer core	1/20"	3/16"	3/16"
13/16" 5-ply Lumber core	1/20"	11/16"	1/20"

STANDARD SIZES

Table 2

Standard Douglas Fir Plywood Sizes (Moisture-Resistant Type).

Item	Width (Inches)	Length (Inches)	Thickness (Inches) (After Sanding)
Standard Panels (S02S) (S01S)	24 30 36 48	60 72 84 96	1/8 (3-ply) 3/16 (3-ply) 1/4 (3-ply) 3/8 (3-ply) 1/2 (5-ply) 5/8 (5-ply) 3/4 (5-ply)
Wallboard	48	60 72 84 96	1/4 (3-ply sanded 2 sides) 3/8 (3-ply sanded 2 sides) 1/2 (5-ply sanded 2 sides)
Sheathing	36 48	96	5/16 (3-ply unsanded) 3/8 (3-ply unsanded) 1/2 (3 or 5-ply unsanded) 5/8 (3 or 5-ply unsanded)
Automobile and Industrial	As ordered up to 48	As ordered up to 96	1/4 (3-ply unsanded) 5/16 (3-ply unsanded) 3/8 (3-ply unsanded) 1/2 (5-ply unsanded) 9/16 (5-ply unsanded) 5/8 (5-ply unsanded) 11/16 (5-ply unsanded) 3/4 (5-ply unsanded) 7/8 (5-ply unsanded) 7/8 (7-ply unsanded)
Concrete Form Panels	36 48	60 72 84 96	1/4 (3-ply sanded 2 sides) 1/2 (5-ply sanded 2 sides) 9/16 (5-ply sanded 2 sides) 5/8 (5-ply sanded 2 sides) 3/4 (5-ply sanded 2 sides)

Data from Douglas Fir Plywood Association publication "Technical Data on Plywood".

Table 3

Standard Douglas Fir Plywood Sizes (Exterior Type).

Item	Width (Inches)	Length (Inches)	Thickness[1] (Inches) (After Sanding)
Standard Panels (G2S-Ext.) (G1S-Ext.) (S02S-Ext.) (S01S-Ext.)	12 26 14 28 16 30 18 36 20 42 22 48 24	48 60 72 84 96	3/16 (3-ply) 3/4 (5-ply) 1/4 (3-ply) 13/16 (5-ply) 5/16 (3-ply) 7/8 (7-ply) 3/8 (3-ply) 15/16 (7-ply) 7/16 (5-ply) 1 (7-ply) 1/2 (5-ply) 1 1/16 (7-ply) 9/16 (5-ply) 1 1/8 (7-ply) 5/8 (5-ply) 1 3/16 (7-ply) 11/16 (5-ply)
Sheathing Exterior	48	96	5/16 (5-ply unsanded) 3/8 (3-ply unsanded) 1/2 (3-ply unsanded) 5/8 (3-ply unsanded)
Industrial Exterior	As ordered	As ordered	1/4 (3-ply unsanded) 5/16 (3-ply unsanded) 3/8 (3-ply unsanded) 7/16 (3-ply unsanded) 1/2 (5-ply unsanded) 9/16 (5-ply unsanded) 5/8 (5-ply unsanded) 11/16 (5-ply unsanded) 3/4 (5-ply unsanded) 7/8 (5-ply unsanded)
Concrete Form Panels Exterior	Same as Standard Panels	Same as Standard Panels	5/8 (3-ply sanded 2 sides) 3/4 (5-ply sanded 2 sides)

[1]Number of plies listed under thickness is minimum.

Data from Douglas Fir Plywood Association publication "Technical Data on Plywood".

Courtesy: Department of Mines and Resources; Mines, Forests and Scientific Services Branch; Dominion Forest Service; Forest Products Laboratories.

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NEWS FROM THE INSTITUTE

ALBERTA

The work of the architect is greatly affected by the various public regulations to which buildings must conform. Besides the usual Building Codes and Zoning By-laws there are provincial regulations concerning schools, theatres and other special classes of buildings. Firewriters' and electric installation standards must also be observed. The National Building Code has its own wide domain. The necessary limit to the enforcement of all or any of these is the impracticability of complete inspection. There are many buildings, even important ones, to which efficient inspection cannot extend. A limited number of inspectors cannot be everywhere all the time. Competent architects and competent builders are, in any case, the best guarantors of good work.

Regulations tend to raise the standard both of the planning and of the construction of buildings. That is one of their objectives. It seems inevitable that, in fulfilling this good purpose, they also raise the cost of building and, often enough, they also lower the possible financial return from the buildings. At present, building costs are on the up-and-up from a variety of other causes and at the same time the demand for lower-priced living accommodation sounds ever louder in our ears and somehow it must meet with response. It is considered a highly meritorious thing for an agriculturist to get two blades of grass or two ears of grain growing where only one could grow before. It is not at all meritorious in the architect to make two families live in a space where only one could live before. It is, on the contrary, one of the principal aims of town planning to provide more living space for presently overcrowded families.

This applies most forcibly to apartment accommodation for low-income groups. The competent architect does not require legal regulations. He may even find that some of these hamper the best solutions to his problems. Yet he may at times be thankful that he can refer to regulations which offer him a defence against the machinations of the high-pressure, profit-seeking client. They also call attention to the need that each must proceed with careful regard to neighbours and to the public interest. The architect may design an apartment building with, say, two suites per floor. His client, however, wishes to have three. What is the architect to do? He sees more clearly than his client that three or maybe even four are possible, but he would rather provide the decent space for family living that two will admit of. The client, on the other hand, would like to have the financial return of several extra thousand dollars to his own pocket. Some check on the situation may be a regulation requiring a minimum amount of floor space per family unit. Such regulations are not easy to frame, for many families consist of only one or two persons. Some guarantee is necessary to secure that a family of six or eight does not have to occupy the space barely sufficient for two.

In the "Standards" of the National Housing Act—which are very carefully prepared—"it is 'recommended' that any building have an area of at least 750 square feet, providing for an ultimate 4 standard room dwelling, measured by exterior wall dimensions and not including porches or verandahs." Further requirements as to sizes of rooms are laid down. These, or better, should be incorporated in the by-laws of all municipalities. They are framed specially for individual houses but they may furnish a basis for the regulation of multi-family dwellings. The apartment building urgently needs very intimate attention for the poorly designed apartment building especially when spread over too large a proportion of its lot area is the most fertile seed of slum conditions. Even the better class apartment house, for which too little garage or other self-contained parking accommodation is provided, greatly intensifies the congestion of streets by motor cars, a growing headache in our present day city life. It seems that it is becoming necessary to regulate the planning of apartment buildings with strict regard to sufficient parking facilities on the same lot. It may seem to a building owner in a commercial district an uncalled for hardship that loading and unloading space must be provided on the lot itself whether he or his tenants require this or not. Yet regulations now quite generally insist upon the provision on the grounds that the building may any day pass into the hands of others who do need the provision and what is law for one must be observed by all. In view of the car situation and for the sake of sufficient space for all it may be found that the maximum coverage of a lot with apartment building should be reduced from the fifty per cent. required by the N.H.A.

Cecil S. Burgess

BRITISH COLUMBIA

Extracts from Mr. William Fredk. Gardiner's letter to members and students of The Architectural Institute of British Columbia.

Eight months have passed since I wrote my last report covering a summary of what the Council had accomplished up to that time, so I feel that I should write you again as our Annual Meeting is drawing very close and much has taken place in the meantime.

Perhaps the most outstanding news which you would like to be acquainted with is the progress made in connection with our new Act. During the past eight months much has been accomplished which I hope will ultimately be to our benefit in acquiring a better Act.

You probably know that our Bill was not by any means turned down but simply referred back to the Committee of the Caucus for further consideration. Mr. McDougall, M.L.A., Chairman of that Committee, has in the meantime expressed the opinion that he sees no reason why the Bill, with the few amendments suggested, should not go through at the next Session. Mr. Hutcheson, our lawyer, and also Mr. Norris whom we engaged especially to assist Mr. Hutcheson in Victoria, expressed regret that the work they put in at the last Legislature did not lead to more successful results.

Jack McCarter and John Porter, our President, together with Fred Townley, spent days in Victoria watching our interests. However, their time and trouble was not wasted, insomuch that the Bill was adjusted to the satisfaction of many of those who were affected by it and while it did not reach the Legislature at the last Session, it is still before the Committee of the Caucus and we have every reason to believe will be presented at the Fall Session to the Caucus and in turn to the Legislature.

Excellent work has been done by the Editorial Committee under the Chairmanship of Prof. Fred Lasserre which I hope you have already noticed from the pages of your recent *Journals* of the R.A.I.C. We recently held a meeting and decided to put on an Exhibition before the end of this year of which you will be notified shortly.

Also, it was felt that the Annual Meeting should be extended for at least a two-day session rather than a half a day which does not begin to allow sufficient time to enter into the discussions from the various reports submitted, as well as deal with new business which I am sure many of the members would like to have the opportunity of presenting at the Annual Meeting.

You will be receiving a letter very shortly, if you have not already received one, from Prof. Lasserre, outlining the proposal of presenting plans for publication every Saturday in the Vancouver Daily Province under the auspices of the A.I.B.C., which will be open to all Registered Architects as well as the Articled Students, and including, I hope, the Architectural Students at the U.B.C. It has also been suggested that these plans be made into a book form later on, to form the nucleus of a small house bureau under the auspices of the A.I.B.C.

In conclusion, your attention is directed to the action of certain School Districts in British Columbia requesting submission of sketch plans for school projects on the basis that no obligation is incurred for payment of such plans unless they are approved and accepted by the Board.

School Districts who have made this proposal have been advised that members of our Institute are required to adhere strictly to the provisions of the Architects Act and that their proposals are tantamount to Architectural Competitions and subject to the Rules and procedure as laid down in the Institute By-Laws.

William Fred'k. Gardiner
Honorary Secretary.

ONTARIO ASSOCIATION OF ARCHITECTS 1949 CONVENTION AND ANNUAL MEETING

The 1949 Convention and Annual Meeting of the Ontario Association of Architects will, in all probability, be one of the most interesting, educational and entertaining gatherings in the history of the Association.

The Committee of Arrangements, under the Chaimanship of Mr. George Gibson, have spared no effort in providing a programme, which will include many new features and functions, and which it is felt will ensure a record attendance of Members from all parts of the Province.

Mr. Louis Skidmore, A.I.A., of the firm of Skidmore, Owings and Merrill, New York City, will be the guest speaker at the Annual Dinner. It is felt that his presence at a gathering such as the Annual Dinner of the Ontario Association of Architects will be unique because of the prestige of his firm and the wide diversity and international scope of his practice; and because of the unusual projects which he has designed and planned, including atomic bomb plants for the United States' Government.

Other features of the Convention include a larger and more carefully planned Exhibition of New Building Materials and Techniques, an Exhibition of Renderings by Members of the O.A.A., and a display of the work of the Students at the School of Architecture, University of Toronto.

Panel discussions led by prominent professional specialists, business sessions, tours of new buildings, cocktail party and entertainment will ensure the professional and social success of the Convention.

The dates: January 21st and 22nd, 1949 – the place: the Royal York Hotel, Toronto.

QUEBEC

J. J. P. Oud has been worrying (via the correspondence columns of the R.I.B.A. Journal) about the architectural integrity of the projected United Nations buildings in New York. He expects to see in the finished buildings a competent statement of modern architectural-engineering. But he fears that the statement will have nothing spoken from the heart to warm it—that the smartly engineered project will lack that aesthetic ingredient which he calls "art-in-building".

The polite challenging of this judgment by Howard Robertson and Edward Passmore provoked a second letter from Oud, in which he showed that he is disturbed not merely by the evidence of the U.N. project but by the general tendency of contemporary architecture. He contends that "functional building at the moment is in a phase of self-sufficiency which is the best state to lead it quickly and totally to an end, and, as a matter of fact, by eclecticism if we are not attentive".

The less inspired majority of architects are not the ones who crash the history books; and this majority, through all the ages of building, have no doubt supported their not-too-robust creative abilities with eclectic props. Today, to choose one obvious example, the designers of brick-faced industrial buildings up and down and across the continent have community of property in a little bagful of tricks that are swapped about from project to project—the light horizontal stone framing of the row of office windows (the "art" in this stonework being interpreted by the wise bidder as "artificial"), the extensible concrete hood that is as serviceable to the architect in actuality as the old "hide" tree used to be in renderings, the integrated flagpole that is an invaluable skewer to pin down the centre of interest.

The principle of international collaboration rather than competition in the designing of the U.N. buildings, is, when you come to think of it, a remarkable departure. And if, on the one hand, too many temperamental cooks can't be expected to produce a distinguished broth, on the other hand the collaboration itself is one of the few heartening demonstrations by the United Nations to date.

And, considering the architectural aspect only, an international competition for such a project today would undoubtedly suffer the same history as such competitions have suffered in the past. Great, or near-great, architecture *might* be offered by some competitor, and it might be saluted with a prize. But ten to one it wouldn't be the first prize.

The shrewdest and most diplomatic judgment of a prominent competition in controversial times was, to my mind, that of the competitions for the R.I.B.A. headquarters early in the 'thirties. The prizes were judiciously divided between the old and new schools of thought and the winning design offered a three-fold policy. It presented the general appearance of contemporary London business-architecture, ponderous with Portland stone (a slimmed-down version of what Howard Robertson had called "the Cyclops architecture of finance, fat, aggressive, and blindly groping toward a future empty of everything except an alarming durability"). Secondly, it made a formal little bow to the modernists by foregoing applied ornament. And, finally, it kept the important die-hards quiet by meeting them at the door with two free-standing Doric columns, supporting delicate bronze nudes.

However, there was a refreshing variation here. In most of the respectable building projects of that day (e.g. Montreal's Sun Life Building) the classic columns were hanged by the neck to the steelwork. At the R.I.B.A. they were guillotined instead, and stood there without capitals, supporting the bronzes on their raw neckings. To some spectators of the scene (particularly architectural students and fresh graduates) it was a pleasure to see the very guardians of the Style proceed so cheerfully to the execution with gallows and axe.

There's evidence to show that most laymen, if they felt it were respectable to speak up frankly, would confess that the architect's earnest concern with the philosophies of modern architectural expression adds up for them to just so much double-talk. The indulgent client, while he understands and appreciates—and can even be proud of—much of what he is given in his building, is liable to show a negative reaction to just those qualities of the design that please or deject the architect (and account for the most soul-searching ordeals at the drawing board).

But I suspect at times that, while the layman is unforgivably uncouth in his aesthetics, yet he may secrete vestiges of certain earthly instincts that have to do with man and his buildings—instincts that the architect has lost through the purging effect of his special education. So far, I must say, my observations of these suspected instincts suggest that most of them have become rather perverted. Take the case of oak, for instance. It is more often than not foolhardly to specify oak for, say, an entrance door that demands painting in order to complete the colour scheme of a facade. Once the client catches sight of that hallowed wood, the safe bet is that no paint brush will be allowed to touch it. Make it as golden as you like with heavy varnish, but don't hide that oak.

I have wondered why oak can depend on such a spirited defence of its virtue (even bastard-cut oak) when other fine native hardwoods are abandoned lightly to the architect's whims. Recently I came across the following observations of one William Harrison, a chronicler of the English scene in the latter half of the 16th century, which go to show that oak has been tampering with the integrity of human beings fully long enough to have left the stirrings of instinct in the modern client:—"In times past men were contented to dwell in houses built of sallow, willow, plum-tree, hardbeams, and elme, so that the use of oke was in manner dedicated wholie unto churches, religious houses, princes' palaces, and navigation, but now all these are rejected and nothing but oke anie whit regarded. And yet, see the change, for when our houses were builded of willow then we had oken men; but now that our houses are come to be made of oke, our men are not onlie become willow, but a great manie, through Persian delicacie crept in among us, altogether of straw, which is a sore alteration."

Robert Montgomery

CONTRIBUTORS TO THIS ISSUE

S. T. J. FRYER

Born in England in 1885 Mr. Fryer received his education in England and Switzerland, coming to America forty-one years ago. Before coming to Canada he spent a number of years in New York and Boston, and in 1911 formed a partnership with W. G. Evans in Hamilton. He was President of the A.A.A. 1923-24. Returning to England just before the outbreak of war, Mr. Fryer was attached to the Ministry of Works in London during the battle of Britain; afterwards he was Technical Officer at No. 1 Region M.O.W. located at Newcastle on Tyne. Returning to Canada this spring he is now associated with H. E. Murton and W. G. Evans in Hamilton.

Wm. E. Wakefield, M.E.I.C.

Born in England, 1892. Pupil in Mechanical Engineering at the Midland Railway Co., Derby. Technical education Derby Technical College. Served 1914-19 with Royal Engineers. Engineer City of Prince Albert, 1920-21. Dominion Forest Service 1926 as Engineer in Forest Products. Chief of Division of Timber Mechanics 1940, Forest Products Laboratory, Ottawa, Dept. of Mines and Resources.

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The Editorial Board wishes to express its indebtedness to **Mr. Arthur H. Eadie** for the interest, which he took, in the compilation of material for the Industrial issue.

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PUBLIC RELATIONS OFFICER

The Council of the Ontario Association of Architects has under consideration the appointment of a Public Relations Officer and is of the opinion that there may be some one among the Members who may be interested in undertaking public relations work on behalf of the Architectural Profession in Ontario.

The appointment would be on a full time basis, and any Architect who may be interested is requested to communicate with the Secretary, Ontario Association of Architects, 1323 Bay Street, Toronto.

BOOK REVIEW

THE AGE OF ADAM
by James Lees-Milne

Published by B. T. Batsford Ltd., London, W.1, England. Distributed in Canada by Clarke, Irwin & Co. Ltd., 480 University Ave., Toronto. Price $5.00

This book is one of the British Art and Building series, for which Messrs. Batsford are to be highly commended. Few of the authors in the series will be known to Canadians, but, like Mr. Sacheverall Sitwell who wrote "British Architects and Craftsmen," all have produced books that are remarkable for their scholarship, readability and humour. All are well illustrated and the "Age of Adam" is no exception with 200 illustrations, some of which are in colour.

We like to think that the modern architect or the modern art critic is aware of contemporary achievement in British architecture, but that each is capable of appreciating the architecture of the past – even to the extent of writing about a period which interested him particularly. The history of architecture is taught in the Schools of Architecture for as long as four years in a five-year course, and is thought to be essential to an understanding of the problems of our own age. For Mr. Lees-Milne there is only the past, unless one mistakes his meaning in the foreword. *"But to-day, since Britain has won the war, we exist (for human beings have long since ceased to live) in a more progressive vacuum – one of political ineptitude, social decadence, spiritual deadlock, and artistic gelidity."* And so he approaches his subject upon delicious bits or retrogression away from the present quagmire of existence." However one can forgive him that (and indeed sympathize with him) for an excellent little book that should make glad both architect and lay reader if they are fortunate to receive it for Christmas. It should be in every School of Architecture library.

E.R.A.

LOCAL STYLE IN ENGLISH ARCHITECTURE

An Enquiry Into Its Origin and Development by T. D. Atkinson. Published by B. T. Batsford Limited, London W. 1, England. Distributed in Canada by Clarke, Irwin & Company, Limited, 480 University Avenue, Toronto. Price $3.75.

This is another in that profusely illustrated and beautifully got out series on British Art and Buildings by Batsfords. It is on a rather more specialized subject than those previously and confines itself to analysis of distinctly local varieties of medieval architecture in England. The factors determining the local variation are listed as geology, race, religion, foreigners, wealth, transport and fashion and each is studied as well as the actual variations themselves.

The subject is rather too large for so small a book, the chapter on variations in church furniture for instance is only five pages long. It is likely to be chiefly interesting to those with an already fairly comprehensive knowledge of English architecture.

A. Adamson

OBITUARY

JOHN METHVEN

John Methven, well known Chatham architect, died November 1. He was in poor health for the past year.

Mr. Methven was born in Dundee, Scotland, 65 years ago. He came to Canada 33 years ago, and practised architecture in Chatham for the past 30 years, during which time he designed many fine homes, schools, public buildings, and factories in this city and district.

He was architect for The Canada and Dominion Sugar Company, and was associate architect for the International Harvester Company on their new Chatham factory. He was architect or associate architect for the Chatham Board of Education on various schools in the city.

Mr. Methven graduated in architecture from the Edinburgh University, and for some time was associated with Sir Rowand Anderson in work for the Ancient Monuments Commission in Scotland.

Mr. Methven took a great interest in community affairs. He was a charter member of the Chatham Rotary Club and a member of the Kent Club.

He is survived by his wife, the former Miss Nicholls, two daughters, Mrs. Garland Fiske of Toronto, and Miss Elizabeth Anne Methven of Chatham, and one son, Dr. J. F. Methven of Toronto.

J. W. Storey

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Facts by Pilkington about Glass
FOR ARCHITECTURAL STUDENTS

NO. **25** *Thermopane** INSULATING UNIT *(CONTINUED)*

*Registered U.S. Patent Office

In calculating the performance of *Thermopane* where unusual pressures exist, as in the case of exterior glazing of high buildings to withstand high wind velocities, the pane on the pressure side may be examined for strength by the formula:

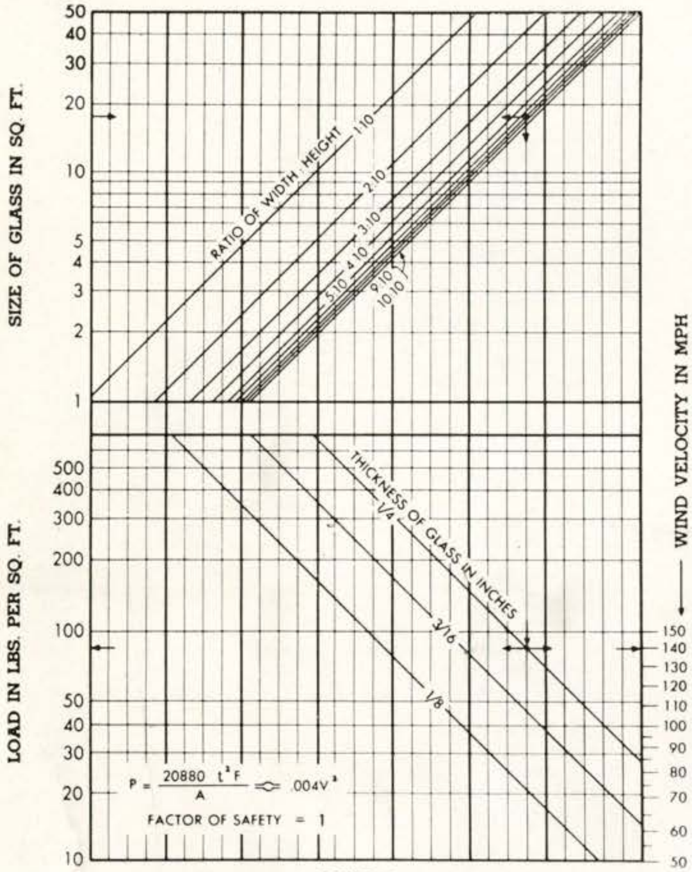

FIGURE 6

BASIS OF CALCULATING WIND LOAD ON *THERMOPANE*

Since *Thermopane* is a hermetically sealed unit the air in the air space is free to expand and contract to some extent with changes in temperature and exterior pressures. In large *Thermopane* units, under conditions when both glasses are convex or bowed out from the air space, part of the exterior wind load would be directly transmitted to the inboard glass and the inboard glass would be expected to lend some support. However, when atmospheric conditions cause both glasses to be concave or bowed into the air space, the addition of wind load on the outside glass would cause it to deflect further and the pressure thus added to the inboard light would cause it to flatten, at which time it would not be lending any appreciable support to the outboard glass. Thus at regular intervals conditions can exist where the outboard light must assume practically the entire wind load and the wind load resistance of large size *Thermopane* should, therefore, be calculated on the *strength of the outboard glass* with little, if any, allowance for the variable support from the inboard glass.

$$PA = 3.48\ Mt^2F$$

If the modulus of rupture (M) for standard glass is taken at 6000 pounds per square inch, this formula becomes:

$$P = \frac{20880\ t^2F}{AS}$$

in which

P = the pressure in pounds per square foot
t = the thickness in inches
A = the area in square feet
F = the factor for ratio of width to height of the pane
S = safety factor (1 to 10)

Ratio Width-Height	Factor (F)
10:10 (Square)	1.000
9:10	1.005
8:10	1.02
7:10	1.07
6:10	1.14
5:10	1.25
4:10	1.45
3:10	1.8
2:10	2.6
1:10	5.0

The wind velocities in miles per hour (V) which are equivalent to given pressures in pounds per square foot may be found from the formula

$$\text{PRESSURE} \subset 0.004V^2$$

The chart (Fig. 6) gives the strengths of standard plate glass for various thicknesses, width-height ratios.

As an example of the use of this chart, suppose we wish to design a *Thermopane* panel of 17.5 square feet with a width to height ratio of 7:10 (5.0 feet wide by 3.5 feet high). Read across the upper part of the chart from the 17.5 square foot size of glass to the diagonal line 7:10 for the ratio of width to height. At this intersection read down to the lower diagonal lines for the thickness of glass. The intersection with the diagonal line shows that a ¼" thickness will stand 78 pounds per square foot on the left hand scale. Reading to the right from this intersection we find this is equivalent to 140 mph wind velocity.

NOTE: A factor of safety of 1 has been included in Fig. 6. The appropriate factor of safety to be used is a matter of engineering judgment and should be governed by the individual application. If the application involves a substantial hazard, a safety factor of 5 to 10 is recommended. The decision should be made at the discretion of the architect or engineer.