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ROYAL ARCHITECTURAL INSTITUTE OF CANADA

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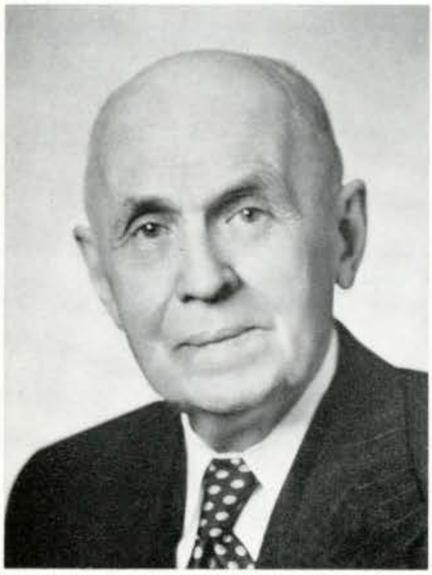


A. J. C. PAINE, PRESIDENT

On May 14th, at the close of the dinner which marked the end of the 47th Annual Assembly, A. J. C. Paine, FRAIC, was installed as President of the Institute. The ceremony was very simple. R. Schofield Morris, the retiring President, removed from himself the Presidential Collar and Medal, and with a few well chosen words, placed them on the shoulders of the incoming President, who then stepped into the vacated place at the head table. The hundreds of members present and their ladies showed their pleasure by prolonged applause.

This honour conferred upon Arthur Paine is well earned, for inside and out of office, privately and publicly, but mostly privately, he has rendered many services to the profession. He was President of the Quebec Association, after a term on the Council, and, as everyone knows, he served the Institute successively as member of the Council and Executive Committee, Honorary Secretary and Honorary Treasurer before attaining his present office.

Among committees upon which he has served, might be mentioned the National Building Code Construction Committee, 1936-37, Advisory Committee for the preparation of the Building Code of the City of Montreal, 1946-49, Canadian Standards Association – Chairman of Building Materials Standards Committee, RAIC – CCA Committee on Standard Contract Forms.

Arthur Paine was born and received his early education in Newfoundland, graduated in architecture at McGill University, then worked in the offices of Robert Findlay, Montreal, and Darling & Pearson, Montreal and Ottawa offices. He became associate architect for the Sun Life Building of Montreal with Darling & Pearson and associate architect for the Sun Life Building, London, England, with Septimus Warwick. His private work includes, among others, hospitals, sanitaria, university buildings, and, recently, a Memorial Stadium at St. John's, Quebec.

However, the purpose of these words is not to give a biographical sketch nor full appraisal of the qualities of the new President, but rather to show our appreciation that the honour has been so justly earned.

The office of President is no sinecure – it comes after many years of devotion to the interests of the profession and brings with it added responsibilities, personal sacrifice, and dedication of time that might otherwise be devoted to gainful purpose of his calling, recreation or a hobby.

The new President is well aware of the task that lies before him. His past record indicates that he will continue to devote himself wholeheartedly to the affairs of the Institute with sincerity, intelligence and tact.

We extend our best wishes to the incoming President and Council, and look forward to a further period of prosperity for the Royal Architectural Institute of Canada.

Harold Lawson

The Effect of Architectural Environment on the Social Fabric

A paper read before the Ontario Association of Architects **by Charles E. Hendry**

Mr Gordon Adamson, at the time of the meeting, President of the Ontario Association of Architects, introduced Professor Hendry.

We are very fortunate in having with us today one who is so closely related with the subject of community planning. It has been my good fortune to know our speaker for at least thirty years, and, in all that time, I doubt if I have met another quite so interested in people.

Originally a leader in boys' work in Ottawa, and at Dufferin Park, his orbit has expanded with the years until his interest is in people of all ages, all creeds and all colours.

A graduate from McMaster University, he took post-graduate work at Columbia University, both in Teachers' College and Union Theological Seminary; he was eight years member of the faculty of George William College in Chicago. With the possible exception of the underworld of crime, he has taken part in almost every kind of group activity known to man, as speaker, director, adviser or reporter.

Over the years, he has been associated with many important organizations; among them, the National Council of YMCA, Boy Scouts of America, the Boys' Clubs of America, the Canadian Council of Christians and Jews, the National Defence Research Board, UNESCO, and the World Brotherhood Movement, which work has taken him to almost every country in Western Europe, India, Pakistan, Israel and Jordan.

In 1942, he wrote a book entitled, "The Role of Groups in World Reconstruction".

Director of the School of Social Work, at the University of Toronto, his teaching and research there have included community organization. Professor Hendry.

Mr Chairman, ladies and gentlemen. Yesterday at noon I had lunch with Northrop Frye, the distinguished professor of literature, at Victoria College. Professor Frye is leaving for Princeton where he will be visiting professor during the coming term, and during the summer months. As you may know, he is one of the great authorities in literary criticism, particularly of the poet Blake, and his book with the rather cryptic title, "A Fearful Symmetry", is regarded as the last word on criticism in that particular area. He was telling me that at one of our leading American universities, the book was catalogued by a rather naïve librarian under "architecture".

My purpose in recounting this otherwise irrelevant episode is by way of confession, – I know as much about architecture as this well-meaning librarian seemed to know about literary criticism.

Some of you, who like myself, are addicts of the *New Yorker*, may recall a profile done some years ago on Beardsley Ruml. Beardsley Ruml had just given up his job as Associate Dean of Social Science at the University of Chicago, where I knew him first, and had become treasurer of Macy's, a great department store in New York, and the reporter who was preparing his profile asked him, "what would you say to be the chief difference between working in the University and working in a big department store?" "Oh", he said, "I would say the chief difference is in business, problems are intellectual".

And when I realize that architects are also men of business, the alarming extent of my foolhardiness in accepting this invitation becomes painfully apparent, especially the cosmic dimensions of the topic assigned, "The Effect of Architectural Environment on the Social Fabric".

All joking aside, however, I have a very deep personal and a very lively professional interest in the functions of the architect, and in the functions of architecture. I think I can trace my interest back to a powerful portrait in the library of my parents' home in Ottawa, a portrait of John Ruskin, and to a long series of relationships and interrelationships his writings have set in motion for me, and men like Patrick Geddes and more recently Louis Mumford, who have had a very profound influence on me.

KEN BELL

Like many of you, I find it highly intriguing to explore the relationship between physical life space and psychological life space. When I sat down in my study last night to make some notes on this address, I picked up Mumford's remarkable book, "The Condition of Man", and when I put it down about twelve o'clock I found I had made no notes at all for my speech.

I think I can convey something of the spirit of my awareness and appreciation of architecture best by sharing in a rather informal and intimate way a variety of recent experiences. I do not think that a Saturday luncheon is quite an appropriate time to attempt a learned or technical paper even if one were capable of the performance. Rather, at the outset at least, I would like to share with you snatches from a kind of personal diary; the first, a brief epilogue which I placed at the end of a book which Gordon Adamson referred to, a book written following an intensive six month assignment in Western Europe a few years ago, and then a few passages from a report I completed last July for the United Nations, based upon three months of observation and study in Scandinavia, including Finland.

This first bit is a mood piece you might say, which I hope may set a tone for the contribution I hope to be able to make.

One day after two months of almost continuous travel, an incessant round of some three hundred interviews, responsibility for organizing and conducting an international institute at UNESCO House in Paris, and the mounting impact of a thousand new geographic, cultural and aesthetic experiences, I retreated to the quiet Swiss village of Glion, high in the Alps, midway between Montreux and Caux. In moments snatched from my heavy work schedule, I had seen the Sistine Chapel and the Chapel of the Medici. I had climbed up into the dome of St. Peter's and strolled about the incredibly inspiring Coliseum by moonlight. I had visited St. Mark's Square and the Lido in Venice and gone through the Doge's Palace. The majestic perspectives of Paris were no longer something I had to imagine, nor were the great galleries of the Louvre, the exquisite beauty of La Sainte-Chapelle near Notre-Dame, the Red Ox at Heidelberg, Gustav Vigeland's phenomenal Statue Park in Oslo, nor the ceremonial dignity of Stockholm's world renowned city hall. At St. Stephen's, in Vienna, I had heard a Beethoven Mass sung by a choir of boy sopranos. In Stuttgart, I had enjoyed beyond measure a matchless performance of The Merry Widow. In Copenhagen, I had seen the Royal Ballet.

On my last day at Glion I sat on the sunny terrace of the Victoria Hotel where I was staying. Before me stood the snow-capped summits of the Dents du Midi, bisected by the simple, severe spire of a solitary church, at eye level, and at the water's edge by the famed castle of Chillon where the Pays de Vaud enters the fertile valley of the Rhone. Below was the lovely lake.

Beyond the strange insulation of those massive mountains, beyond the serenity and simplicity of my quiet retreat, were the cities, the people and the leaders of ten countries I had so recently visited. And I could feel again their anxiety, the intensity of their anxiety, the intensity of their earnestness – the poignancy of their deep longing for a new justice, a new peace and a new promise of fulfilment.

The last evening at Glion, at twilight, I walked alone, out along the winding roadway that led to the edge of the village. The effect of the sunset on the mountains was to place in sharp relief every separate shape. It was as though the whole exterior around me had suddenly been illuminated by indirect lighting. Every object before me became three-dimensional.

Arnold Toynbee's insight into the necessity of alternation – alternation between advance and retreat – had had its influence. I discovered anew that one must retreat periodically into a kind of privacy if one is to advance in effective collaboration with others.

And I would judge that the creative architect would understand the mood of that report.

Shortly before I left for Europe on my first trip, I spent a dinner hour and the evening with an old friend, Marcel Breuer, a distinguished colleague of yours in the field of design and architecture. He had given me a large number of letters of introduction, one to Sven Markelius in Stockholm, which turned out to be a most useful one indeed. At one point in the evening I happened to say to Mr Breuer, have you ever thought of going back to your native land, even just to see it, to Hungary? And he said, no, he did not seriously intend to go back. At one time he had thought about it – there was a certain nostalgia came over him, pressing him in that general direction, but he said he had come to the conclusion that the reason he did not want to go back was not so much all his old friends and relatives were gone, but the places were gone. The old bridges that he used to walk over and enjoy looking at; the buildings that had special meaning for him had been bombed. And I thought to myself then, and I have thought many times since, that the physical environment does build up a terrifically powerful symbolism, full of meaning, and that there is a poignant and profound significance to what Breuer was saying to me.

Now, let me turn to a few passages from my U.N. Report, which I am going to read just seriatim without comment in moving from one to the other.

In Oslo, I stayed at the Norum, a small residential hotel within walking distance of the centre of the city and close by the famous Vigeland Statue Park, to which I repaired on more than one occasion.

Gustav Vigeland's colossal achievement in this incredible park stirred my soul. I can close my eyes at any time and see it as a whole, or any one of its many units, or a particular single figure, and recover the same glow of amazement and admiration as the first day its vital, life-celebrating realism stopped me dead in my tracks.

There are many people who do not enjoy Vigeland's granite sculptures. Some find them offensive, crude and grotesque. They insist that the sculptor must certainly have been mad, and suggest that only a kind of compulsive fanaticism could possibly account for such a stupendous undertaking. My reaction was totally different. I found it overpowering both in conception and execution. Citizens do not voluntarily support such a gigantic project as this, stretching over half a century, unless it expresses something remarkably precious and meaningful. The central piece, and Vigeland's greatest sculpture, is a column weighing 270 tons, excavated from a quarry by the Norwegian coast, transported to Oslo by sea and pushed from its place of landing to its present site in the park. It took three stone masons, working under Vigeland's direction, fifteen years to complete the one hundred and twenty-one figures that now comprise that tremendous monolith.

Words simply fail me in attempting to describe this mighty creation. To me it epitomizes Norway and Norwegians. But it goes far beyond this. It also has a universal character and significance. Somehow, for me, it places human life and human love back where they belong, in the very centre of things. It celebrates what one might call the life principle. It traces the cycle of life in the individual with humour and with poignancy. It interprets life's endless continuity. Its wrought iron gates, its bridge and massive fountain, its stairway, its column procedure a veritable symphony and the movements represent the ages of life, its many moods and the eternal quest for human fulfilment.

Sigrid Undset could convey what I am trying to say with compelling clarity and conviction. She would see Vigeland in the true tradition of Norwegian craftsmen — craftsmen who carved beauty into their ships and into their homes and whose earliest works today are treasured in the great open-air folk museums of Norway. Indeed, such museums are rather characteristic of Scandinavia as a whole, several of which I was privileged to visit.

While on this general theme I must refer to the new city hall in Oslo. This unusual building, opened in 1946, is one of the liveliest conversation pieces in Europe. I spent several hours on several different days examining its exterior and visiting and revisiting its great hall, council chamber and its many smaller rooms. Its design is defiant. Every feature of the building speaks of Norwegian achievement and inspiration. Powerful murals trace the tragedy and triumph of military conquest. Portraits of Nansen, the explorer, and Bjorson, the poet, symbolize pioneers of the outer and inner worlds. The heritage of the past and the hope of the future for Norway combine in challenging and severe directness.

One morning I mounted the formidable granite steps of the Finnish Parliament. The Diet Building, as it is called, is as sturdy and as sombre as a fortress. But the moment I was inside I became aware of a rare delicacy and beauty. Enclosed within that hard and severe exterior I found something akin to tenderness. The librarian who took me through the building was formerly in charge of all Finnish war orphans. Presently, we were standing in the large Session Hall before the speaker's dais. Directly behind were several figures by Vaino Aaltonen. The central figure was of a mother with her child. This is eloquence. Child and maternal welfare do occupy just such a central position in Finnish social policy. Suffering, deprivation and danger not infrequently help a people put first things first. And experience over the years seems to support the view that the basic social services, so widely developed in all the Scandinavian countries, have not been demoralizing.

I cannot conclude these altogether inadequate notes on Finland without reference to the Children's Castle in Helsinki. This, without question, is one of the most beautiful, functional and impressive children's hospitals I have ever seen. What I remember most vividly, apart from the pine grove in which it is located overlooking the sea, is the treatment of the exterior circular walls and the metal work at the entrance of the elevators inside. All around the building, skilfully impregnated into the walls, are glistening shapes in primary colours, squares, circles, stars, crescents, giving the impression of carnival and romance. The very design of the building and its name "Children's Castle" carry out the same psychological theme. The entrance and the walls hung with pictures that appeal to the child are warm and inviting. Hand wrought iron and other metals have been used to enclose the elevators. Figures of children pulling along toys, or playing with balloons and a little family of ducks, supply happy association as toddler patients wait to be taken upstairs. Everything in the Children's Castle reflected the magic touch of an architect sensitive to the dimensions and subtleties of the world of the child.

And the architect, in this case, was a woman.

Aarhus, the second largest city in Denmark, a city of 120,000 and the site of the University of Aarhus, was also on my itinerary. I took the night boat from Copenhagen and arrived at my destination in Jutland about 6.30 the next morning. After enquiry of a policeman who was directing port traffic, I made my way in the early morning fog, "down past the dome" (the large Lutheran cathedral) to the Royal Hotel where I deposited my bags. I was in the heart of the medieval part of Aarhus, and I felt very much in the mood to take a stroll through the intricate winding streets and lanes to get a feel of the place. I had no appointments until after breakfast and it was too early for breakfast yet. Here and there the sidewalks gave evidence of an earlier delivery of milk. An old man methodically filled a small pail with horse manure and carried it away. Store windows were being washed. Butchers busily prepared the day's supply of meat. Hand-carts delivered fresh fish from the sea. An undertaker turned the key in his store entrance as I paused to look at the generous assortment of white coffins in a wide range of sizes. Back in a cobble stone courtyard I could hear the blacksmith at his anvil. Here and there, a bakery was open and early morning customers were picking up their bread and pastry.

The damp grass around the Danish National Bank clung to the blades of the lawn mower and gave off a welcome and fresh aroma. I had never seen a lawn so designed, as if fluted, like a great fan spreading out from a bed of flowers. I think I must have been one of the first to buy a tag-day flower from two girl guides. Several others approached me hopefully and I delighted to stop and lift the lapel of my raincoat where I had concealed it, and then to watch the expression on their faces change—from pleasant anticipation to sudden surprise and disappointment, then back again to a friendly smile. Bicycles appeared at every turn carrying every conceivable burden. Gradually the volume grew. It was as though a trickle of a stream suddenly flushed into a rushing torrent. Another day in Aarhus had begun.

My time in Aarhus was divided between the Department of Welfare, and the new city hall, the University and the famous open air museum, "Den gamble By" ("The Old Town"). Svend Unmack Larsen, the Mayor of Aarhus, formerly the Minister of Finance for Denmark, extended most gracious hospitality to me and entertained me in the private dining room of the new city hall. Once again I was captivated by the spirit of these people in Scandinavia. This building is quite as daring in design as the city hall in Oslo. I had the Mayor autograph two brochures containing illustrations and a description of the building to the Mayors of Toronto and Ottawa. I had the Mayor of Stockholm do the same. The council chamber, to refer to one room only, is a masterpiece of design and appointment. The great rug on the floor has woven into it an entire map of the city of Aarhus. In the tower, there is a carillon and around the well landscaped exterior are several striking pieces of sculpture.

It is about two a.m. as I write this paragraph in my office at the University of Toronto. There is a certain irony in the fact that I am about to pen a few lines about the University of Aarhus. My office is in a building which for the early decades of this century and before belonged to my own Alma Mater, McMaster University. In 1931, the School of Social Work of the University of Toronto moved into the building, the property having been acquired by the University of Toronto when McMaster University moved to the nearby city of Hamilton. I can hear mice or squirrels scampering around in the walls of my room as I write. The building is as antiquated in physical repair as it is in original design. And I must write about the University of Aarhus. What an unbelievable contrast! I have just leafed through a booklet of full page photographs of the University and I am now looking at an interior view of the auditorium. The next double-page spread is a close-up view of the front section of the auditorium, showing the ingenious use of the bricks to create patterns; wall seats around the sides covered with cowhides; huge shaped sounding boards suspended from the side walls; cylindrical and spiral chandeliers lowered from the lofty ceilings; one end completely of glass. I have turned over several more pages. Now I am looking at a professor's study, complete with a built-in sofa. Probably I have said enough.

And finally one other passage, taking us back to Stockholm, and tying in probably with your discussion yesterday on the civic centre.

Frequently, when I visited local municipalities in Scandinavia and had the pleasure of seeing local government buildings, such as at Aarhus in Denmark, I found myself comparing them with municipal offices in some parts of Canada. In the last analysis, do we not invest our resources in what we value most? Communities, whether in Scandinavia or in Canada – and there are an increasing number in Canada – that truly recognize the central meaning and functional significance of government and seek out architects to design buildings, appointments and settings with appropriate dignity, do a service to democracy. Canadians, I fear, have been too prone to make shift or to adopt conventional, unimaginative and quite uninspiring types of building for local governmental purposes.

I have little doubt that the city hall in Stockholm is regarded as one of the most impressive and inspiring buildings of its kind in the world. When I first saw it I mistook it for the Swedish Parliament. Along the corridor leading past the office of the mayor, bronze busts of the laborers who had constructed the building were displayed over the many doorways. This appealed to me greatly. Here again is an indication of what I mean – a pervasive pride in being associated with the centre of government in one's community.

Now, I have more notes here than we can possibly deal with in the limited time available. I was going to make a passing reference to some experiences in India and Israel, which made me feel that physical and social planning in these new-old lands have much to teach us. There is a vitality and vigour and vibrancy of vision and high courage asserted in these enterprises there, which are nothing short of inspiring, and I am sure must be very constructive to men like yourselves who are experts in this field. I am convinced as I have talked with Nehru in New Delhi, with men like Tarlok Singh, Albert Mayer, the Chairman of the National Planning for India, and their opposite numbers in Israel, that design in dignity, planning and development oriented to basic needs of people rather than to the less basic wants of people is surely a clear guide to fulfilment. I would add that while I am the Director of School of Social Work, I am not interested in doctrinaire welfarism of any kind. I am interested in accent on positive dynamics that will mobilize and release resources both physical and human, that will help us achieve human dignity, the watchword of human well-being.

I brought along with me today a document from Cleveland where, back in the thirties, I worked on a slum project, a slum-clearance project. This map is a fascinating one, with overlay maps showing distribution of the various indices of social disorganization, death from T.B., houses of prostitution, major crimes, illegitimate births, and all the rest, and was able to work with authorities there in assessing the need, in sharing in building and designing of plans and the introduction of their extensive redevelopment project with large-scale housing and so on. As I was thinking about this this morning, I recall going on a train from Oslo to Arendal on the southeast coast of Norway, and there was a vacant space just opposite me on the railroad train. A Salvation Army woman came on, and on her hatband were the letters "S.L.U.M." I was intrigued. She could not talk English so we did not carry on a conversation. Later on I found these letters "S.L.U.M." represented a worker with the poor, but I jotted down in my notebook at that point, in all my travels throughout Scandinavia I have only seen one slum and that was on the hatband of a Salvation Army worker. They do not believe in slums in Scandinavia.

One of the chief reasons why I came back to Canada in 1946 after twenty years in the United States, at a goodly salary over there, is loyalty to the aspirations and the achievements of the pioneer and early leaders of the School of Social Work at the University of Toronto. I am thinking of Professor Urwick, who is chairman of the first committee I think in Canada, appointed by the Lieutenant-Governor of this Province, to study housing.

I am thinking of Harry Cassidy, who was secretary to that Commission back in the twenties.

I am thinking of Dal Grauer, former director of the School, now president of British Columbia Electric, who is helping us to develop our research program, and who – incidentally, I brought this along to show you – for his Christmas card this year, had a reproduction in colour of the Dal Grauer substation in Vancouver, one of the most beautifully designed buildings, I guess, in Canada.

There is a man, an economist, a tough-minded, disciplined economist, not a sentimental do-gooder, who at one time headed the School I have the honour to direct, who now is in the big league, in big business, but who has time and temperament and inclination to build into his business the beauty that those who design, those who are the architects in this country can make available for him.

I have a feeling there is something – there is a kind of affinity between our School and architects. That is one of the reasons I came here today.

Humphrey Carver was brought on our staff to work with us and the School of Architecture on the social aspects of housing and town planning, to build up a committee, an interdepartmental committee, for training in housing and town planning at the University of Toronto.

Last night, I read Humphrey Carver's address before this body, given at your jubilee in 1952, on the social aspects of housing. It is a magnificent job.

Dr Rose, who has helped on a number of studies. Some pilot studies for Central Mortgage and Housing. Just the other day we sent through three completed research reports by our graduate students to the Planning Commissioner here in Toronto, on health, welfare and delinquency aspects of the Regent Park Housing Project, and you will be interested to know that next week I am hoping that the Board of Governors of the University of Toronto will authorize two appointments under the newly established Harry M. Cassidy Memorial Research Fund. Two of the five awards that will be announced are in that area of housing.

One will involve a project in Quebec, and will tie in two departments, the School of Social Work and the School of Architecture there, with a brilliant young scholar who will take on a project in that area. The other is an award, a modest one, which will be supported also by the Central Mortgage and Housing, to prepare, to complete, what I hope will be a definitive volume on the social aspects of housing in Canada.

The other day, I encouraged our students to invite over to our School a group of students in architecture, to look over the dismal student lounge that we have inherited, to help them discover resources of architecture, and to do something with that room, and we are doing it. That room is going to be a beautiful place in another couple of months as a result of this kind of collaboration.

These students of ours who take two years post-graduate work in the University, go out all over Canada, and to other parts of the world, and frequently they find their offices in very uninspiring, unattractive settings.

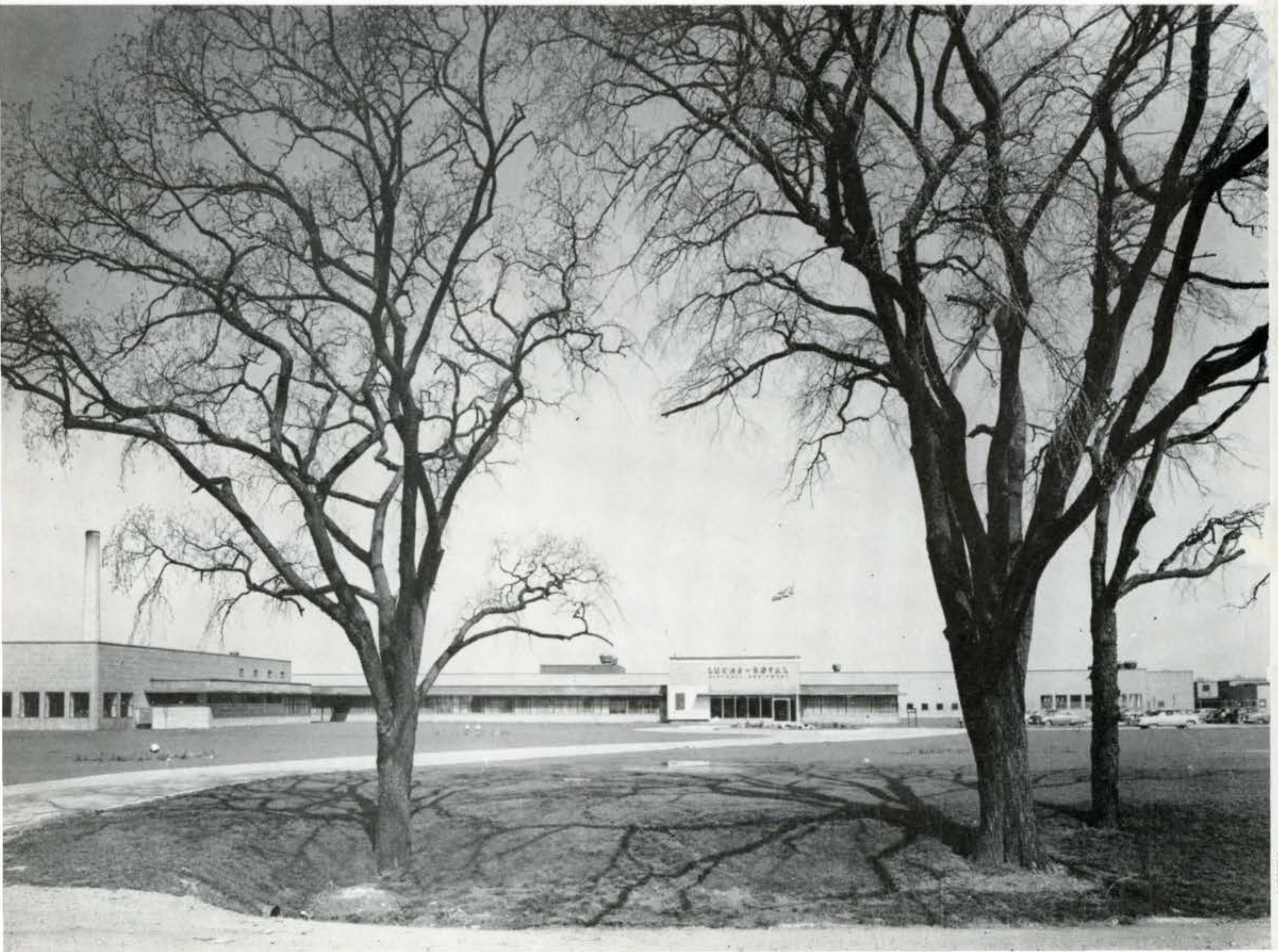
I feel that one of the obligations we have is to explore new patterns of partnership, so that beauty is not simply placed in museums and art galleries, but is built into places of work; to add the support that comes from colour and texture and surface, and the other principles that you are building into these new art forms for use.

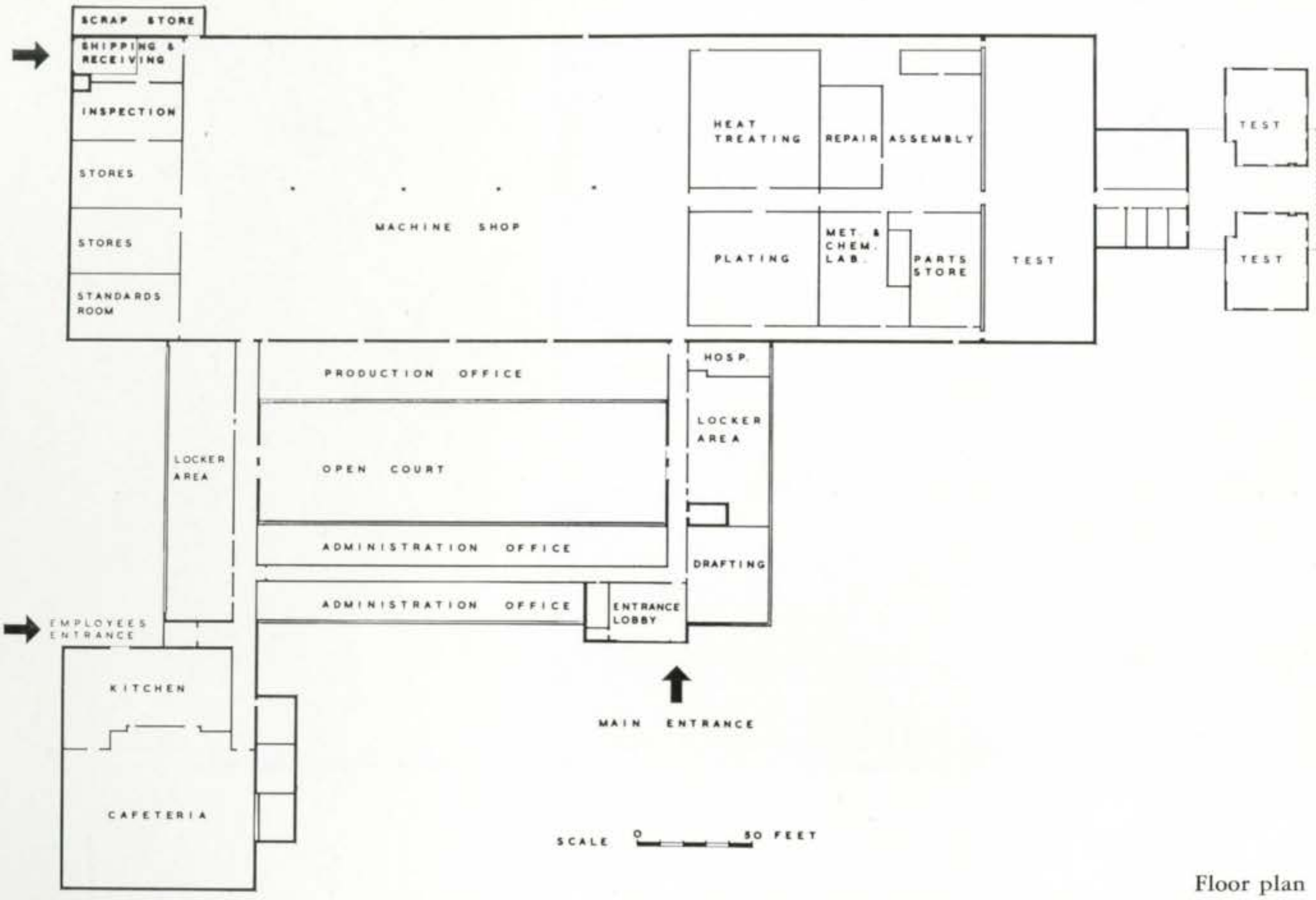
Well, there were a few other things that I was going to say, but the hour is late, and we were very late getting started and we have other things to do. I will close, if I may, by merely quoting this one sentence with which I closed Louis Mumford's book last night, and trundled off to bed: "With Goethe, Geddes used to say, 'Animals are always attempting the impossible and achieving it.' That, he would add, is the essential condition of man."

Lucas-Rotax Limited, Scarborough, Ontario

Architect, Howard D. Chapman
Associate Architect, George P. Hassig

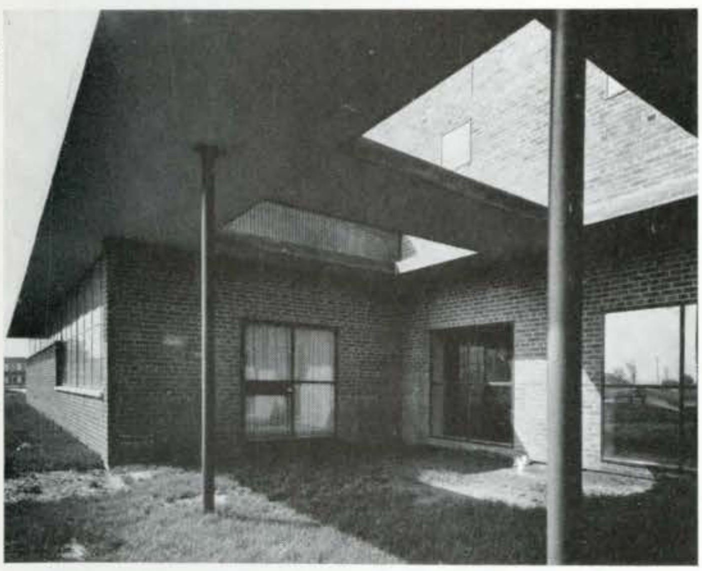
Engineer, Ron G. Meschino
Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, R. P. Allsop & Associates Ltd.
General Contractors, Pigott Construction Co. Ltd.



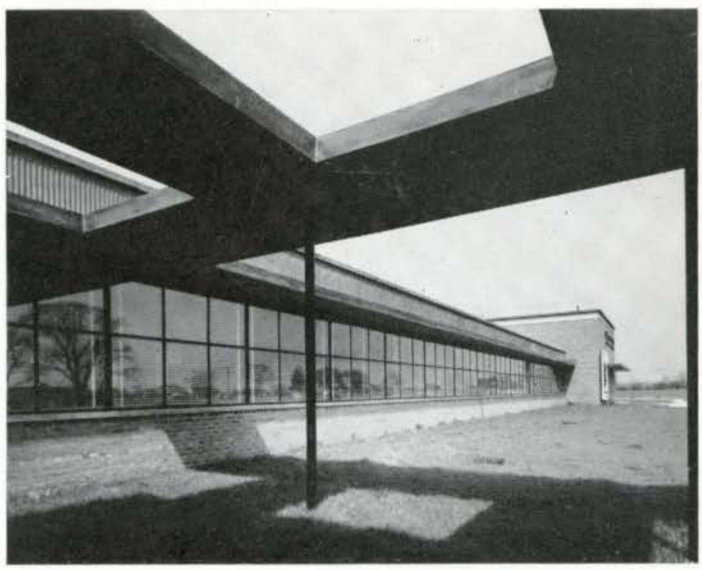


Floor plan

PANDA



View from administration office towards cafeteria



Administration office

View from corner of cafeteria

Entrance block facing south
Bronze plaque by Jacobine Jones

PANDA

Entrance lobby

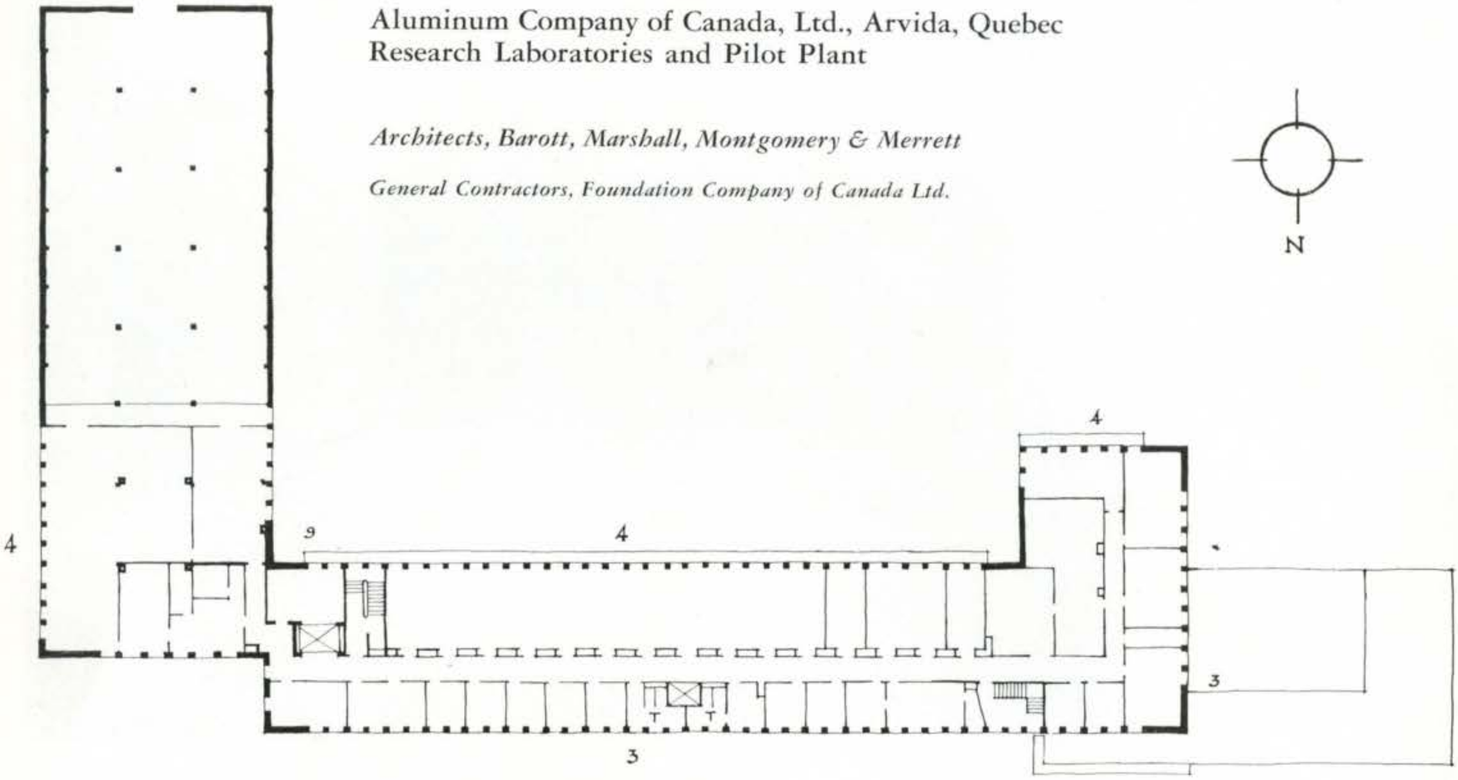
PRINGLE & BOOTH

Production office

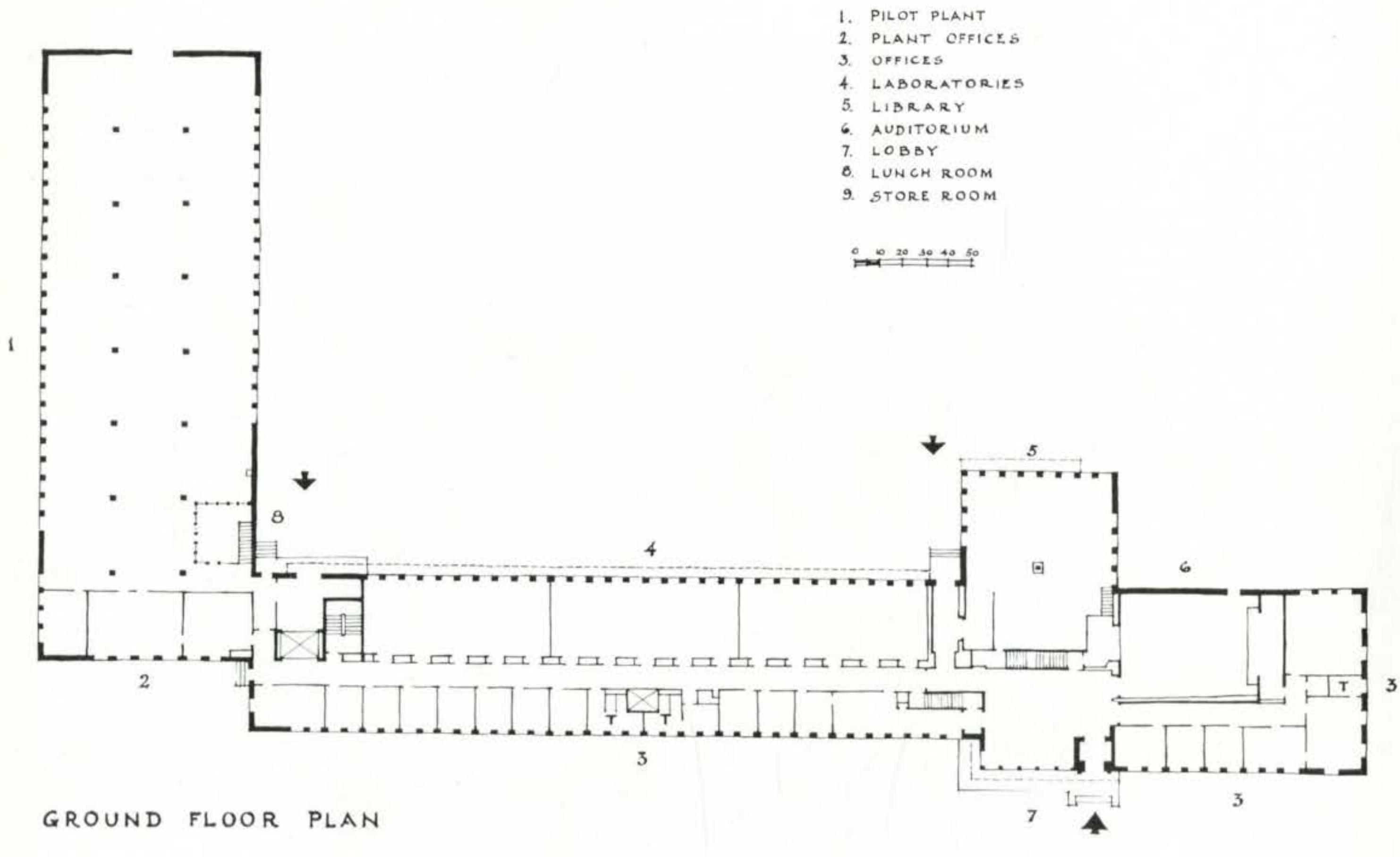
Aluminum Company of Canada, Ltd., Arvida, Quebec
Research Laboratories and Pilot Plant

Architects, Barott, Marshall, Montgomery & Merrett

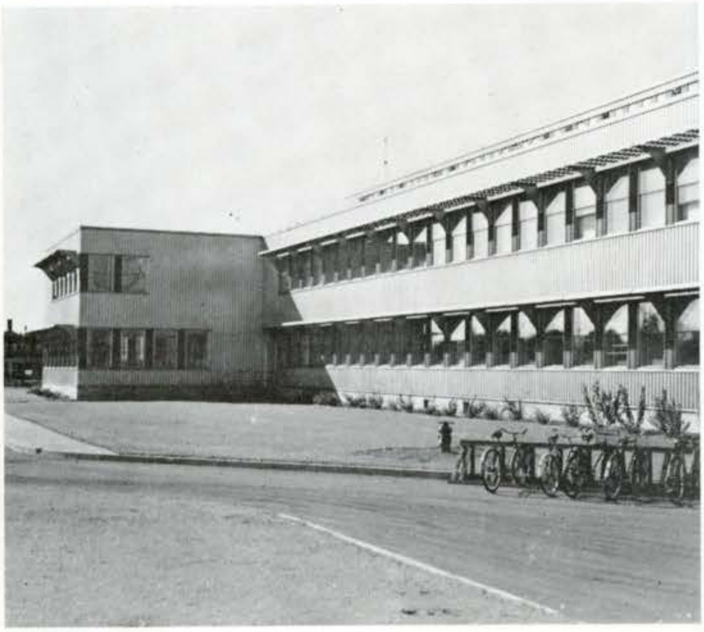
General Contractors, Foundation Company of Canada Ltd.



SECOND FLOOR PLAN



GROUND FLOOR PLAN



South elevation

Aluminum sunshades

Main entrance

Lobby

Interior of laboratory ventilation penthouse. Walls are lined with corrugated aluminum sheet.

The building facing south east

Canada Packers Limited, Toronto

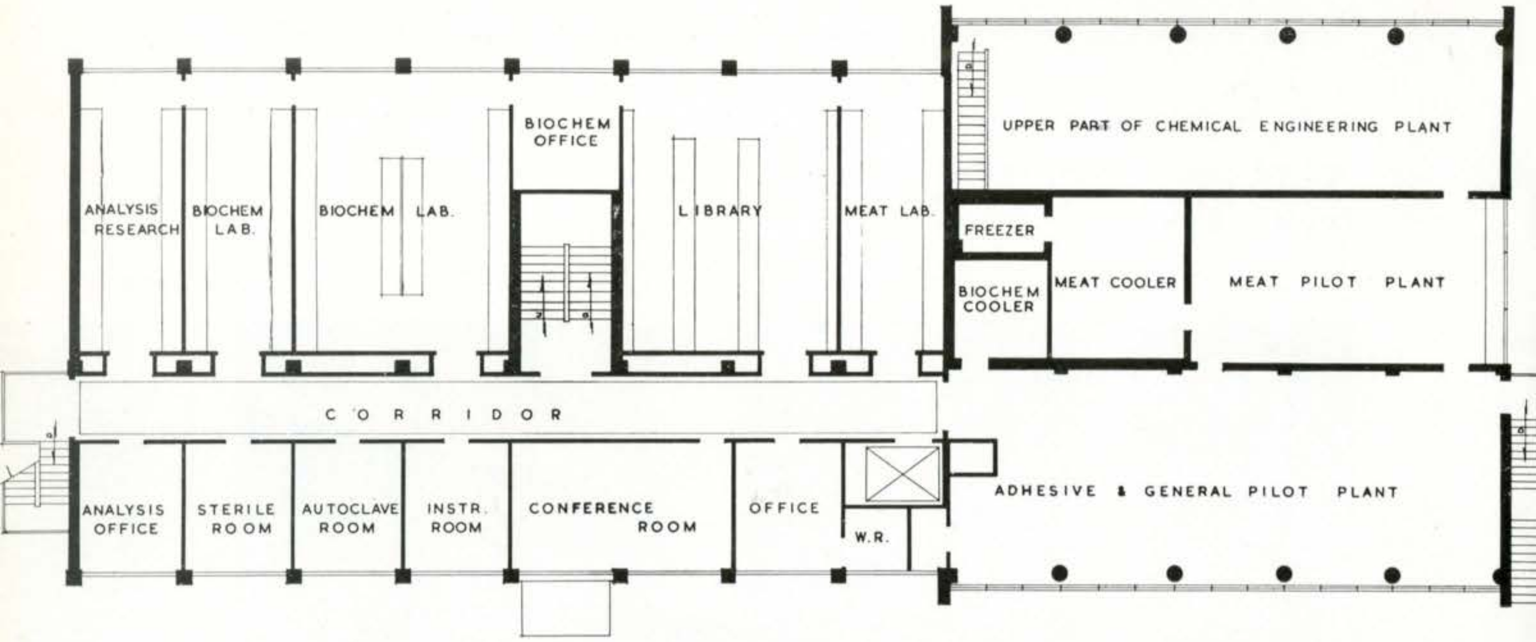
Research and Development Laboratories

Architects, Fleury and Arthur

Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, Wiggs, Walford, Frost & Lindsay
General Contractors, Finley W. McLachlan Ltd.

The entrance

PANDA



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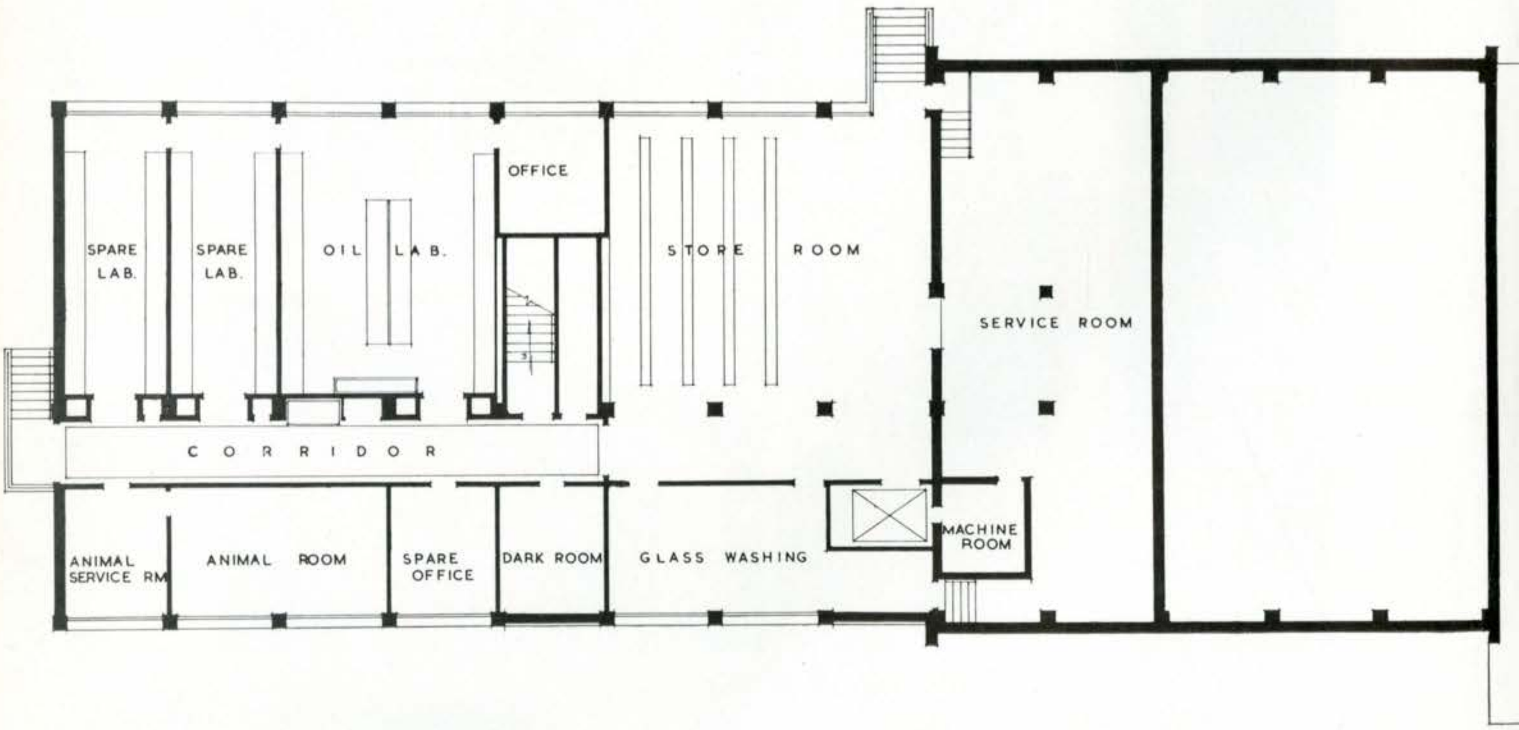
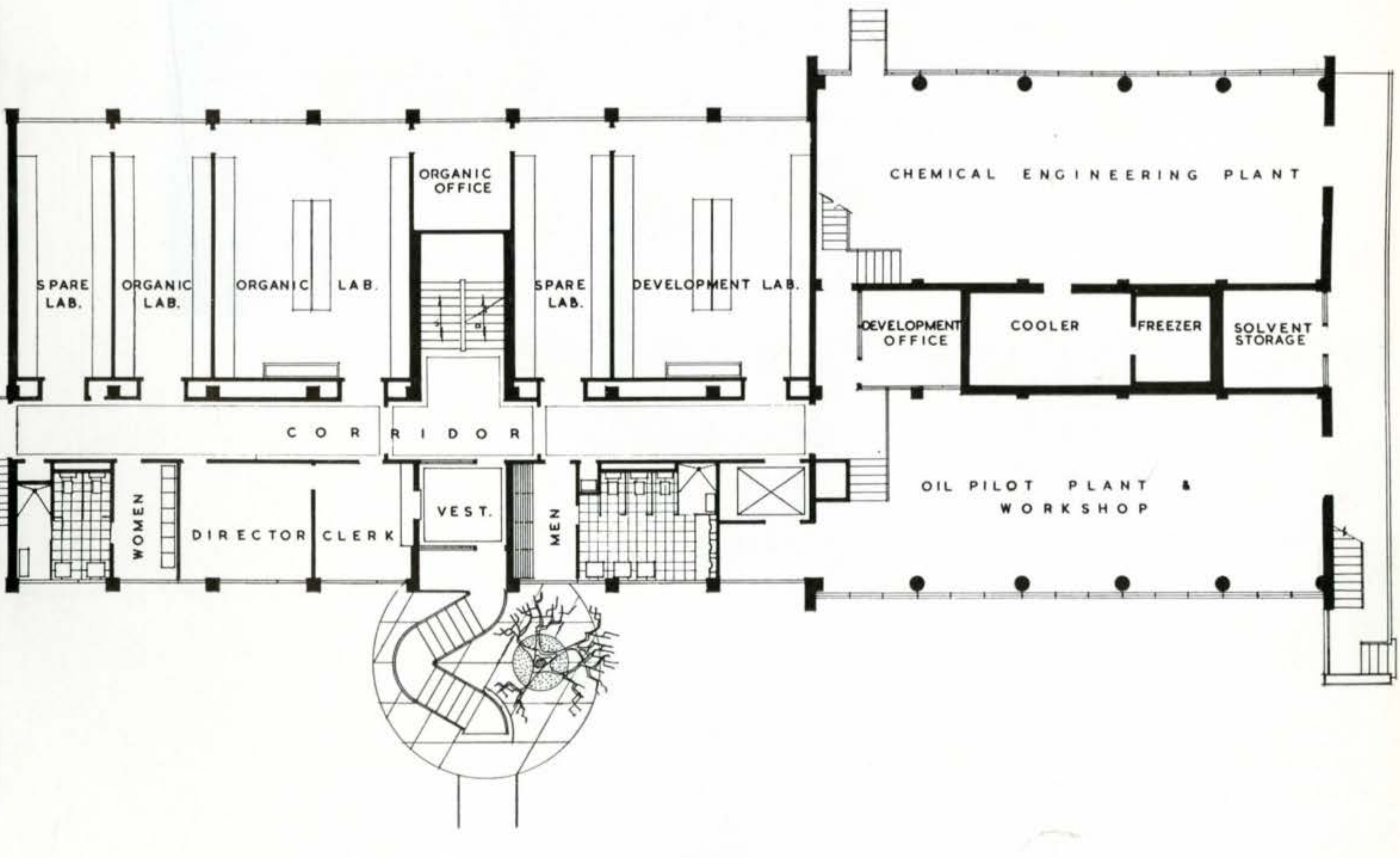


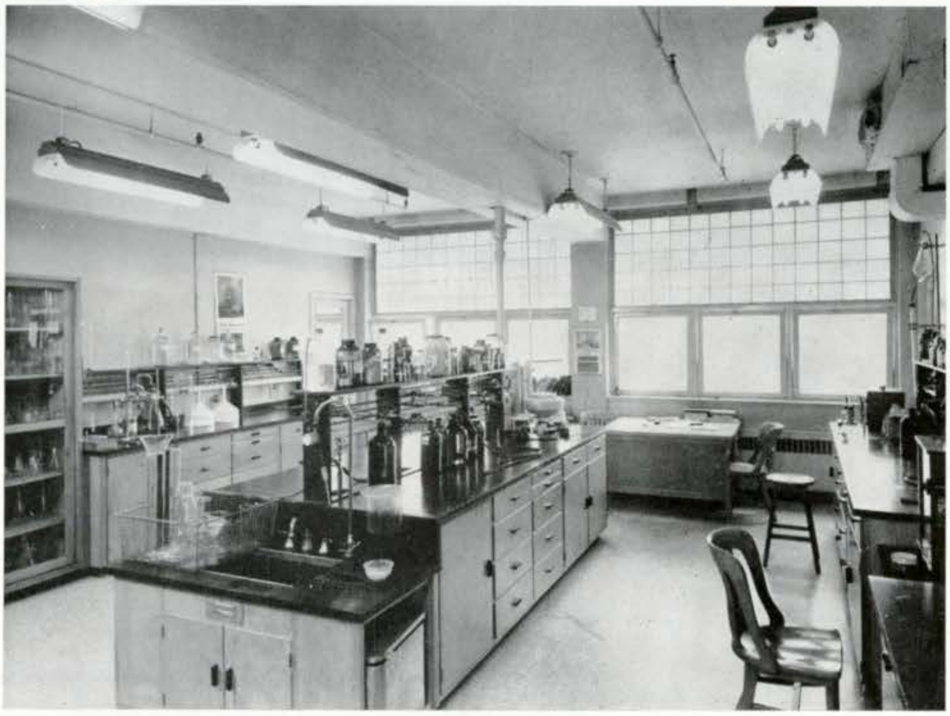
BASEMENT PLAN

North elevation on St. Clair Avenue



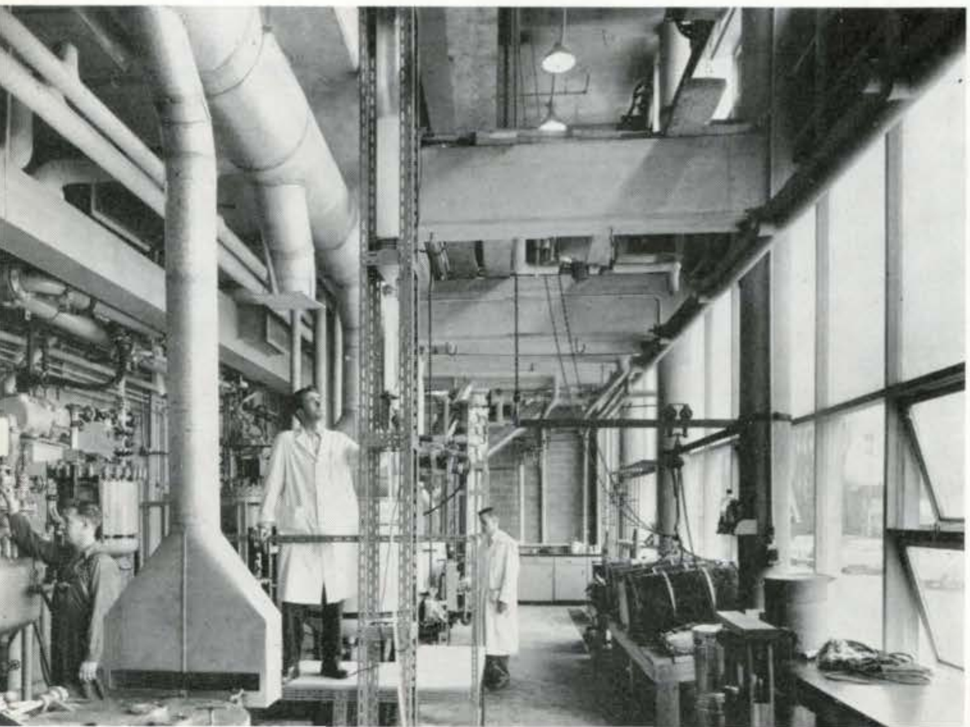
FIRST FLOOR PLAN

The President's office



Biochemistry laboratory

PANDA

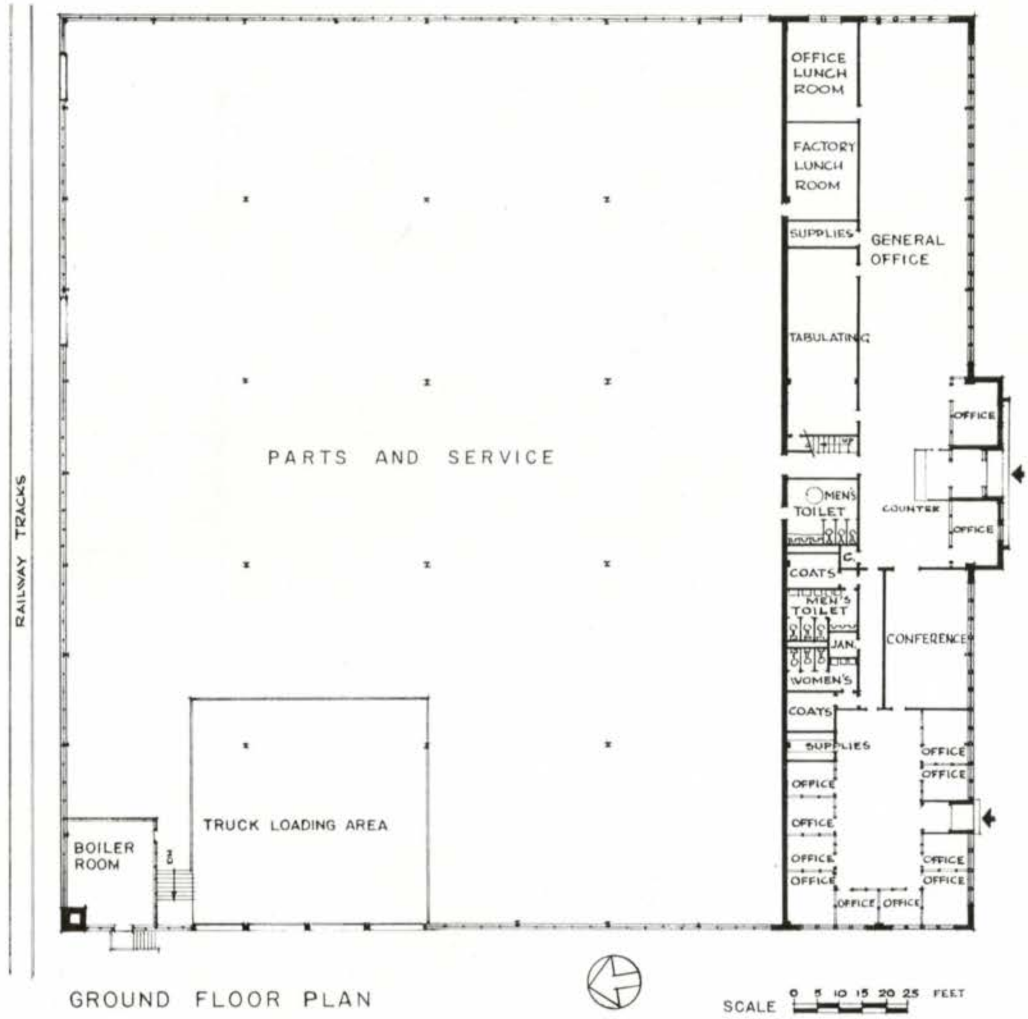


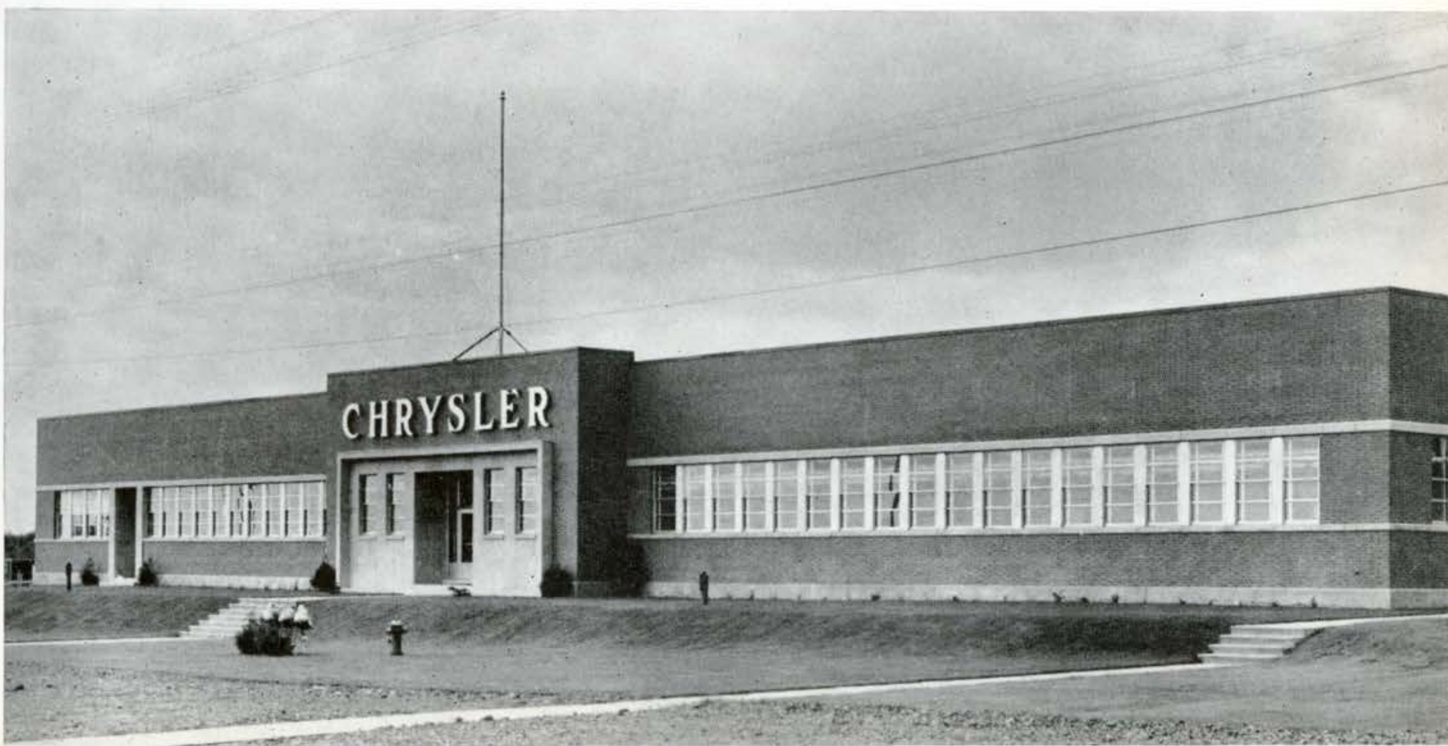
Chemical engineering plant

Chrysler Corporation of Canada Limited, Moncton, New Brunswick
Parts and Service Depot

Architects, William R. Souter and Associates

Structural Engineer, Norman Wagner
Mechanical Engineers, L. H. Schwindt and Company
General Contractors, Ambrose Wheeler Ltd.

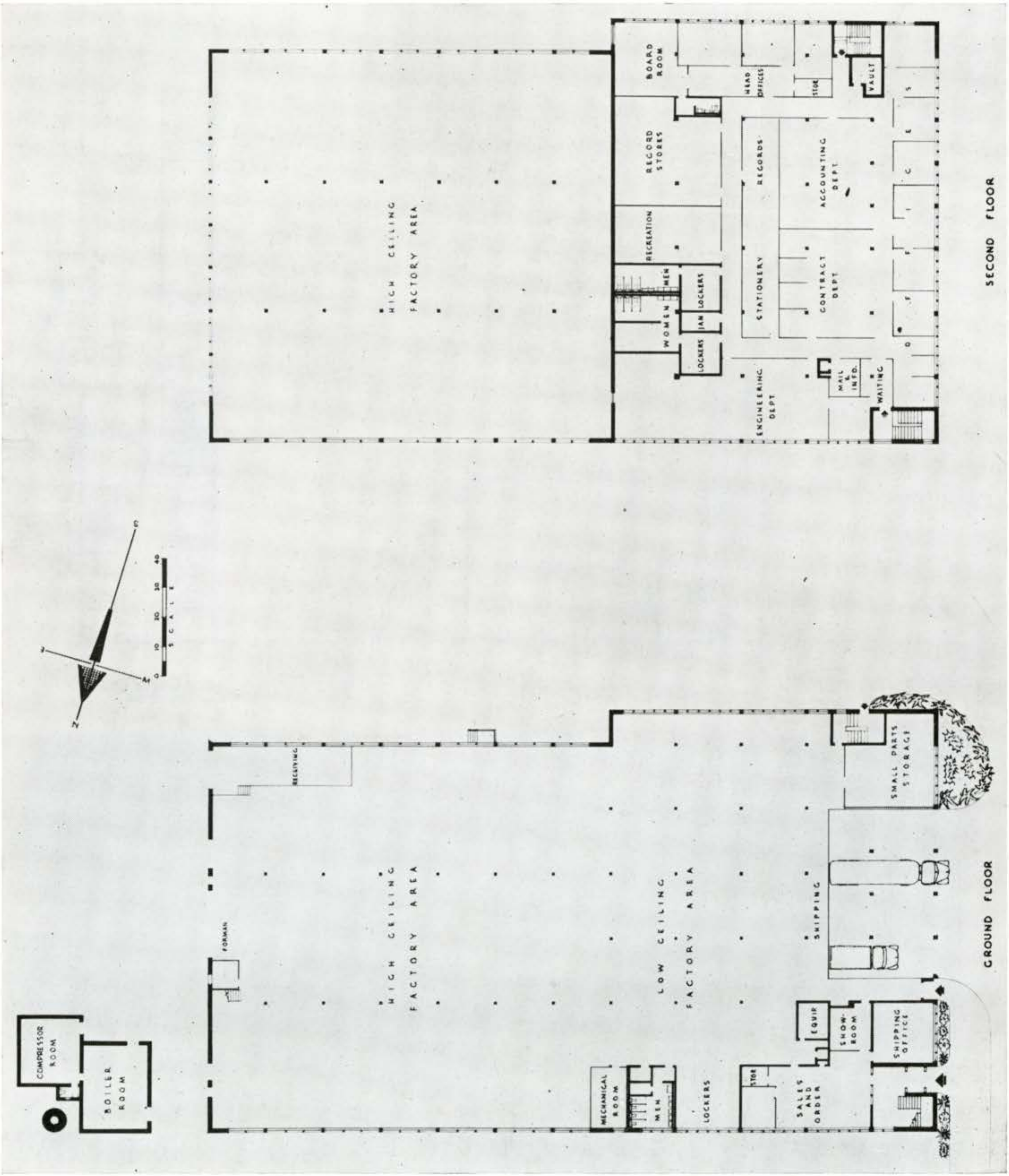




Westeel Products Limited, Toronto

Architects, Shore & Moffat

Structural Engineer, Ralph C. Manning
General Contractors, Soules Construction Ltd.



Main elevation facing west

Executive offices looking towards board room

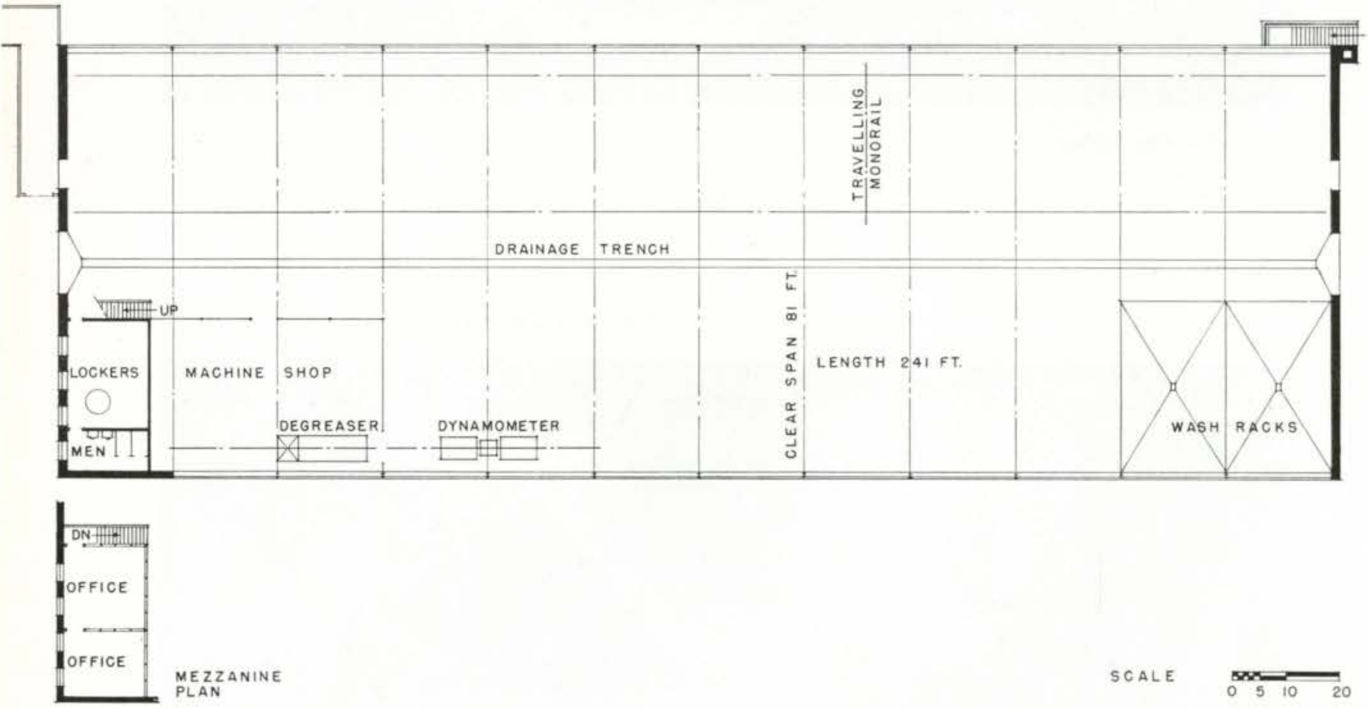
PANDA

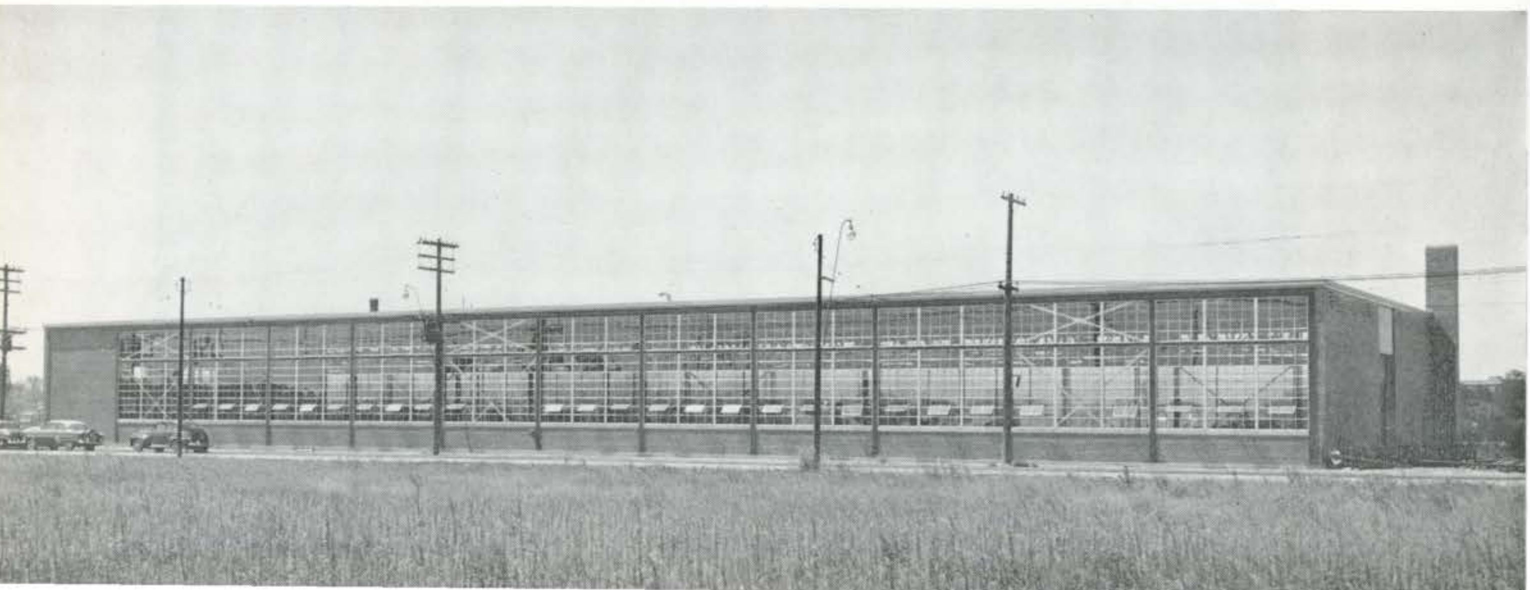
Diamond T Trucks of Toronto Ltd., Weston

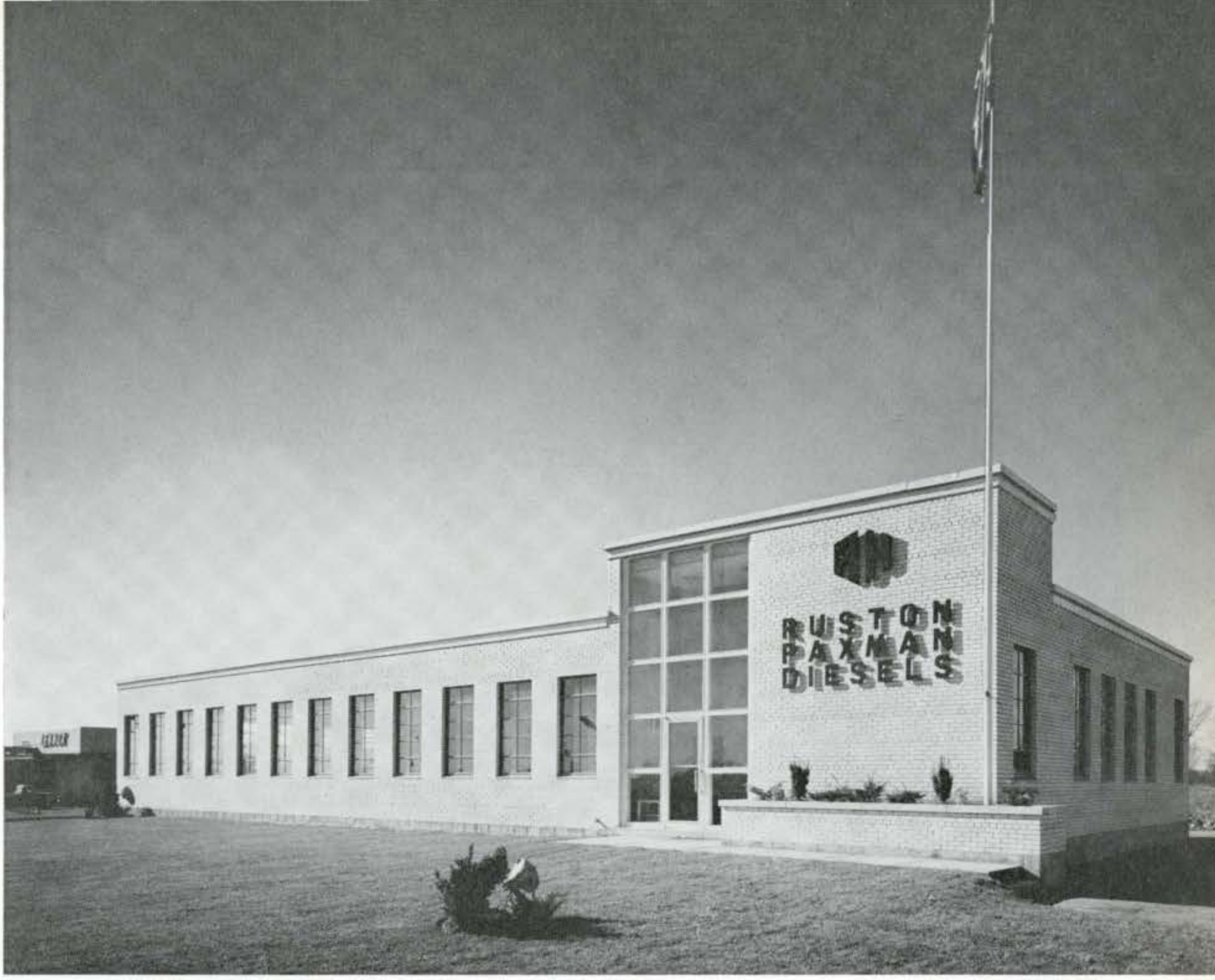
Architects, Wilson and Newton

Structural Engineers, Wallace, Carruthers & Associates Ltd.
General Contractors, Gratton Construction Co.

West elevation



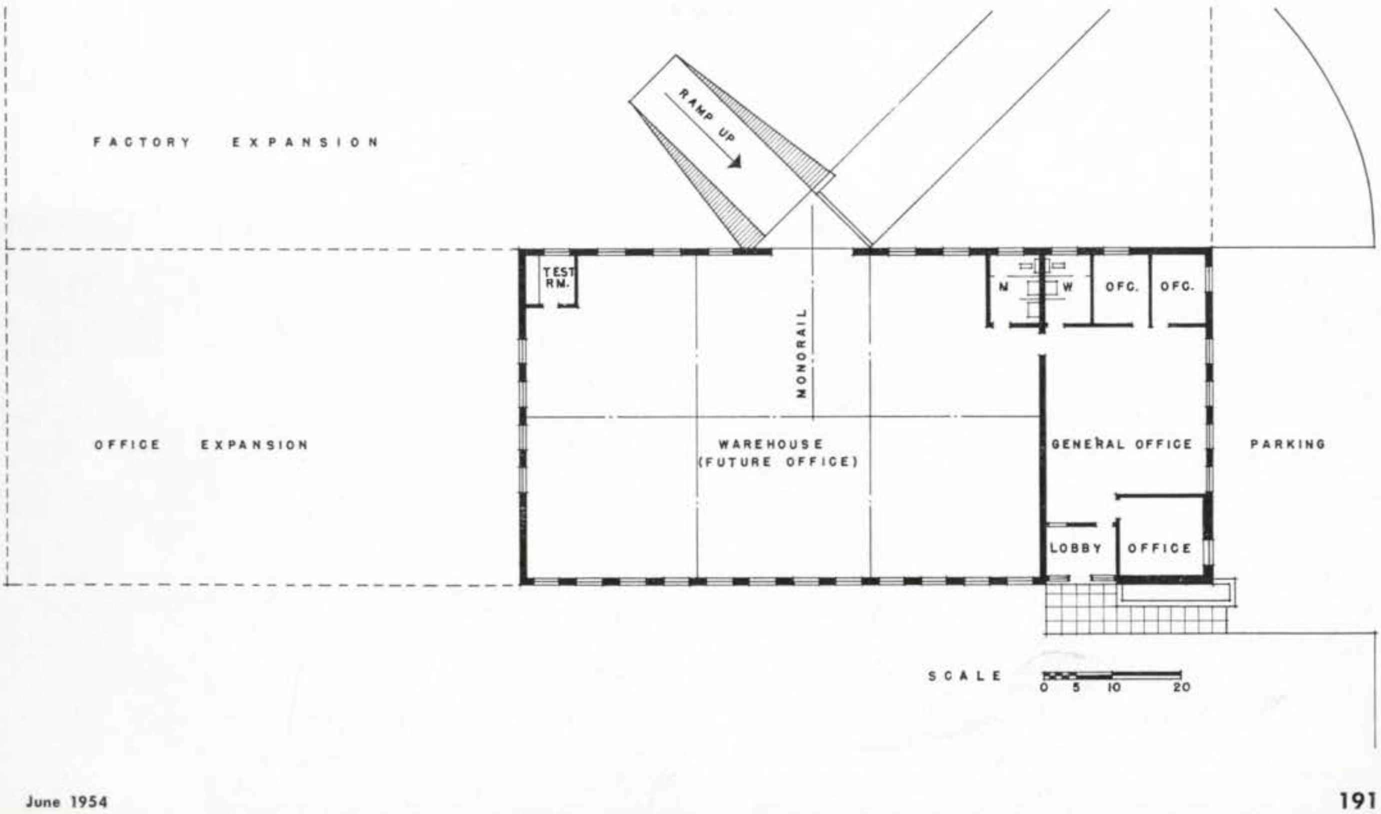




Ruston & Hornsby Limited, Toronto

Architects, Wilson and Newton

Structural Engineers, Wallace, Carruthers & Associates Ltd.
General Contractors, Bradford-Hoshal Associates Ltd.



ARCHITECTE—PHOTOS

Salada Tea Company of Canada Ltd., Montreal

Architects and Engineers, Ross, Patterson, Townsend & Fish

General Contractors, Anglin-Norcross Ltd.

Employees' lounge

Entrance lobby

North American Cyanamid Limited, Montreal
Consolidated Process, Office and Warehouse

Architects and Engineers, Ross, Patterson, Townsend & Fish

General Contractors, J. L. E. Price & Co. Ltd.

JACK MARKOW & CO.

ARCHITECTE-PHOTOS

Main entrance

Packaging department

JACK MARKOW & CO.

Inglis-English Electric Company Ltd., Scarborough, Ontario
Engineering Plant

Architects, Allward & Gouinlock

Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, R. P. Allsop & Associates Ltd.
General Contractors, Angus Robertson Ltd.

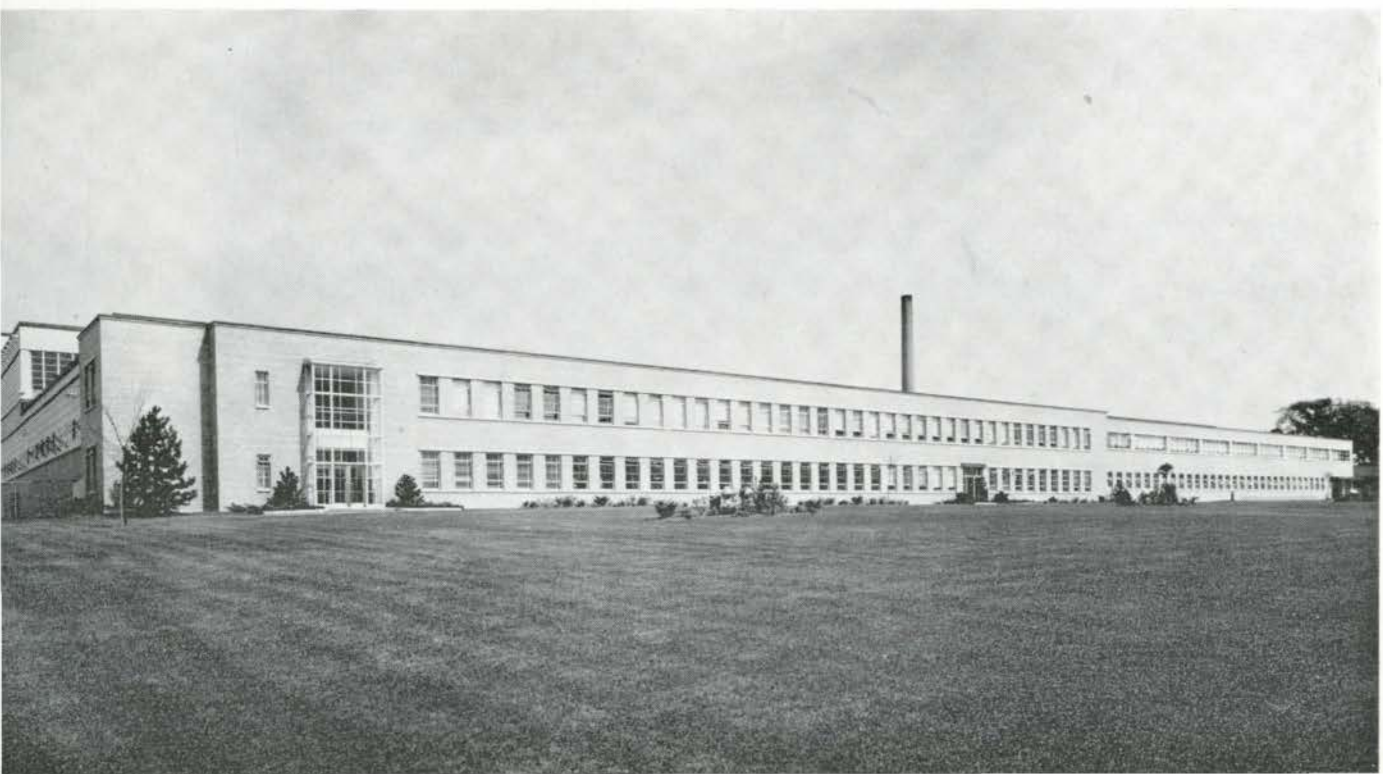
1 Parking lot
2 Engineering plant
3 Administration
4 Cafeteria
5 Gantry crane, boiler house, substation, oil tanks and pump house.

First floor plan

WARNER BROS.

The entrance

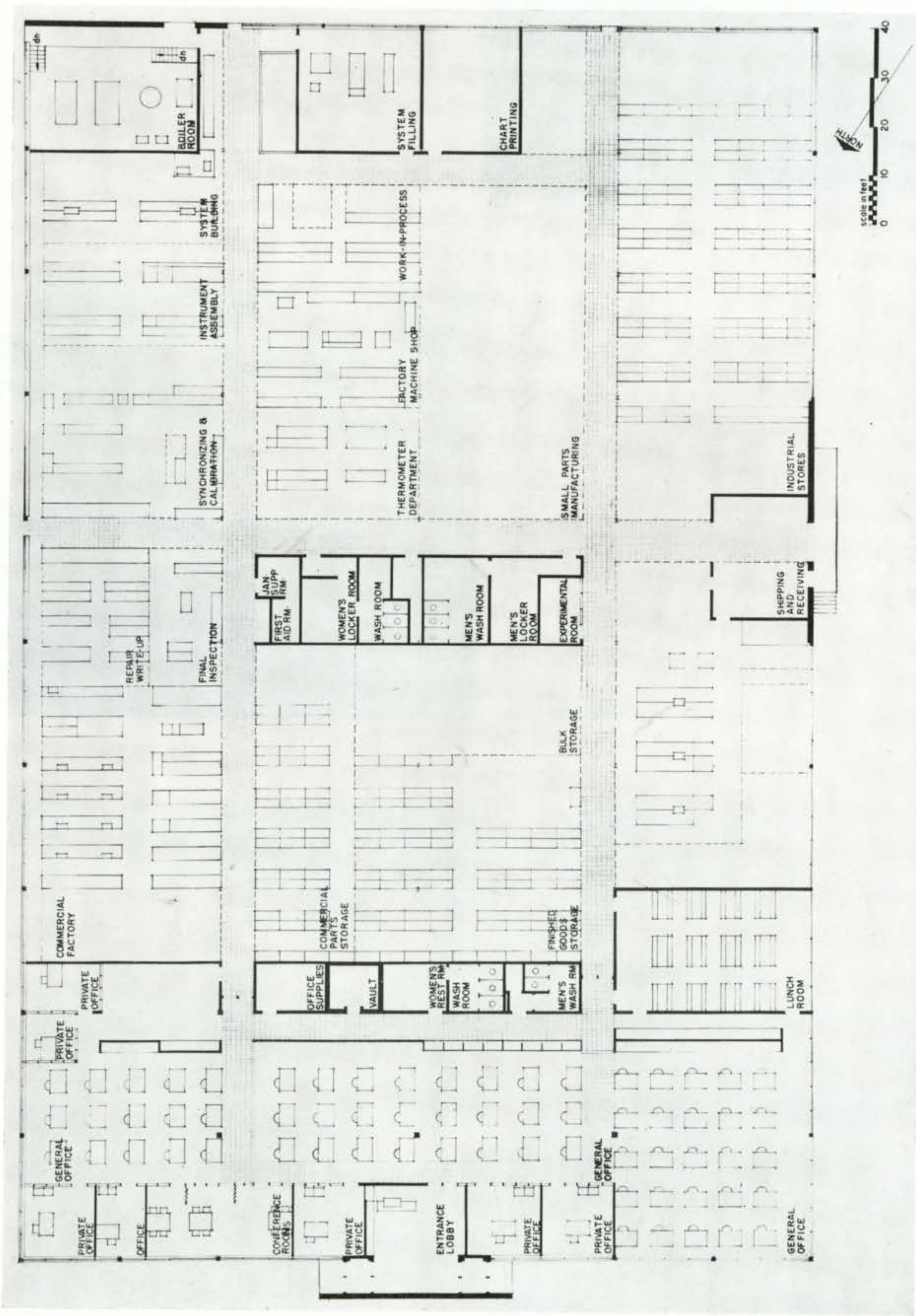
North elevation



Taylor Instrument Companies of Canada Limited, North York, Ontario

Architects and Engineers, John B. Parkin Associates

General Contractors, Chestnut, McGregor Ltd.



Floor plan

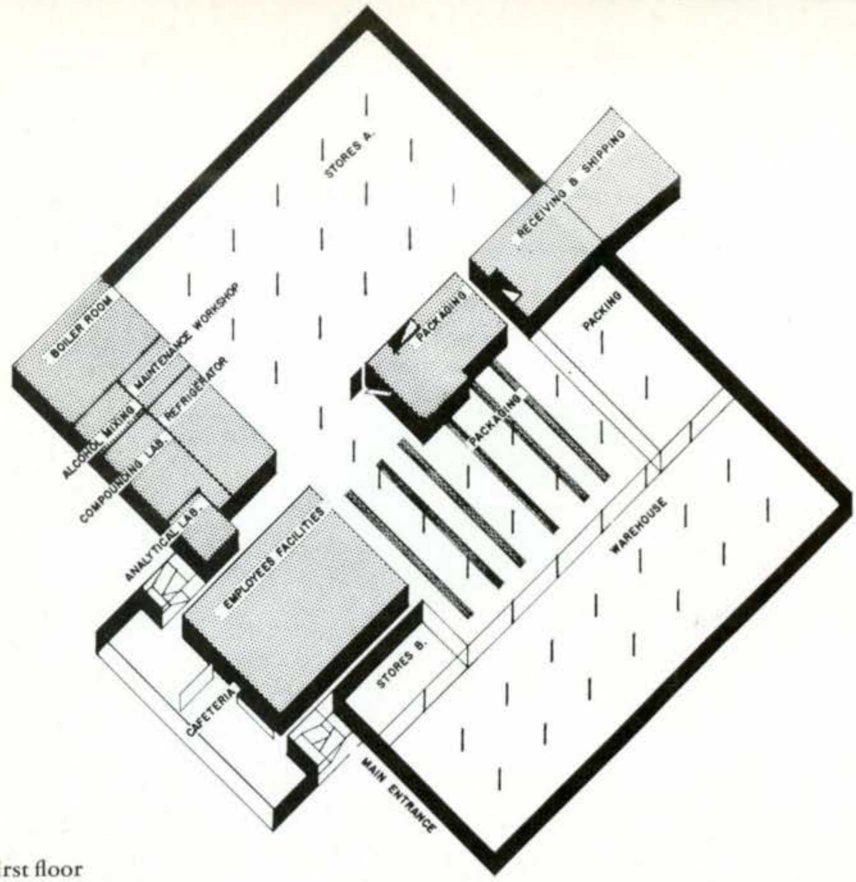
PANDA

A factory for the manufacture of instruments covering the entire field of calibration from those recording the weather, both commercial and household, to huge instrument panels used in the oil fields of Canada. The executive and sales offices for the Company in Canada are also centred here.

Special requirements include easy expansion without interruption of production, large spans not less than 40' clear by 25'.

Area at present — 40,000 sq. ft. Ample space on the site allows eventual expansion of 100,000 sq. ft.

North elevation



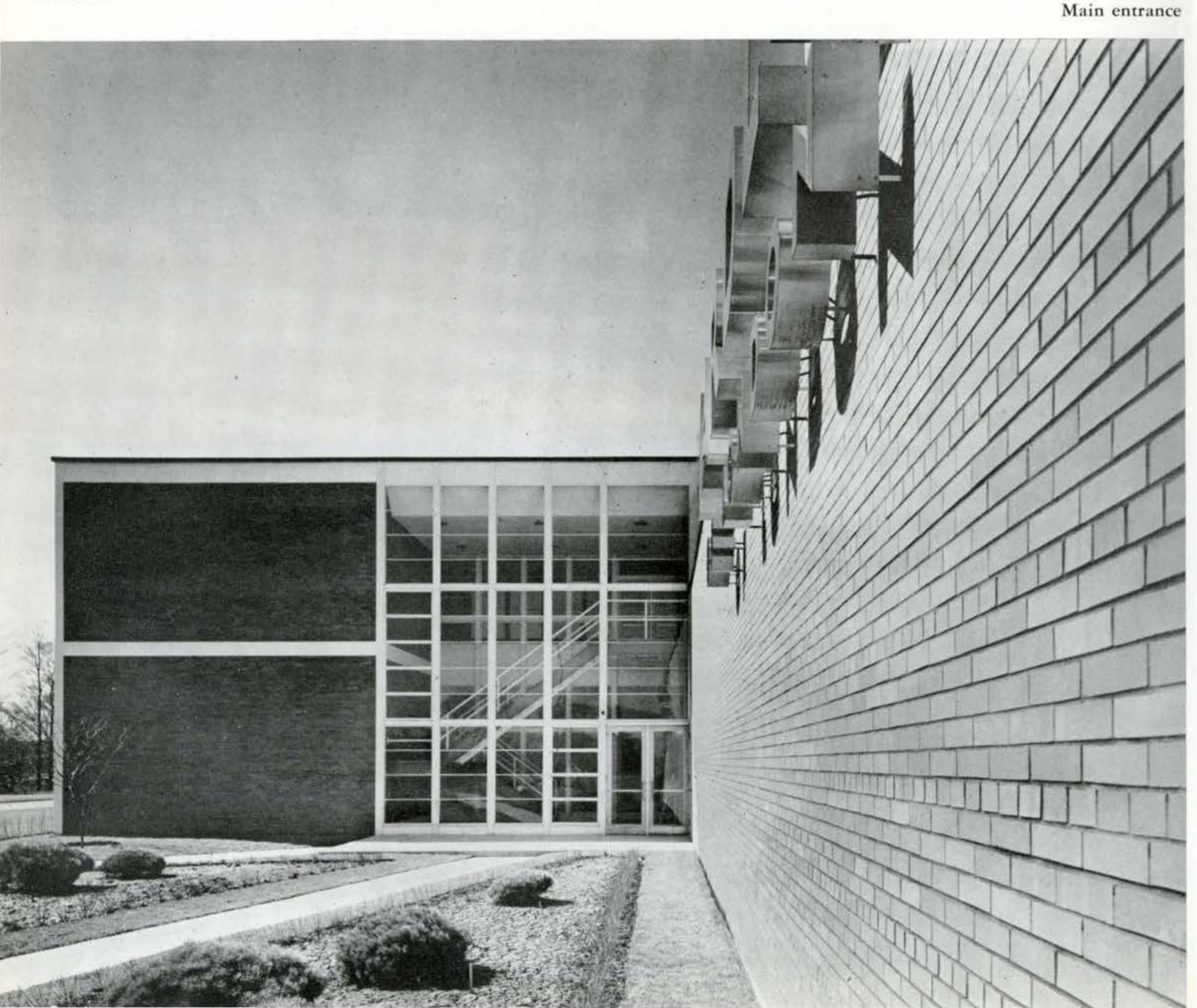
First floor

Factory and eventual sales offices and main administration office for Canada of a world-wide organization producing perfumes, soaps, talcs and various other cosmetics.

Special requirements include one floor production area with gravity flow over certain parts. Expansion to be had in all four directions without interrupting the operation. High ceilings, 14' clear under all obstructions, wide spans. Water flooded roof. Exterior wholly imported brick in contrasting colours, exposed steel frame.

Area — 75,000 sq. ft. of space situated in a 14 acre site at the edge of a beautifully wooded ravine, the whole area to be eventually landscaped to a high degree.

Main entrance

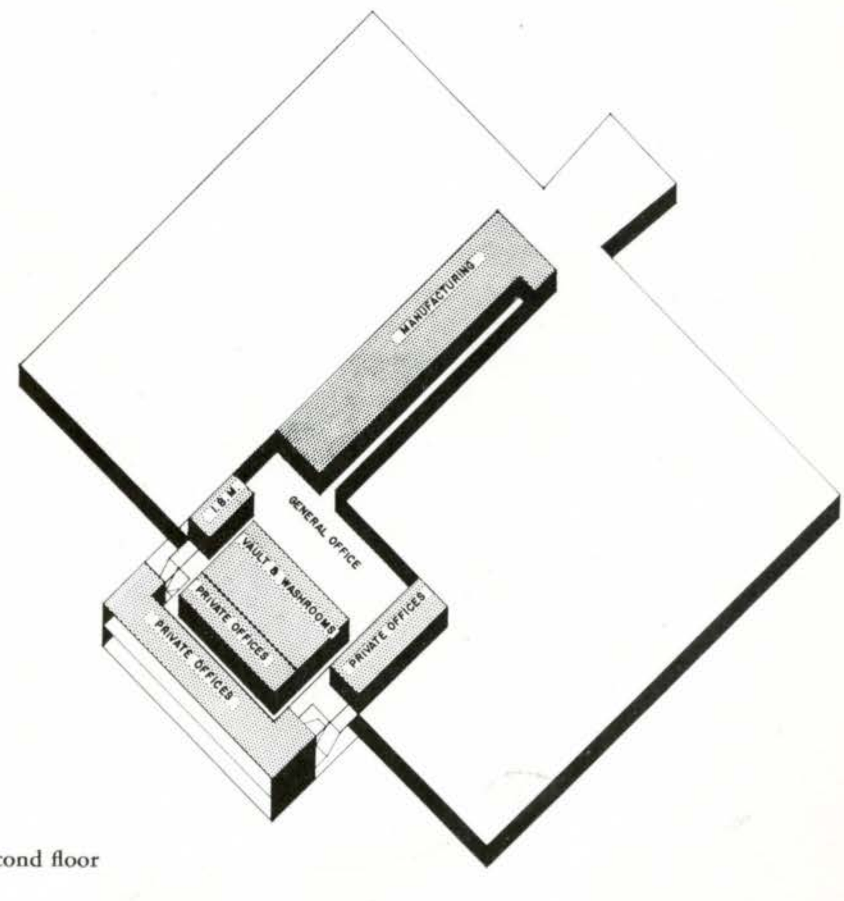


PANDA

Yardley of London (Canada) Limited, East York, Ontario

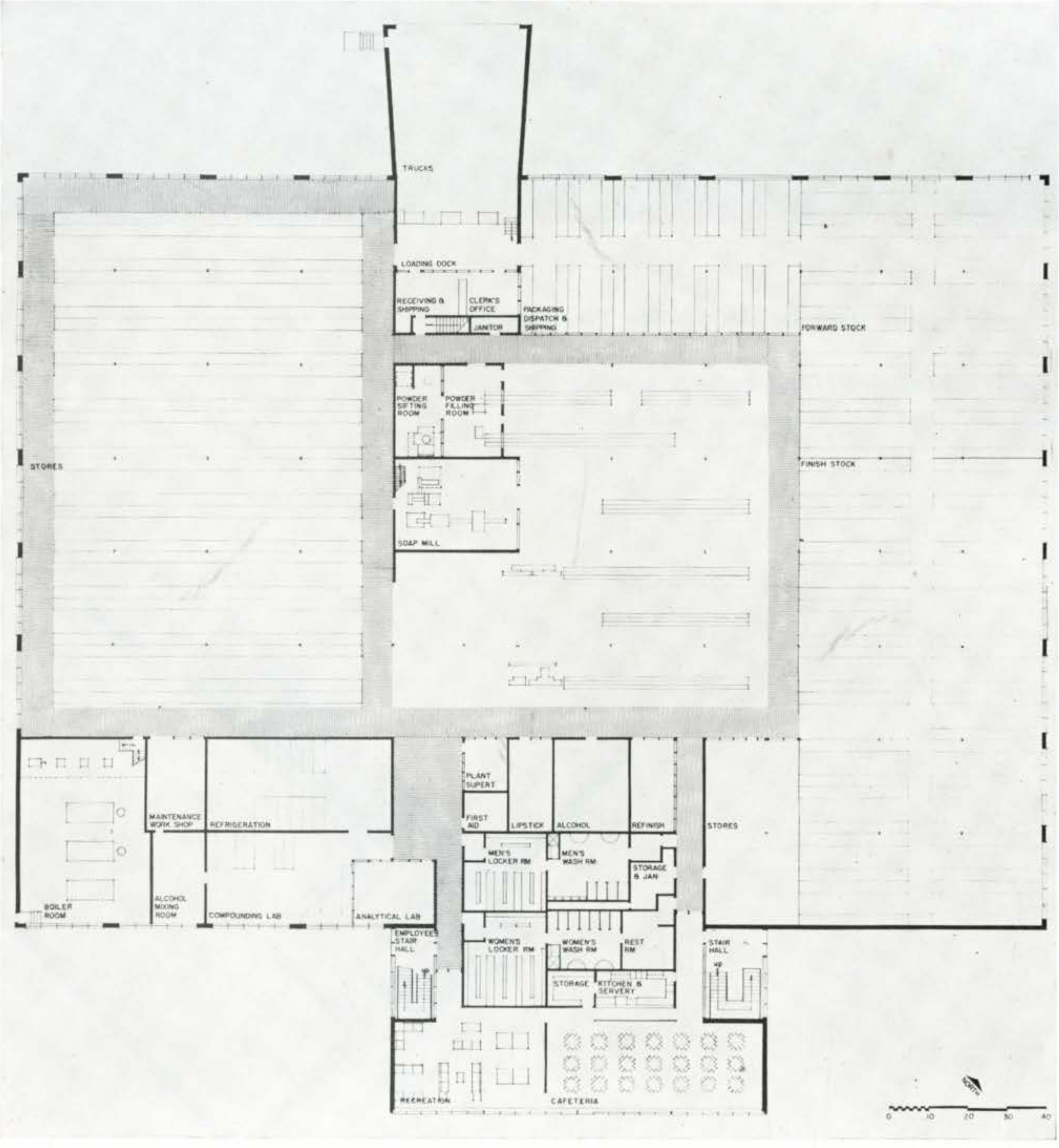
Architects and Engineers, John B. Parkin & Associates

General Contractors, Foundation Company of Canada Ltd.



Second floor

Elevation from the south east

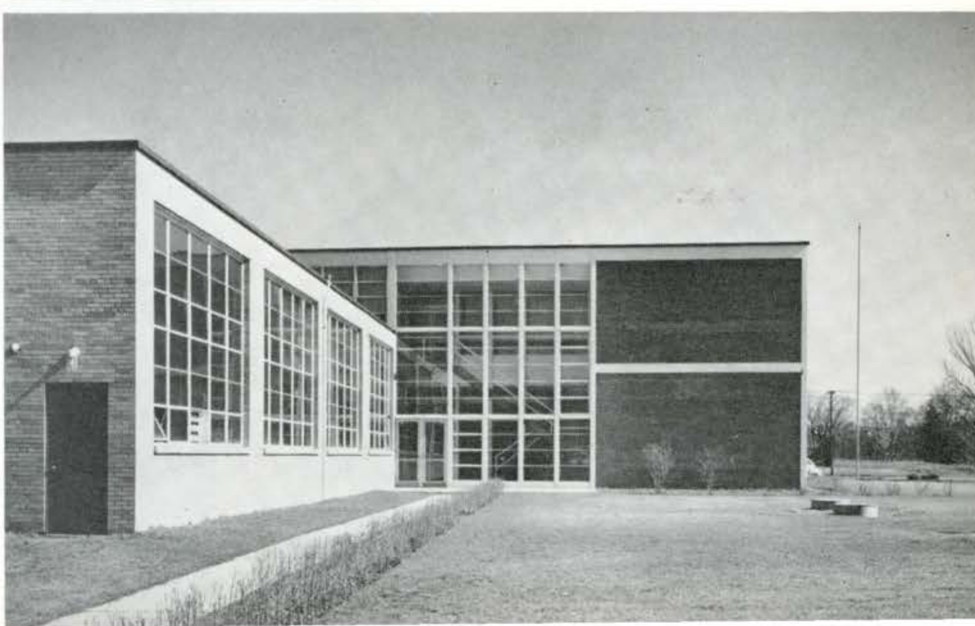


First floor plan

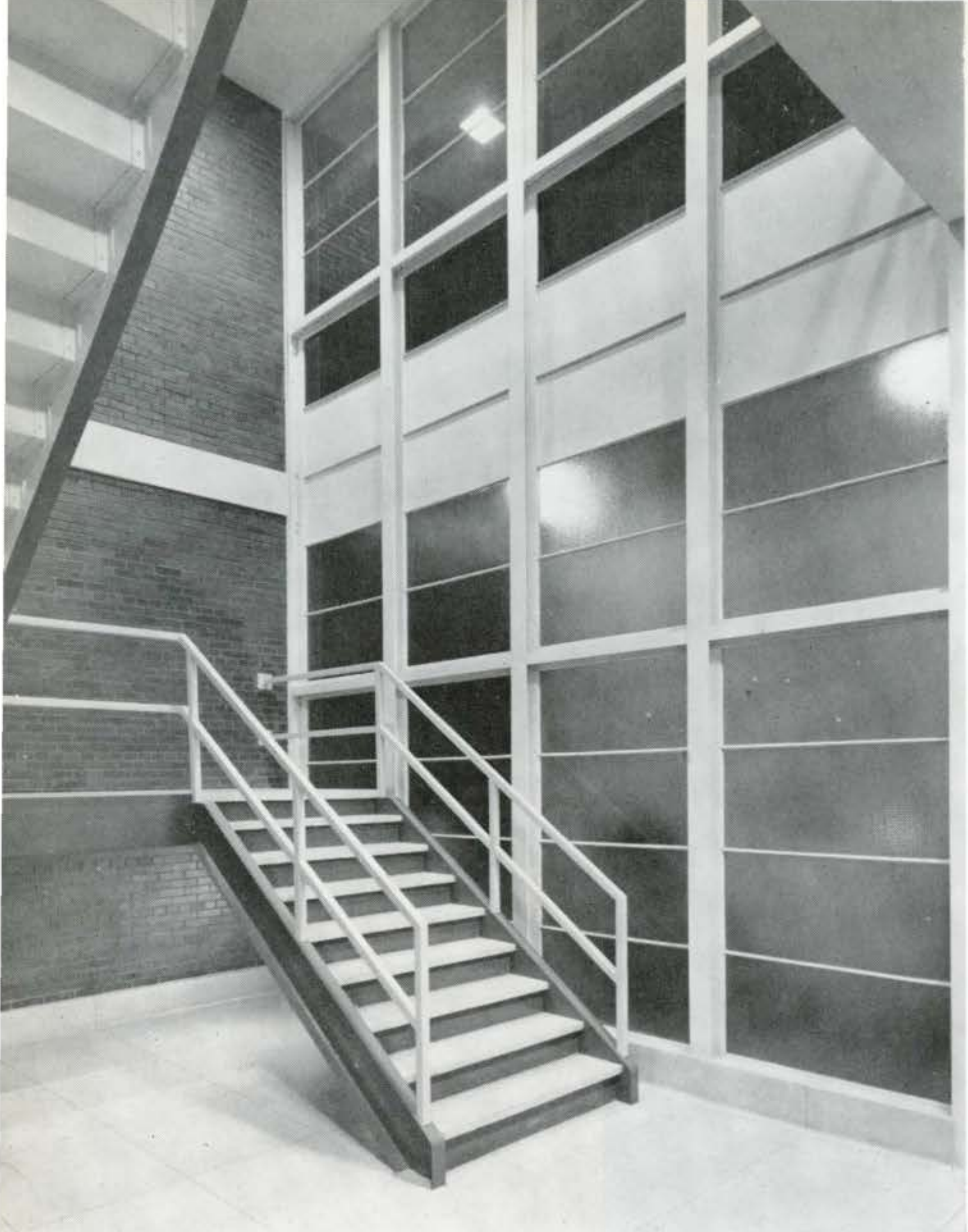
View of main production area. Service mezzanine with spectator gallery in right foreground.

PANDA

The entrance

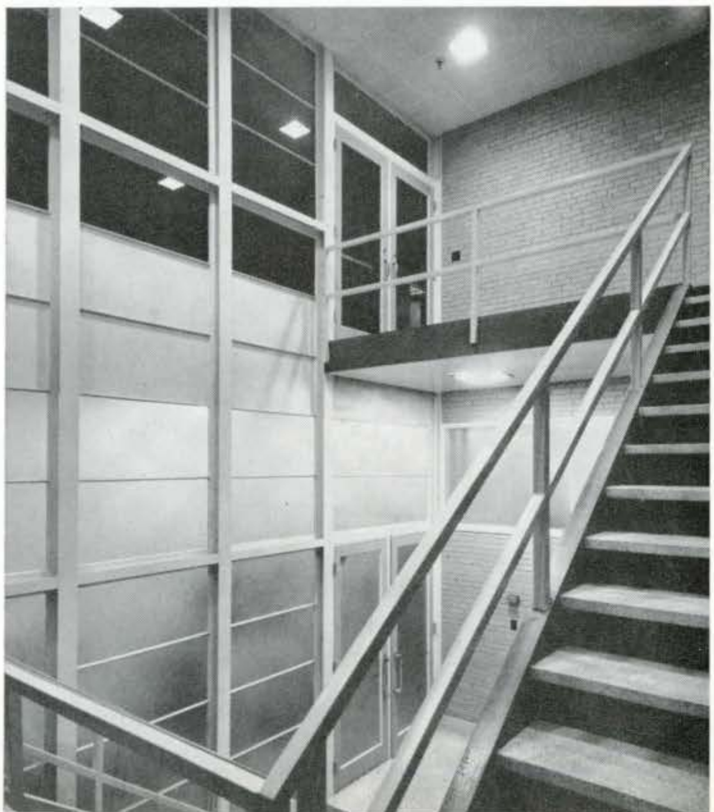


Employees' entrance



PANDA

Main entrance stair tower.

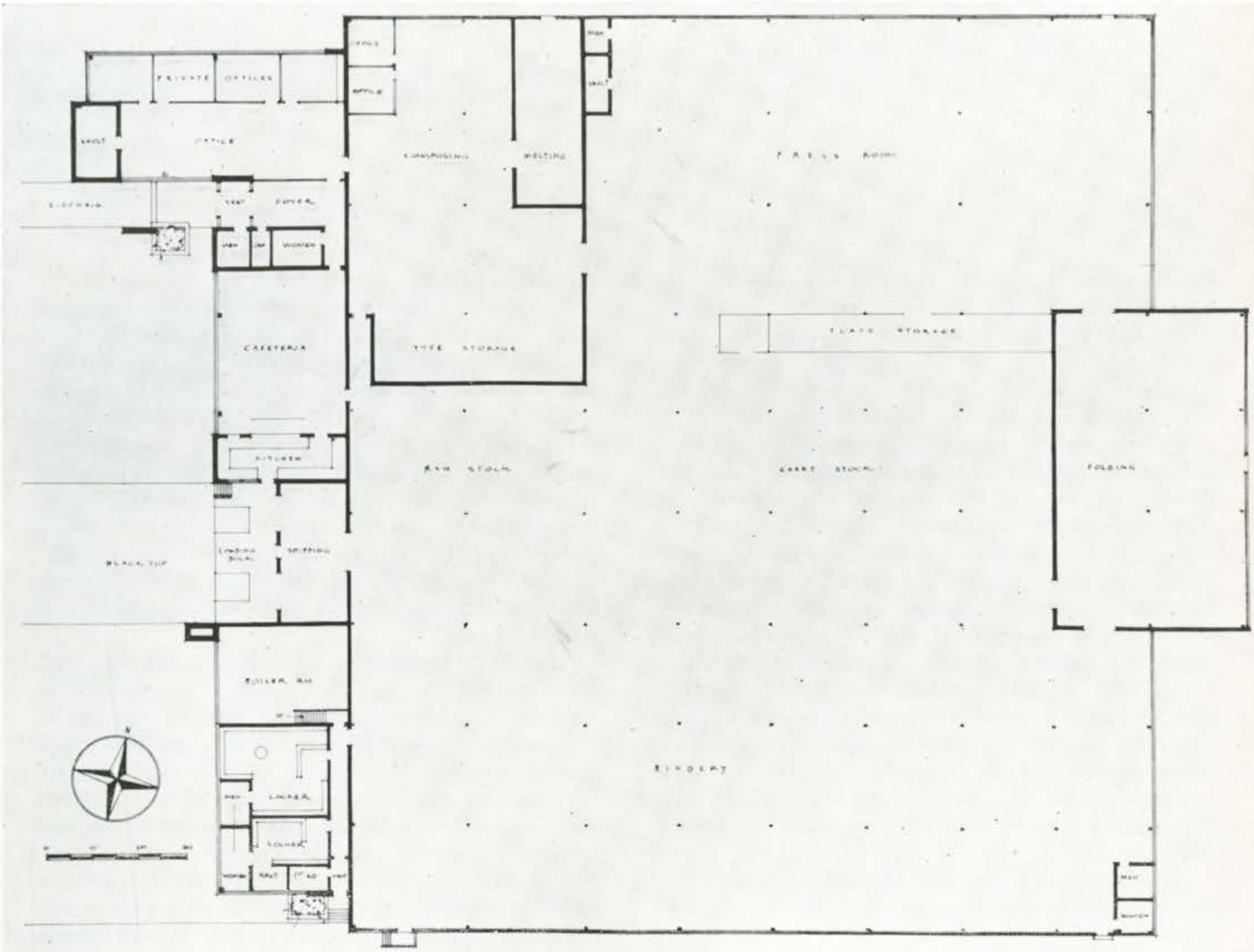


Main entrance stair. Reception area through doors on upper landing.

Hunter Rose Co. Ltd., North York, Ontario

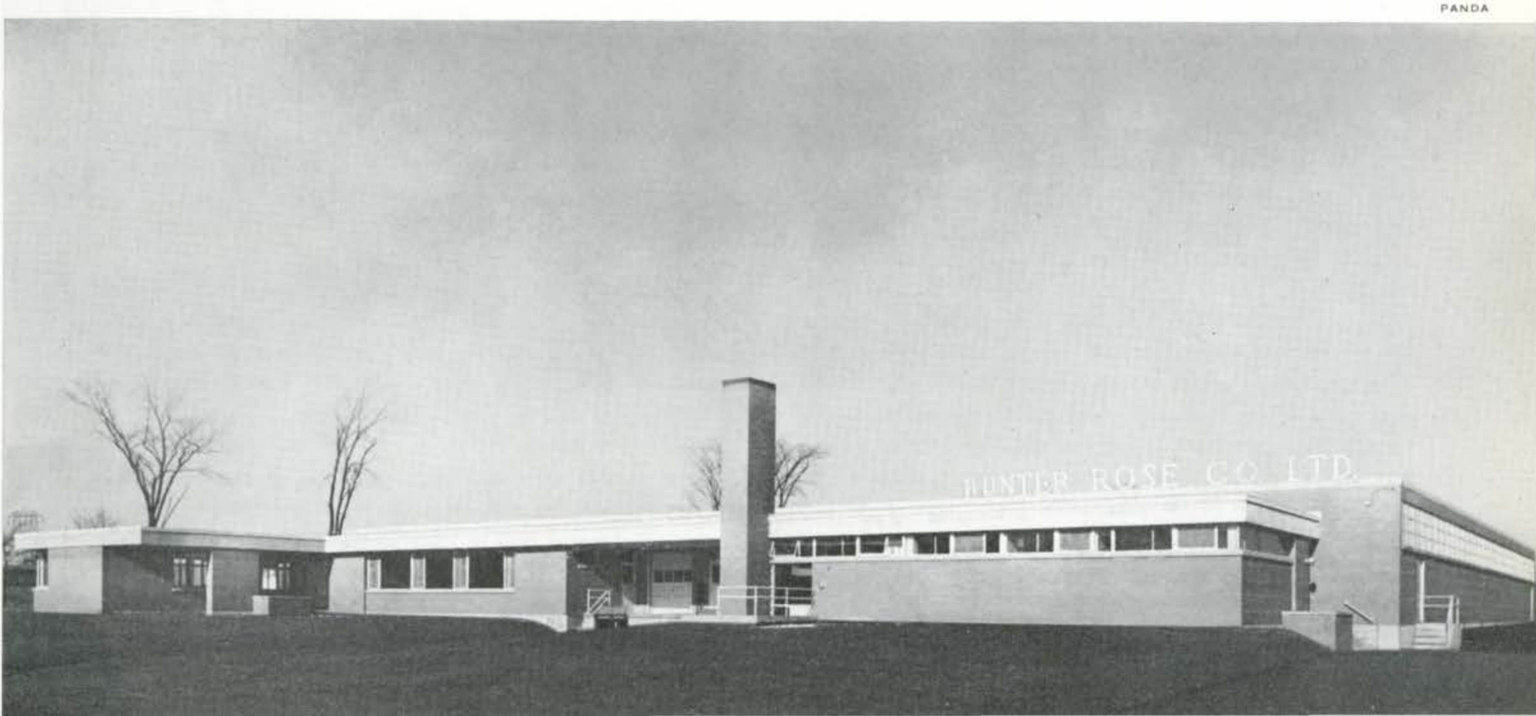
Architect, Richard A. Fisher

Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, H. H. Angus & Associates Ltd.
General Contractors, Varamae Construction Ltd.



Floor plan

PANDA



Control of Water Vapour in Dwellings

Neil B. Hutcheon

THIS IS THE FIRST of three short papers presented as the basis for discussion of water vapour control and condensation in building constructions at the RAIC Annual Meeting, May 11th, 1954. The action of water vapour is discussed and the problems and present recommended practices in dwelling constructions are presented.

Water vapour is present in small but significant quantities in all space involved in human activities. It may best be pictured, for present purposes, as a gas consisting of water molecules in rapid motion which collide with and rebound from one another and from other molecules with which they come in contact. The average velocity of these molecules is directly indicated by temperature; added heat energy increases the average velocity, which is reflected in a higher temperature. The molecules in bouncing off any restraining surface exert a force which is recognizable as pressure. This vapour pressure is related only to the average molecular velocity and density of the vapour present, and may be regarded as a measure of the tendency of the water molecules to migrate. Increasing either temperature or density increases the vapour pressure.

There is no need to deal at length with the various characteristics of water vapour, but the following may be noted:

1. *Water vapour acts with a reasonable degree of independence when mixed with air.* It exerts its own vapour pressure, which contributes to the total, or barometric, pressure of the air-vapour mixture, and can diffuse through the air under differences in its own vapour pressure from one point to another. It can also be carried along by a moving air stream, and to this extent may not act independently of the air.
2. *Water vapour will pass through many of the common building materials.* It may diffuse through materials, independently of any air movement, or may be carried in some cases into and through walls, ceilings and roofs by moving air. The tendency of a material to allow the passage of water vapour by itself can be measured and expressed quantitatively as a permeance coefficient.
3. *The amount of water vapour which can be held in a space is related to temperature and decreases with decreasing temperature.* It is this characteristic more than any other which leads to condensation problems in buildings. Some further elaboration of this is required by way of background.

Heating and Cooling of Air-vapour Mixtures

The change in properties of a mixture of air and water vapour with heating or cooling can best be presented for those who are familiar with graphs and charts by a simple plot of water-vapour content of the air against temperature, as presented in Fig. 1. On the vertical scale is shown the vapour content as a percentage by weight of the weight of dry air present. The limiting quantities which can be held at any given temperature, indicated on the horizontal scale, are shown by the heavy line marked "saturation". At 75°F, for example, the water vapour content is 1.9 percent. At 49° (point D) the water vapour required for saturation is 0.7% while at 20° (point F) only 0.2% is required.

Now, if at a temperature of 75° there is less than 1.9% of water vapour present, the air-vapour mixture is said to be partially saturated. The degree of saturation can be expressed in terms of relative humidity. On the vertical line representing 75° a number of points can be located which correspond to the percentages of water vapour present at various values of relative humidity. This may be extended to other temperatures to permit the construction of the curved lines on the chart showing relative humidity. The simple chart thus formed is part of that commonly called a psychrometric chart. It is of interest here since it presents in graphic form the relationships between temperature, vapour content and relative humidity, and can readily be used to illustrate changes involved in heating or cooling of the air.

Now, on heating or cooling an air-vapour mixture without changing the water content, the percentage of water present will obviously remain constant, and these processes can therefore be represented by horizontal lines on the chart. Three processes typical of conditions which may arise at times in dwellings will now be considered.

Dampness in Basements

The conditions in a very damp basement on a humid day in summer might be represented by point A, corresponding to 100% relative humidity at 75°. At this condition molds will form, wood will swell, and clothing and other articles will be damp. If, however, heat is added to the air to raise its temperature to 90°, the resulting "process" can be represented by the line AB on the chart. The final condition, represented by point B, shows that the relative humidity will be only 62%. Clothes will now dry, and wood will shrink to a more normal condition. Adding heat is thus one way of curing dampness in basements, although in summer the cure may be less acceptable than the ailment. The reverse process, B to A, is also representative of the same summer condition in which outside air at conditions represented by B enters a basement and is cooled on the basement walls to 75°, to become saturated with moisture. If the walls were cooler than 75° for the particular air conditions taken, condensation would occur and basement walls would actually become wet, since at the reduced temperature the air can no longer hold its original load of moisture. Condensation is, however, most commonly experienced on windows in winter as represented by the next example.

Condensation on Windows

Point C represents a common condition in modern Canadian homes in winter – 40% relative humidity at 75°. The window surfaces, however, may be only at 49°. This will be sufficient to cool the air to saturation just at the window surface, as shown by the process line CD. The temperature of 49° at which this air-vapour mixture, if cooled, becomes saturated is known as its dew-point temperature. If the window surface is colder than the dew-point of the air-vapour mixture in contact with it, condensation will occur. For the example represented by the process C.D.E., the air in contact with the window surface at 32° can only retain 0.37% moisture, whereas there was 0.74% present initially, and condensation on the window surface must occur. If the window surface is above 32°, the condensation will appear as dew; if below 32°, it will appear as frost.

Relative humidities at 75° above which condensation may be expected on window surfaces for various outdoor temperatures are shown below.

	Single Window		Double Window	
Outside Temperature	Wind	No Wind	Wind	No Wind
+20°F	22%	38%	51%	58%
.0	11	26	39	48
–40	4	17	30	38
–20	2	11	23	32

It may be noted that double windows provide higher inside surface temperatures and therefore permit higher humidities to be carried. Windows will in general set the limit on the relative humidities which may be carried in dwellings since they normally provide the coldest surfaces, on which condensation occurs, removing water from the air, as the humidity tends to rise.

Humidity in Houses

It has long been generally recognized that Canadian houses are very dry in winter; that is, the indoor relative humidities are low. Although this is no longer true for most houses now being built, this condition in older houses can readily be explained, again by reference to the chart of Fig. 1. Air outside may be saturated at 20°, if there is frost

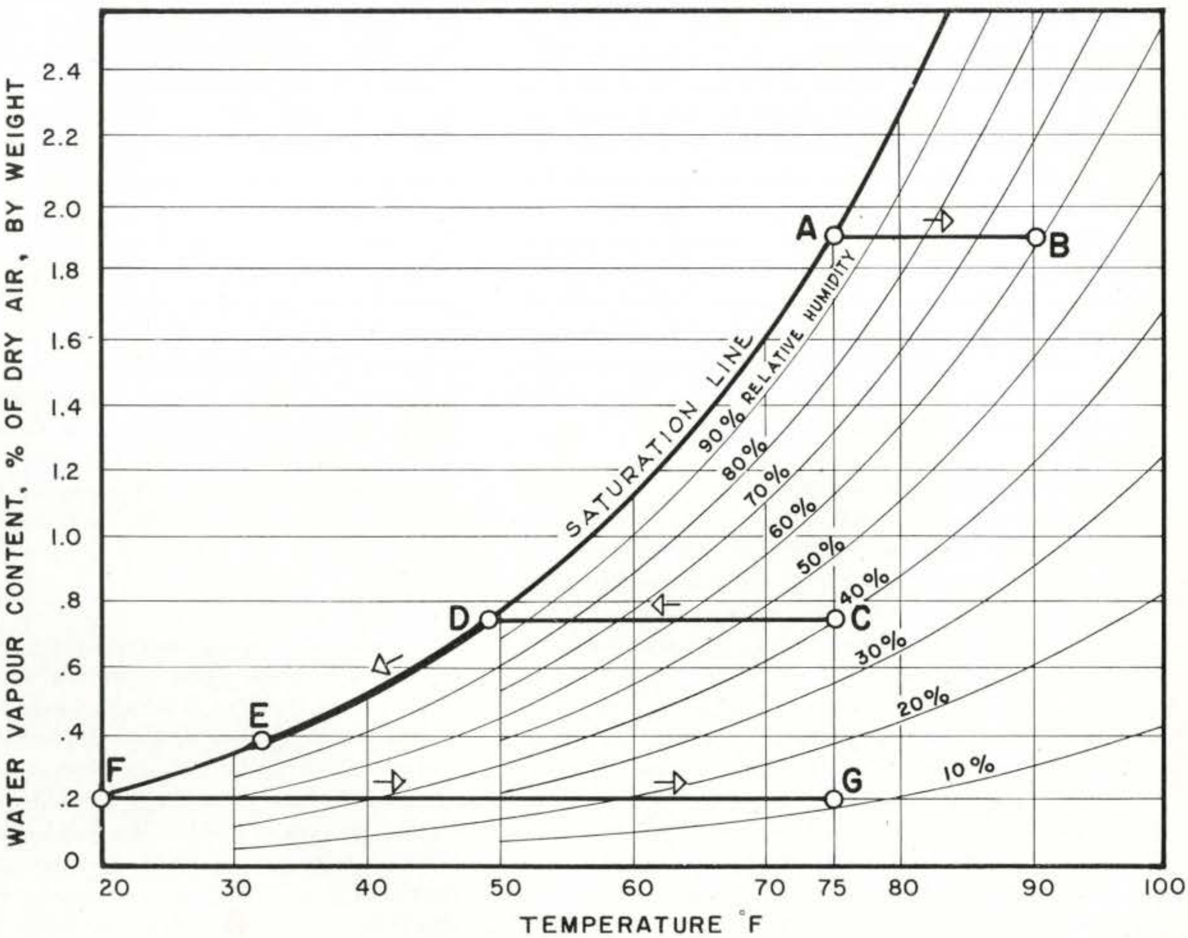


Fig. 1 Heating and cooling of air-vapour mixtures

or snow in the air, as represented by point F. This air is saturated, but because of the low temperature it can hold a maximum of only 0.2% moisture. This air, when introduced into the house and warmed to 75° will, if no water is added, then have a relative humidity of 12% as shown by point G. An additional 0.54% of water vapour will be required to bring the relative humidity to 40% at 75°. If in a house of 10,000 cubic feet capacity the air infiltration is at the rate of one air change per hour, the weight of dry air involved will be about 740 pounds per hour. The water vapour which will be required to maintain 40% humidity in this case, for the conditions assumed, will be 0.54% of 740, or four pounds per hour. The humidification rate required will be 9.6 gallons per day. The natural sources of moisture, from people and from cooking, washing and drying of clothes within a house, will seldom exceed four gallons per day, so that intentional humidification to the extent of 5.6 gallons or more will be required to maintain 40% humidity. Modern houses are, however, quite tightly built, so that air infiltration rates seldom reach the values attained in older houses (air leakage is reduced intentionally in the interests of fuel economy). Further, modern houses are smaller, providing less space per person, so that natural moisture sources tend to be relatively more important. While houses of twenty years ago seldom had sufficient humidity without the use of humidifiers, it is probable today that at least half of the houses constructed since 1945 will have sufficient humidity to produce condensation on window surfaces in cold weather without the use of humidifiers.

The humidity may vary widely from one house to another of identical construction in the same locality, depending on the living habits of the occupants, from as little as 15% where windows are frequently opened and clothes are dried outside, to as much as 50% where windows are seldom opened and clothes are dried inside. Extreme conditions exist on the west coast of Canada, where, because of high outdoor moisture associated with moderate temperatures, the air-leakage into houses is reduced, clothes must frequently be dried inside, and the outside air entering the house already has a substantial load of moisture. Excessively high indoor humidity is common under these conditions. Low humidities are more common in areas of extreme low winter temperatures.

Condensation Difficulties in Houses

The occurrence of visible condensation on the room-side surfaces of windows, walls, floors and ceilings depends upon the combination of the relative humidity maintained and the extent of the cooling produced at the surfaces in question. Condensation can be avoided if the moisture content is low, or if the surface temperatures are high. If the wall or window surface is unavoidably cold, then the relative humidity must be kept low. Wall surface temperatures can be raised by inclusion of insulation in the construction. Window surface temperatures can be raised by the addition of storm windows or by the use of double or triple glazing, permitting higher humidities to be maintained without condensation. Visible condensation in an existing house in winter can most readily be eliminated, in most cases, by a reduction in relative humidity by reducing the moisture supplied to the air or by intentionally increasing the ventilation rate. Where high humidities are desired, special provision must be made in design, with the aid of psychrometric and heat transmission calculations.

Visible condensation, although common on windows in winter, is not as troublesome as concealed condensation, which can occur in attic spaces and within walls. Water vapour can diffuse through interior finishes of walls and through ceilings, or may be carried by air leakage, until it encounters cold surfaces and is condensed. When the surfaces on which this condensation occurs are below freezing for long periods of time, the condensation accumulates as frost. It is not impossible (in the colder areas of Canada), with poor vapour control in a wall or ceiling design to collect as much as one pound of frost per square foot of wall or roof area. This provides one gallon of water per stud space in a frame wall, which upon release over a period of a few hours with a rise in outside temperature above freezing, produces difficulties which need no elaboration here. The householder is more frequently aware of concealed condensation in attics than in walls, since water may run from light fixtures and drip from ceilings, but may run down within walls without attracting attention.

The condensation problem results partly from the use of insulation and partly from the substantially increased humidities now carried in houses. Insulation, by reducing heat flow, makes the room-side surfaces of a wall warmer, but also makes the outer portions of a wall colder. Similarly, insulation over ceilings makes ceilings warmer but by cutting off heat makes attics and roof surfaces colder. It is on these colder surfaces that concealed condensation is likely to occur. The critical surfaces in wood frame dwelling construction will usually be the inside surfaces of the outside sheathing and the underside of roofs. Since it is incompatible with fuel economy for heating to raise the temperature of these surfaces, the remedy must be sought by reducing the concentration of vapour which is allowed to come in contact with them. There is, fortunately, a relatively simple way in which this can be achieved. The vapour flow under winter conditions, which are by far the most likely to produce condensation troubles, is from the region of higher vapour concentration and pressure inside the house to the outside. It is, therefore, possible to employ a vapour barrier in the warm side of the wall which will effectively reduce the concentration of vapour at colder regions by reducing the flow of vapour from inside the house.

Vapour Barriers

It is difficult, and not too rewarding, to attempt to identify by description those materials which will provide resistance to the flow of water vapour. Briefly, however, continuous films of wax or asphalt carried on or in papers, aluminum foils free of pinholes, certain plastic films, and to a limited extent, paint films, are effective in restricting vapour barriers. It is difficult to tell by examination, even after considerable experience, whether a particular product will provide resistance to vapour flow. This is best determined by a vapour permeability test. A rating is established in terms of the weight of water vapour passing through one square foot of the material in one hour for a given vapour pressure difference maintained across the sample. The unit of rating now generally accepted on this continent is called a "perm", and corresponds to a transmission of one grain of water vapour per square foot per hour for a vapour pressure difference across the sample of one inch of mercury. Many vapour barrier materials are now marked to indicate conformity to the requirements of specification 9-GP-3 of the Canadian Government Specifications Board, for vapour barriers. The limiting rating permitted in this specification is 0.75 perms. Acceptable vapour barriers should not exceed this permeance. This figure by itself will have little meaning, but if converted to the weight of water transmitted per square foot in a winter season under average conditions existing in a modern dwelling, it will be found to correspond to 0.1 pounds per square foot. This amount of water if condensed on and later absorbed in a one-inch sheathing board will increase its moisture content by 3%, or if absorbed in a 4-inch brick withe will increase its moisture content by 0.25%.

The actual amount of vapour passing through a vapour barrier of 0.75 perms may be substantially increased by leakage through joints and other openings at electrical fixtures. Reasonable care is required at such points. The four-inch lap provided by the use of 36-inch paper on 16-inch studding or furring is normally considered satisfactory when such laps are held tightly by interior sheathing or finish. Holes resulting from careless workmanship can be quite serious.

The difficulties which can be avoided by proper vapour barrier protection are sufficiently serious to justify far more attention in the selection and application of vapour barriers than is presently being given in present practice.

Exterior Wall Coverings

A vapour barrier properly installed will reduce to a low value the amount of water vapour which can enter a wall. It is now generally conceded, however, that even with this protection it is desirable to avoid membranes or coverings on the cold side of walls which will act as barriers to the escape of moisture to the outside. Specification 9-GP-2 of the Canadian Government Specifications Board for exterior sheathing papers calls for a minimum permeance of 3 perms, which is four times that permitted in vapour barriers for use on the interior of a wall. Exterior sheathings and coverings, if impermeable in themselves to water vapour, should not be installed so as to prevent the escape of moisture from the wall.

In some cases it may be desirable to provide intentional openings in the exterior coverings so that vapour can escape. Walls have been constructed with intentional openings for circulation of outdoor air behind impermeable coverings. It is preferable, however, to avoid constructions requiring such openings since the direct entry of cold air into a wall construction may quite seriously disturb the thermal conditions.

Attics and Roofs

Condensation difficulties arise more frequently in cold attic spaces and in roof constructions than they do in walls, quite apart from the fact that they attract more attention. This is brought about by the tendency for the warm air in a house in winter to rise and to find its way by leakage out through the upper parts of the structure. In so doing, it carries water vapour with it which can be condensed in the same way as vapour which diffuses through the ceiling into the attic space itself.

The tendency for warm air to find its way upward is identical in principle to the situation in a chimney in which "draft" is produced. A column of air twenty feet high and one square foot in area will, at outside winter temperatures, weigh up to 0.35 pounds more than a similar column of air at indoor temperature. There is thus created a potential pressure of 0.35 pounds per square foot available to induce leakage of cold air at lower levels in a house and to force warm air out at the top. In other words, the warm air in a house tends to be "floated" up and out by the heavier cold air leaking in and collecting at lower levels.

The transfer of water vapour by convection can occur into walls as well as into attics and roofs. Cracks and gaps in either plaster or in dry wall construction and openings around electrical fixtures and access doors will permit air leakage. It is important, therefore, that vapour barriers be reasonably continuous to guard against air leakage as well as direct diffusion of vapour.

Cold attic spaces over ceilings are potentially serious condensation areas because of the added effects of air leakage, but, in addition, the roof coverings are frequently resistant to the escape of vapour. It is now recommended practice to ventilate such spaces by providing intentional openings to outside, even when vapour barriers are used in ceilings, provided that the ceiling is well insulated. Ventilation over uninsulated ceilings is not, of course, to be recommended because of heat loss difficulties. Specific recommendations on the size and location of ventilating openings are given elsewhere and need not be repeated.

The ventilation of attic spaces over insulated ceilings has several other advantages. Difficulties with ice dams forming on eaves can be greatly reduced when attics are kept cold by ventilation, and ceiling temperatures are substantially reduced in summer. Difficulties may be created in keeping out birds and insects and in avoiding the entry of blowing snow in winter. Difficulties may also be created in one and one-half storey construction where it is desired to utilize the space behind dwarf walls for storage. In spite of these problems, experience has shown that ventilation to the outside of unheated attic spaces over insulated ceilings and behind insulated walls is good practice.

Flat roofs present a special problem since the roof covering is invariably both water-tight and vapour-tight, so that any vapour entering the space immediately under the roof covering is forced to accumulate until condensation occurs. The rate of this accumulation will be governed by the resistance imposed by the materials forming the ceiling. Ideally, a perfect ceiling vapour barrier is required; practically, this is difficult to achieve. It is possible in most dwelling construction where flat roofs are framed of wood to provide for ventilation over the insulation but under the roof covering, and this must be regarded as desirable.

Condensation in Industrial Building Construction

G. Lorne Wiggs

DR NEIL HUTCHEON has covered the question of condensation in dwellings both briefly and clearly. His presentation is therefore an excellent introduction to this paper, because the problems which arise in industrial buildings are basically the same as those which exist in residences. However, they are greatly accentuated in many industries, such as textile mills, paper mills, etc. In the limited time available it is proposed to deal with the condensation problems in such industrial plants as textiles and the like.

During the winter months, most Canadian homes are heated to 70°-72°F while the relative humidities rarely exceed 50% but are more commonly between 10% and 30%, especially during sub-zero weather outdoors. In contrast with this, many Canadian industrial plants in winter must be heated to between 75°F and 80°F and relative humidities exceeding 50% are frequently maintained the year round. In the textile industry, relative humidities of 65% to 75% are commonly maintained, while in a few textile processes relative humidities as high as 90% must be provided and this even when outdoor temperatures drop below zero. By referring to the psychrometric chart shown in Dr Hutcheon's paper, it will be seen that at a temperature of 70° and a relative humidity of 20% that the water vapour content of the air is about 0.3 while in a textile mill having a temperature of 75°F and a relative humidity of 65% it is over 1.2 or about four times that generally found in a residence. In a spinning room held at 75°F and 90% relative humidity, it would be over 1.7 or more than five and a half times that usually found in a Canadian home. But even though this greatly increased quantity of water vapour in the air is the cause of serious problems, there is an additional factor which is frequently neglected in the consideration of condensation in structures. That factor is the vapour pressure exerted by the water vapour in the air. The vapour pressure exerted varies as the dew point temperature of the air, as does the quantity of water vapour in the air.

Fig. 1 is the same psychrometric chart as that presented by Dr Hutcheon but the vapour pressures have been added, with the vapour pressures expressed as usual in inches of mercury.

In the following discussion and on the illustrations which follow, the vapour pressures have been expressed as pressures corresponding to inches of water instead of inches of mercury because the former undoubtedly have more meaning to architects and engineers than the latter.

Not seen on the chart, but from the tables it is found that air at –10°F has a vapour pressure of 0.3 inches of water. From the chart it will be seen that air at 70°F and a relative humidity of 60% has a vapour pressure of 6 inches of water. Similarly, it may be seen that air at 75°F and a relative humidity of 65% has a vapour pressure of about 6.67 inches of water, while air at 75°F and 90% relative humidity has a vapour pressure of almost 11 inches of water.

In order to see the effect of this, some of the figures read from the psychrometric chart have been tabulated in table 1.

Dry Bulb Temp.	Relative Humidity %	Water Vapour Content % of Dry Air	Vapour Pressure Ins. of Water
–30	100	.015	.49
–20	100	.026	.89
–10	100	.046	1.56
70	20	.300	2.00
70	30	.460	3.00
75	50	.940	6.00
75	65	1.220	6.67
75	90	1.710	10.8

Consider a residence, without humidification, at an outdoor temperature of –20°F. With the air in the house at 70°F and 20% relative humidity, the water vapour content of the air in the house would be 0.274% of the weight of dry air higher than it is outdoors while the vapour pres-

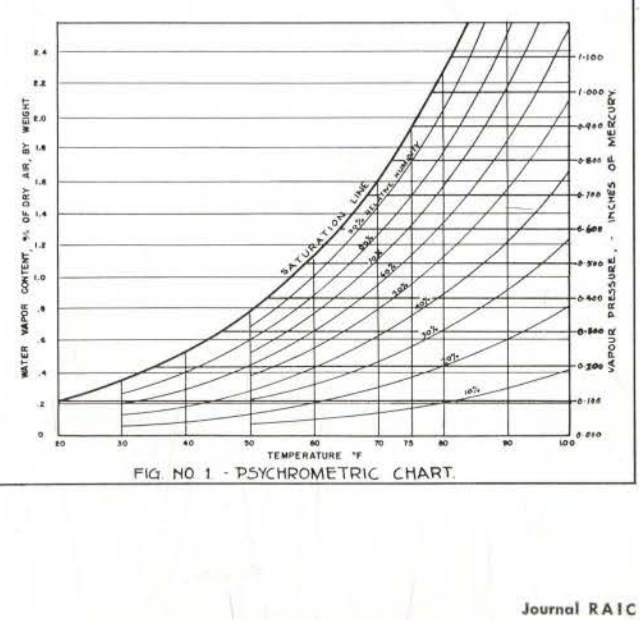


FIG. NO 1 - PSYCHROMETRIC CHART.

sure difference across the exterior walls is 1.11 inches of water.

Now consider an industrial plant maintained at 70°F and 65% relative humidity at the same outside temperature, the water vapour content of the air in the plant is 1.174% of the weight of the air higher than it is outdoors while the vapour pressure difference across the exterior walls is 5.72 inches of water.

Thus, in the textile mill the water vapour content is slightly over four times that in the residence, while the difference in vapour pressure is almost five times greater. It is for these two reasons that the design of walls for textile mills and other buildings in which high humidities are maintained is so important. In order to design such walls properly it is necessary to know something of the temperature and humidity conditions which occur within the walls.

One of the simplest methods of finding those conditions is to adopt a graphical method.

Fig. 2 shows the graphical analysis of the conditions in a simple wall. It is constructed as follows:

A line A-A_1 is drawn of such a length and so divided as to show the temperature range over which the study is to be made. In this case it is from –20°F to 75°F.

Obtain from "The A.S.H.V.E. Guide" the thermal conductivity coefficients of the materials being considered and of the other components entering into the heat transmission of walls. These are as follows:

Material	Conductivity K	C	Resistance
Face Brick 4″ thick		2.30	0.435
Terra Cotta 4″ thick		1.00	1.000
Cinder Block 8″ thick		0.60	1.670
Fiber Glass Insulation	0.28		3.575
Insulmastic	0.36		2.780
Air Space		1.10	.909
Surface			
Still Air		1.65	0.606
15 MPH Wind Velocity		6.00	0.167
Steel		312	

The resistance for each material is then listed in the proper order, starting with the inside still air film.

Material	Resistance	Cumulative Total
Inside Air Film	.606	.606
4″ Terra Cotta	1.000	1.606
1″ Air Space	.909	2.515
8″ Cinder Block	1.670	4.185
4″ Face Brick	.435	4.620
Outside Air Film (15 MPH)	.167	4.787
Total	4,787	

Now draw a line at right angles to the line A-A_1 through the –20°F point and to some convenient scale divide that line up in parts so that each part represents the resistance of one of the materials and all equal the total resistance of all the materials. Thus the distance AB equals 0.606, BC equals 1.00, CD equals 0.909 and so forth. Now draw the vertical lines BB_1, CC_1, DD_1, EE_1, FF_1, and GG_1 parallel to AA_1. Also draw horizontal lines through each of the temperatures.

It is intended to study the conditions in a plant in which a temperature of 75°F and a relative humidity of 65% is maintained inside and conditions are to be examined for outside temperatures of 0°F, –10°F, and –20°F.

On line AA_1 at the 75°F temperature, draw a point K. On the line GG at the temperature of 0°F, –10°F, –20°F and –30°F draw points L, M, and N, respectively. Draw line KL, KM, and KN. These lines then give the temperatures which occur at each point of the wall, at the conditions stated. For instance, at 75°F and 0°F outside the temperature of the inside surface of the wall will be 65°F. The temperature of the 4″ terra cotta face next to the air space will be 50°F. The temperature of the 8″ cinder block face next to the air space will be about 35°F and so forth.

At 75°F and 65°F the dew point temperature is 62½°F. Its vapour pressure is 7.74 inches of water. Therefore, the vapour pressure difference across the wall is 7.74″ – 0.51″ equals 7.23 inches of water.

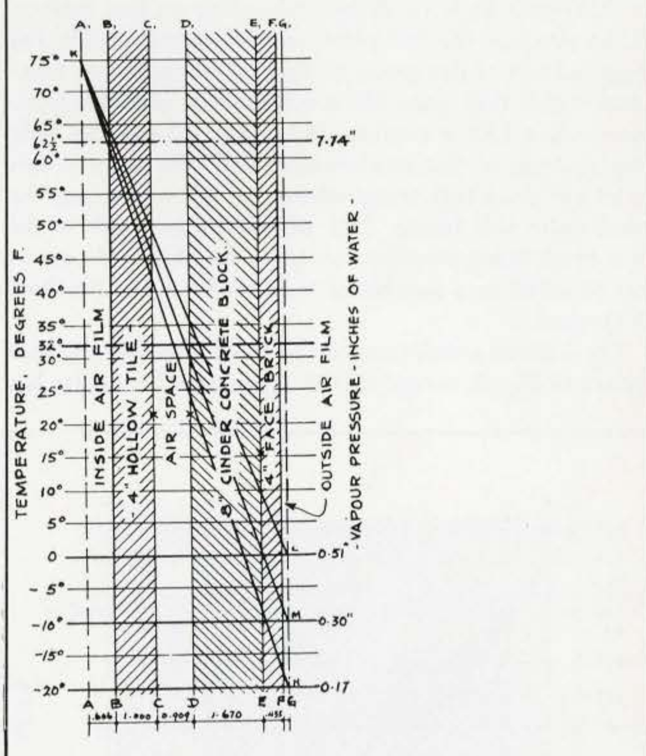


FIG. NO 2 TEMPERATURES IN A SIMPLE WALL

Condensation on the interior wall will occur whenever the temperature of its interior surface is below the dew point of the room. From this chart it will be seen that down to outdoor temperatures of –20°F, the temperatures on the line BB_1 are at or above 62½°F and so no condensation occurs on the interior surface of the wall.

The formation of condensation within any wall is not as simple to determine as the temperatures within that wall because it depends not only on the temperature at any point but also on the permeability or vapour transmission rate of the various materials of which the wall is made up. As long as the vapour resistance of each successive component of the wall from the inside to the outside decreases in magnitude, no accumulation of water vapour will take place within the wall and the danger of condensation trouble is minimized.

In this case, the following are the vapour transmission rates, in perms, and the vapour resistances of the different components of the wall.

Material	Permeance	Vapour Resistance
4″ Hollow Tile	0.120	8.333
Air Space	120.000	0.008
8″ Cinder Block	2.400	0.417
4″ Face Brick	0.800	1.250
Total Vapour Resistance		10.008

The dew point temperatures which result from the above are shown on Fig. 2 as follows:

On line BB_1	62.5°F
" " CC_1	21.6°F
" " DD_1	21.5°F
" " FF_1	15.4°F

By plotting these on Fig. 2, it will be seen that when the temperature outside is –20°F, the temperature of the inside face of the wall is below its dew point temperature so that condensation will then take place on that surface. In the air space the dew point temperatures are below the temperatures of the space, so that no condensation takes place within that space. However, the dew point temperature on line EE_1 is considerably higher than its dry bulb temperature, so that condensation will take place at this point and since both temperatures are below freezing, the condensate will freeze. This will probably result in the face brick being forced away from the cinder blocks, as has occurred on a number of textile mills in the Province of Quebec.

Fig. 3 shows a wall constructed exactly the same as that shown in Fig. 2, except that 2″ fiber glass insulation has been substituted for the air space which constituted part of the wall construction shown in Fig. 2. It should be noted that distances AB, BC, DE, EF and FG are exactly the same length as the same distances in Fig. 2. The striking thing is the difference in the lengths CD of the two charts. The introduction of fiber glass insulation into the wall has made the distance CD almost eight times as great as it was for a single air space. It will be observed that in this case condensation will not take place on the inner surface of the wall even at outdoor temperatures as low as –30°F.

In this case, the following are the vapour transmission rates, in perms, the vapour resistance and the dew point temperature of the different components of the wall.

Material	Permeance	Vapour Resistance	Dew Point Temp.
4″ Hollow Tile	0.120	8.333	21.6
2″ Fiber Glass	116.000	0.009	21.5
8″ Cinder Block	2.400	0.417	15.4
4″ Face Brick	0.800	1.250	–20.0

Thus, no condensation will take place in the hollow tile but serious condensation will take place within the fiber glass insulation, starting by forming on the inside face of the cinder blocks and progressing slowly towards the inside face of the fiber glass. The condensation thus formed will change the thermal conductivity of the fiber glass insulation and so upset the whole of both the heat and the vapour transmission rates of the wall that it will then be impossible to obtain any of the results graphically.

Fig. 4 shows a wall constructed exactly the same as Fig. 3 but with the addition of a highly efficient vapour barrier. In this case, the vapour barrier is Insulmastic between ⅛″ and ¼″ thick. ⅛″ thick it is reported to have a permeance of 0.059 perms. As a result, the following are

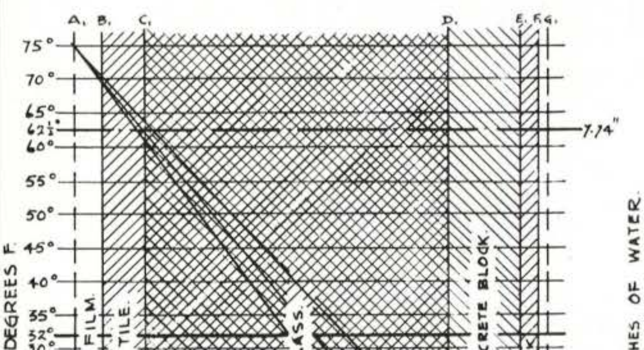


FIG. NO. 3 - TEMPERATURES IN AN INSULATED WALL.

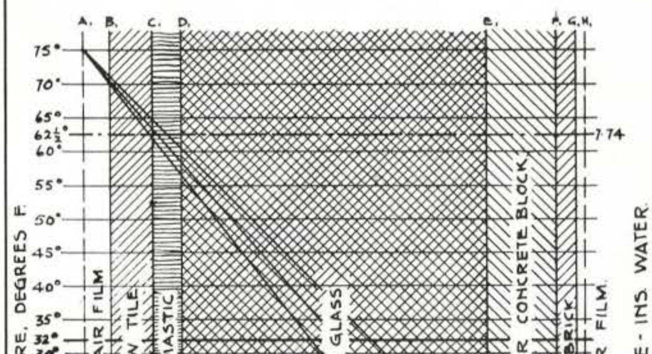


FIG. NO. 4 - TEMPERATURES IN WALL WITH INSULATION AND BARRIER.

the vapour transmission rates, the vapour resistance and the dew point temperatures of the different components of the wall.

Material	Permeance	Vapour Resistance	Dew Point Temp.
4″ Hollow Tile	0.120	8.333	52.5
¼″ Insulmastic	0.059	16.950	4.3
2″ Fiber Glass	116.000	0.009	4.3
8″ Cinder Block	2.400	0.417	0.5
4″ Face Brick	0.800	1.250	−20.0

In such a wall no condensation can take place in the 4″ hollow tile at any outdoor temperature which might occur in this climate. Furthermore, none can take place in the fiber glass, the cinder block nor the face brick because the only moisture which can reach these components comes from the outside and being heated within the wall its relative humidity rises and the possibility of condensation is eliminated.

Fig. 5 is a graphic presentation of the vapour conditions and dew point temperature at equilibrium under the same temperature conditions as are shown in Fig. 4.

All of the previously described results hold true provided no holes occur in any of the components and particularly that no tie rods are run through any. A few holes in any of the wall components or the addition of a few steel tie wires have very little effect on the heat transmission through the wall but they do have a very serious effect on the condensation problem. In order to show the reason that holes are serious on each chart, the vapour pressure which exists at the inside dew point temperatures and at the three outside temperatures is shown on each chart. It will be observed that at −20°F outside the difference in vapour pressure across the wall is 7.74 − 0.17 equals 7.57

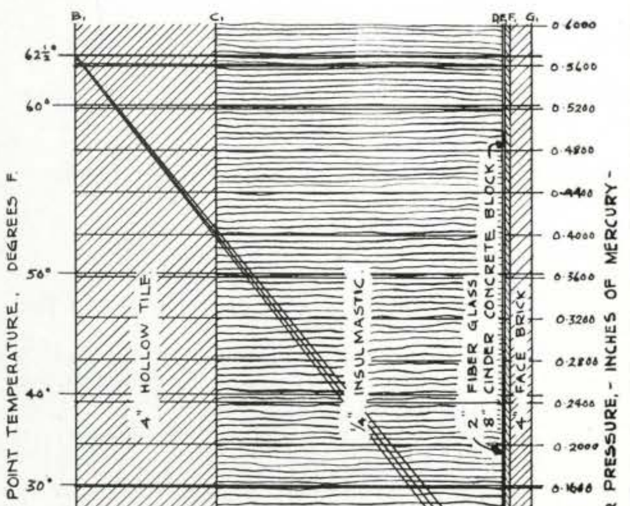


FIG. NO. 5 DEW POINT TEMPERATURES AND VAPOUR PRESSURES IN WALL WITH INSULATION AND VAPOUR BARRIER

inches of water. Where an effective vapour barrier is used in the wall this difference in vapour pressure takes place entirely across the vapour barrier. Thus, holes of any kind in the vapour barrier are particularly serious.

In closing, it should be pointed out that in designing exterior walls to prevent the excessive loss of heat, it is satisfactory to do so on the basis of the average heat loss through the wall. Under such conditions the installation of steel tie rods, steel furring strips or the placing of electric conduits or switch or receptacle boxes in the exterior wall construction is of little consequence, because their installation results in a negligible change in the average heat loss through the exterior walls of the entire building. But the installation of any of these seriously effect the heat transmission rates *at those places* in the wall where they are installed and may cause serious condensation problems. Consequently, when designing walls in high humidity industrial plants it is necessary to eliminate as far as possible the installation of electric conduits, switch or receptacle boxes in the exterior walls and to dispense with all steel tie rods or furring strips in those walls. Also in such buildings, great care must be taken where either steel columns, steel beams or steel joists are embedded in the exterior wall construction, or where reinforced concrete columns or beams form part of that wall construction, to ensure that the heat resistance of the exterior walls is not lowered at those places where the steel is embedded or where the reinforced concrete construction forms part of the exterior walls.

Other places where the design and installation of the vapour barrier must be done carefully are around all windows and doors in the exterior walls and at the junctions between the floors and the exterior walls and between the exterior walls and the roofs. At all of these places particular care must be taken so that the heat resistance of the construction is not reduced and so that the continuity of the vapour barrier is not broken. In using cellular glass insulation, which is not only a good heat insulator but which has a zero vapour transmission rate, care must be taken to use an effective vapour resistant material between the joints, where cracks occur in the same or where it butts up against the floors and the ceilings. If, in this case, the ceiling contains a vapour barrier, it must be brought around and effectively sealed to the cellular glass insulation so as not to have a break in the vapour barrier at their junction. Furthermore, the exterior wall construction should be carefully analyzed not only for the average construction but particularly for the places where low temperatures or low vapour resistance occurs. Then, after the wall has been designed, its construction should be watched carefully to see that neither its conductivity nor its permeance is allowed to be increased anywhere.

In very high humidity plants it may be necessary to embed heat pipes at the edge of the floor in order to allow proper structural support of the floor and yet eliminate the formation of condensation at this point. This was done very successfully in a textile mill near Montreal, in which mill the relative humidity is sometimes raised to about 90%.

Thus, by careful analysis of the wall under the conditions under which it is to be used and by the careful design and specification of all of the construction details of that wall, condensation problems in high humidity industrial plants can be eliminated. Considerably more research work must be done on the vapour permeance of the building materials used in industrial plants. The problem of presenting this paper has been simplified by showing the use of materials of which the permeance is known but even these are not all known precisely. Much work remains to be done so that more precise vapour transmission studies can be made and so that more economical vapour-proof construction can be adopted than our present knowledge allows.

Where membrane barriers of high vapour resistance are utilized, good workmanship and proper application are important to make sure that the barrier is continuous, with no direct openings through it. All holes made accidentally in the barrier should be effectively sealed or the damaged barrier should be replaced.

Vapour barriers may be aluminum or oil paint films, rubber base paints, membranes, metallic sheets or other materials, which resist the passage of water vapour through them. To be completely effective, a vapour barrier must not only have a very high resistance to the transmission of water vapour but it must be able to maintain it through a wide range of temperature and pressure. It must remain intact without cracking or becoming brittle at low temperatures and not soften at high temperatures, and, finally, it must possess either sufficient mechanical strength or elasticity to resist the slight expansion and contraction that occurs in the walls of the building or to resist the changes that take place in the walls due to the settlement of the building.

Where steel pipes or electrical conduits or cast iron vent pipes pass through the exterior wall or roof construction, insulation and effective vapour seals must be provided between the exteriors of such pipes or conduits and the wall or roof construction so that condensation cannot form on their surfaces within the walls or roofs.

Before closing it should be mentioned that in low temperature storage buildings, such as freezer and locker plants, cold storage plants, etc., the vapour barriers must be installed on the outside of the insulation rather than on the inside.

In conclusion, it should be pointed out that not all troubles of moisture in exterior walls are due to the migration of water vapour from the interior of the building. Consequently, the proper installation of effective vapour barriers is not the cure for all the moisture difficulties in exterior walls. The penetration of moisture from the outside in is another problem in itself. Mr J. Govan has made a life-long study of this problem and since he is the next speaker, that problem is left to him to deal with.*

*Mr Govan's paper was not ready for this issue and will be published later.

APPENDIX

Table of Permeance, Permeability and Vapour Resistances of Various Materials

	Permeance	Permeability	Vapour Resistance	
	Perm	Perm-Inch	1/Perm	1/Perm-Inch
Air (still)		120.0		0.0083
Brick Wall with Mortar 4" thick	0.8		1.250	
Concrete (1:2:4 mix)		3.2		0.313
Concrete Block (8")	2.4		0.416	
Tile Wall with Mortar 4" thick	0.12		8.333	
Cellular Glass Insulation		0.0		
Corkboard 75%-0% RH		2.1-2.6		0.476-0.385
Corkboard 100-45% RH		9.5		0.105
Mineral Wool Insulation (unprotected)		116.0		0.0086
Structural Insulation Board (vegetable)		20-50		0.050-0.020
Plaster on Wood Lath	11		0.091	
Plaster on Metal Lath	15		0.067	
Plaster on Plain Gypsum Lath	20		0.050	
Insulating Wool Board—½"	50-90		0.020-0.011	
Paint=Primer & 1 coat flat paint	1.6-3.0		0.625-0.333	
Insulmastic No. 4010 ⅛" thick	0.0592		16.90	
Vapour Barrier Canadian Gov. Spec. No. 9-GP-3	0.75		1.333	
Vinyl Cocooning 20 mils thick	0.91		1.10	
Vinyl Cocooning 30 mils thick	0.57		1.75	

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REPORT OF THE JURY ON ADVERTISING DESIGN IN THE JOURNAL 1953-1954

The Jury selected the September, 1953, advertisement of the NORTHERN PIGMENT COMPANY LIMITED *as the best example of advertising art for the year. Northern Pigment's simplicity of design and pleasing use of colour and pattern gave this page extra appeal which distinguished it from its neighbours. Points of emphasis were well proportioned and were in keeping with the size and character of the Journal.*

KAWNEER CANADA LIMITED'S *page for February, 1954, was awarded second place. Here, text, illustration, and trademark were tastefully related to each other. The background space was sensitively regarded as a vehicle for the advertising matter.*

The following four firms were selected for commendation:

ATLAS ASBESTOS COMPANY LIMITED, *June, 1953, four page insert was most distinguished with type well chosen and spaced. The technical data on the last page was explicit and suitable for filing.*

ANACONDA AMERICAN BRASS LIMITED, *in the February, 1954, issue, attracted attention by its bold use of colour and action pictures which told their story with clarity.*

ARROW-HART & HEGEMAN (CANADA) LIMITED'S *Christmas greetings introduced a welcome note of gaiety in what is often too prosaic fare.*

WESTEEL PRODUCTS LIMITED *had a spread in the October, 1953, issue which was attractively crisp and colourful.*

There were other advertisements which were sufficiently informative and attractive in design to hold the attention of readers as specialized as those of the Journal. However, it might be of interest to future advertisers to mention the Jury's principal impressions which apply to over half of the advertisements reviewed. Too much written information, haphazard layout in which the shapes of blocks of text and pictorial matter were unrelated, and disregard for the value of space as a vehicle for advertising matter, resulted in a congested appearance which made for tedious reading and seriously reduced the effectiveness of the advertiser's message.

Respectfully submitted,

John A. Hall, *Chairman*
Howard Chapman
Henry Fliess

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Lescher and Mahoney, A.I.A.,
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This striking entrance is the product of a highly specialized and meticulous combination of skills.

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The Kawneer Touch consists of large factors, like quality of material and fabrication, basic design by architects for architects, structural grace and strength, the blending of products in a "family" resemblance. And *The Kawneer Touch* is signalled by small but significant quality points, such as silk-smooth, durable alumilited finish, hair-line welded door corner joints, quality hardware including door closers, wide selection of stock sizes and types including both welded and bolted construction.

But of prime importance to any well designed structure is the execution contribution *The Kawneer Touch* makes. Kawneer Installing Dealers are extensively factory-trained to put into every job the inimitable craftsmanship for which they are recognized. *The Kawneer Touch* to applications means quick clean work, neatly fabricated corners, meticulous attention to detail and to the mechanical niceties that contribute so heavily to the architect's design and the customer's satisfaction.

Call your favorite Kawneer Installing Dealer today to learn how your designs can be entrusted to *The Kawneer Touch*. Or contact the new Kawneer plant, warehouse and office, Kawneer Canada, Ltd., Don Mills Road, Toronto 6, for full information.

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*1 Five Ferrite yellows, seven Ferrite reds, and a Ferrite chocolate brown—all lightfast and chemically stable—offer a wide choice of permanent colour design in concrete, cement, brickwork, roofing and, of course, paint. Black iron oxide is also available.

2 The amount of Ferrite colour needed is relatively very small—in concrete work, for instance, a mix of as little as one per cent Ferrite colour gives pleasing effects.

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NEWS FROM THE INSTITUTE

ONTARIO

The year 1927 was a good year in which to graduate – for the first time, it seemed, there were enough jobs in Ontario in architects' offices to provide employment for us all, and the annual exodus to the States was halted. But the 1929 crash that sank a thousand hopes changed the picture again, and many architects became salesmen of a variety of items, from eggs to sheet metal products. The ensuing "dirty-Thirties" saw a decentralization of architects from the populous centres, to the smaller communities where the splash of the large project is rarely known, but where a fairly consistent flow of bread-and-butter jobs seems to hold up in spite of the down-trend of Dow-Jones averages. The Professor of Architecture at the Toronto School remarked at that time that the graduates were going out into a "sobered world" in comparison with the extravagances of the Twenties. And sober they certainly were – not only had Canadian opportunities dried up, but the States also had ceased to offer much hope for young graduates.

The decentralization referred to above affected your correspondent who decided upon the smaller community with the very negative attitude that since opening an office would probably involve sitting around a good deal between projects, and since sitting was his principal occupation at the time, the two might be combined. A shingle was displayed on one of our main courses of commerce, with high hopes. Proper formal announcements were made, and in due course there arrived from the above-mentioned professor, a letter which I suppose was intended to spur one on to magnificent efforts. Apparently the writer of the letter searched the scene from his ivory tower, with great care, looking for hope, however faint, that might be held out to one. The scene must have been desolate indeed, for the best that could be held out was the feeble hope that great international bridges, spanning Lake Ontario at intervals (and particularly at Belleville) would funnel in vast enterprises from the south, causing our office to expand to the point where the coming and going of our staff would create a major traffic problem in our main streets, designed and still used, by horses and buggies.

The bridges have never been built, but a more wonderful thing is happening. The industrialization of the waterfront towns from Cobourg to Cornwall, including the mammoth development of Kingston and its environs, has given an impetus to the construction of every sort of building, and an influx of population beyond the expectation of many who watched the rust gather in the Thirties. Added to this is the recent assurance of the deepening of the St. Lawrence, by which Ontario will have direct access not only to the friendly republic, but also to those great markets beyond the seas; a means less spectacular than the Hugh Ferris-like bridges, but enjoying the very real benefit of low rates of water carriage.

W. A. Watson, Belleville

W. L. SOMERVILLE, LL.D., FRAIC, FRIBA, RCA

Members of the RAIC will be interested to know that a Fellow and past president has recently had conferred upon him the honorary degree Doctor of Laws, by McMaster University. The following is the citation:

"By authority of the Senate, I have the honour to present to you, William Lyon Somerville. A native Hamiltonian, he was professionally trained in Toronto and New York. He is a Fellow of the Royal Institute of British Architects and of the Royal Architectural Institute of Canada, of which body he was president in 1936-37, and is a member of the Royal Canadian Academy of Art. Since 1919, from his own office in Toronto, he has been responsible for the design of many important buildings, the variety of which is evidence of his unusual versatility. Students of Canadian history are grateful for his restoration of Fort Henry in Kingston, Fort George at Niagara-on-the-Lake and Fort Erie at Fort Erie. Citizens and tourists alike admire his Canadian approach to the Rainbow Bridge at Niagara Falls. The medical profession and the afflicted in body and mind benefit from his many hospital achievements, including the St. Michael's Hospital addition in Toronto, the Ontario Hospital in St. Thomas, the General Hospital and the Hospital for Crippled Children in Calgary, the University Hospital and the Aberhart Memorial Sanatorium in Edmonton. Schools, housing developments and industrial buildings in five Canadian provinces and in the United States are of his design. But not least has been his contribution to our life at McMaster University. In collaboration with the late J. Francis Brown, he designed the entire group of our buildings that were opened in 1930; he has been our university architect since that date; and the Mills Memorial Library is his, in connection with which there are the happiest memories of rare professional skill and ready co-operation with every suggestion by our librarians. I therefore present to you, that you may confer on him the degree Doctor of Laws, honoris causa, William Lyon Somerville."

A great many of his clients are numbered among his friends as this honour appropriately witnesses.

Eric Arthur

THE NEW TORONTO BUILDING COMMISSIONER

After forty-nine years in the Department of Buildings, twenty-two of which he served as Commissioner, K. S. Gillies retired in March of this year. His successor is W. F. Holden.

Mr Holden was born in England but came to Toronto at the age of twelve. His technical training was received at Central Technical School – being one of Archie Stringer's "Boys".

His first job in the city hall was with the Department of Buildings in 1913. For making himself as useful as possible, he was paid the munificent salary of five dollars a week. He has been with the Department of Buildings ever since. He became Chief Draftsman in the Department of Buildings in 1934. In 1948, he was appointed as Deputy Commissioner.

Since 1929, Mr Holden has been a member of the Ontario Association of Architects. Some idea of the complexity of the position now held by Mr Holden is indicated by the large staff which he administers. The staff totals approximately ninety permanent employees. The architectural section consists of two architects and five architectural draftsmen. The plan checking and zoning section employs fifteen engineers and four examiners. There are twenty-nine building inspectors in the Department. The rest of the staff is composed of clerks and accountants. The Department has available on its staff laborers and truck drivers, but employs no permanent tradesmen.

All architects in Toronto are fully aware of the plan examination section of the Department. Not many know that this same Department has men on duty every day of the Canadian National Exhibition, checking on the safety of all structures and mechanical rides. The force is also available in case of emergency, night and day of the Exhibition. It has two men whose full time is occupied in checking on signs and other structures over the highways. Three men are employed full time on elevator inspection, and two others are engaged in the supervision and control of hazards involved with the storage and handling of dangerous materials. Safe-guarding the citizens has many ramifications and these jobs now rest with the new Building Commissioner.

The architectural staff is engaged largely in alterations and design of small structures required for city-owned properties. Occasionally, a larger building is designed in this Department but there is usually a special reason for so doing. It is the policy of the Administration that larger buildings be designed by architects in private practice. Mr Holden stated that it is his intention to recommend no change in this policy.

Robert R. Moffat

UNIVERSITY AWARDS

The following awards have been given to graduating students of the School of Architecture:

Manitoba

University of Manitoba Gold Medal to R. Douglas Gillmor.

RAIC Medal to Carl H. Pfister.

Bachelor of Architecture Thesis Prize of $50 to R. Douglas Gillmor.

Toronto

RAIC Medal to L. P. Delean.

Toronto Architectural Guild Bronze Medal to R. Moriyama.

George T. Goulstone Fellowship of $450 to S. F. Heinonen.

Anaconda American Brass Limited Scholarship of $300 to L. P. Delean.

Indiana Limestone Institute Scholarship of $150 to L. P. Delean.

RIBA PRIZES AND STUDENTSHIPS, 1954 – 1955

Word has been received at the Executive Offices of a list of Prizes and Studentships of the RIBA, some of which are open to members of the Allied Societies. Details may be obtained from the Secretary, RIBA, 66 Portland Place, London, W.1, England.

CONTRIBUTOR TO THIS ISSUE

Neil B. Hutcheon, Assistant Director of the National Research Council's Division of Building Research, is a native of Rosetown, Saskatchewan, with his Bachelor and Master degrees from the University of Saskatchewan and his Ph. D. from the University of London. He was a member of the staff of the University of Saskatchewan from 1937 to 1953. He was a consultant with the Division from its formation until joining the staff in 1953, with special reference to the DBR Station at Saskatoon. Dr Hutcheon is a member of a number of professional bodies and was President of the Association of Professional Engineers of Saskatchewan in 1945-46.

FUTURE ISSUES

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BOOK REVIEWS

A DECADE OF NEW ARCHITECTURE edited by S. Giedion. Published by Wittenborn, Schultz, Inc., New York. Price $8.50.

Material for this anthology was contributed by CIAM groups throughout the world; the book being the outcome of a decision made at CIAM Congress 6, at Bridgwater, that an account should be published of work produced during the decade dominated by World War II.

The text in French and English deals with post-war activities of CIAM, with reaffirmation of its aims, and contains contributions by M. Hartland Thomas, S. Giedion, J. M. Richards, Le Corbusier, A. van Eyck and Walter Gropius.

Illustrations, which are numerous, are grouped under headings of Sculpture, Equipment, Living, Working, Cultivation of Mind and Body, Communications and Town Planning. Though it is pointed out by the editor that illustrations are representative rather than a careful selection of outstanding examples, much of the work portrayed is, as one would expect, of distinction, and by well known architects.

It is to be regretted that in a review of such importance there should not be a clearer organization of text – at least for the non-professional reader; and that in the English section more than a few words should be mis-spelled in sentences which sometimes make awkward reading.

We hope we may look forward to seeing examples of Canadian work in such an anthology in the future.

Howard Chapman

ECONOMICAL DOMESTIC HEATING by Henry Gordon Goddard. Published by E. & F. N. Spon, Ltd., London, England. Price $4.25.

As an elementary guide to residential heating, this volume would serve a very useful purpose in the British Isles, but has very limited application on this continent.

Throughout there are a large number of cost comparisons, all, of course, in pounds, shillings and pence, necessitating a conversion into dollars with a knowledge of the rate of exchange at the time the book was written.

Chapter 1, on comfort in dwellings, indicates the widely different conditions required for comfort in Britain from those acceptable on this continent. For example, on page 4, reference is made to "equivalent temperatures" on Fig. 1-2 where they are not shown, but greatest comfort at an indoor temperature of 67°F. and a relative humidity of 45-65%, which is considerably below the requirements as indicated on the comfort chart published by the American Society of Heating and Ventilating Engineers and accepted in this country, where a large portion of the research was carried out, on which the chart is based.

Chapter 2, on heat losses and gains, compares annual cost of various types of heating systems when the mean winter house temperature varies from 55° to 61°F.

Throughout there is continual reference to heating with open fires, and methods of retaining the open fire, but adding devices to approach the efficiency of the closed fire.

The chapters on insulation and ventilation are very well presented, but the sections on the heat pump and solar heating are a little ambitious for the smaller residence at their present stage of development.

F. G. Ewens

MEXICO'S MODERN ARCHITECTURE by I. E. Myers. Published by the Architectural Book Publishing Co., Inc., New York. Price $12.00.

The recent publication in the architectural magazines illustrating Mexico's University City has aroused great admiration for Mexico's architectural vitality. The book "Mexico's Modern Architecture" by I. E. Myers is, therefore, being published at a very opportune moment. Unfortunately, the book does not quite measure up to expectations. The University buildings, the most vital group of buildings published in the book, are quite inadequately illustrated as the photographs are few in number, poor in quality, and judging from other photographs I have seen of these buildings, not too well selected.

The architectural examples chosen show a strange discrepancy in quality and character. The residential work is strongly Mexican in character and is bold in design and detailing, and, at the same time, has elegance and sophistication. The public and commercial buildings, although there are a few exceptions, are of a much lower calibre; they show a strange mixture of the influences of North American and South American architecture and the Mexican character does not generally come through. The University City is the outstanding exception.

In spite of the many criticisms I have raised, I have no doubt that this book will be of great interest to architects.

Henry Fliess

SURVIVAL THROUGH DESIGN by Richard Neutra. Published by the Oxford University Press, New York. Price $5.50.

When I read the book of a man whose work in his own creative field is familiar to me, I seem to come to it with certain prejudices, preconceptions, and hopes. Whatever the subject matter of the book, I use it unintentionally as a medium for better personal understanding of the underlying principles and ideas of the author's other work. In the case of Richard Neutra's "Survival Through Design", it took me a while to recognize the Neutra whose architectural language I thought I knew. But, by the time I reached the centre of the book, it began to seem familiar. The book has very little direct personal language; it is written in an obviously deliberate calmness and objectivity with none of the dogmatic passion so often considered a necessary part of creative man. Even so, it has a very definite message. Where the book does become personal, I always found it particularly enjoyable, such as in the description of the author's first architectural impressions in childhood which, as he says, were largely gustatory.

> "I licked the blotter-like wallpaper adjoining my bed pillow, and the polished brass hardware of my toy cupboard. It must have been then and there that I developed an unconscious preference for flawless smooth surfaces that would stand the tongue test, the most exacting of textile investigations."

Throughout the book, there is a plea for a more physiologically and psychologically based study of design. More scientific knowledge of human behaviour, human sensory reactions, and human idiosyncrasies must replace vague haphazard aesthetic theorizing and judgment; it also stresses that we must get away from the still prevalent unnatural and unhealthy duality which splits the man-made surrounding world into utilitarian and non-utilitarian. Architecture is an art which must use intuitive insight but it must be based on an ever widening scientific background, in the same sense as the art of medicine. The centre portion of the book discusses a number of human behaviour problems and physiological experiments made by various scientists in this field.

Here, the author also records some of the odd discrepancies of our modern civilization, as, for instance, in the account of a camping trip:

> "Although people may go on camping trips in streamlined trailers, or soon helicopters, of the latest model, they feel like pioneers when they build a log fire on which to heat the contents of a tin can bearing the endearing label 'old fashioned Bean Soup' ".

In another place, on ownership, he explains some of the romantic illusions of modern mortgaged home ownership; or again on the idolization of speed: "shooting along in rocket ships should not be combined in one pattern with standing in a tiresome line at ticket windows and customs counters". In one of the final chapters, he lays out a program of researches on the results of which design must eventually be based.

Certain portions of the book are of specific interest to architects, such as the excellent essay on architecture as an omnisensorial art, the part on colour and lighting, or a long chapter on neighbourhood and city, but most of this book should be stimulating reading to anyone interested in contemporary problems. It is a very worthwhile addition to the design literature.

Wolfgang Gerson