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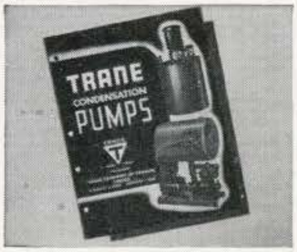

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Toronto June 1951

EDITORIAL

A FEW WEEKS ago we arrived in Toronto by air with a complete stranger with whom we had yawned and chewed gum on a T.C.A. flight. Our companion was about to see Toronto for the first time, and we were anxious to correct any false impressions he might form by too casual inspection. We have been suspicious of hastily formed impressions of a town ever since our attention was drawn to an observation of Rupert Brooke's. Passing Hamilton Bay in winter, he felt impelled to write on the hardiness of those Hamiltonians whose outhouses were far out on the ice. Strangers to Hamilton will be interested to know that what Rupert Brooke thought were privies were, in actual fact, fishing cabins. We felt it, therefore, our bounden duty to be ready with an explanation whenever the visitor to Toronto saw anything unexpected or peculiar. As we landed, we were all ready to explain that the perfectly dreadful architecture of the airport was not a local effort, and that we had friends, and even second year students, who could do much better – but no apology was necessary. The place was in darkness outside, and, inside, oil lamps gave a feeble glow. We, immediately, launched on a eulogy of Hydro and Adam Beck, and all he had done to brighten our night life – at the same time looking for someone who would know why we groped about in the less than 1-foot candle afforded by the lighting system of Governor Simcoe's day. The reason was found, and we glowed with pride as we announced to the visitor that we were changing over from 25 to 60 cycles – all in one night. As he cheerfully smuggled anything from diamonds to grandfather clocks, he asked us why we had 25 in the first place. He had us there, and conversation flagged in the long drive to Toronto's Royal York.

On alighting from the limousine, he was obviously quite overcome to find our streets paved with B.C. fir timbers. No ox-drawn vehicles were in sight, and behind us rose the majestic bulk of the largest hostelry in the British Empire. Surely all the world knows that the withers of Toronto are unwrung – that a thousand bulldozers gnaw at her bowels, and that the nights are made hideous by mammoth pile-drivers. We explained all this to the bewildered stranger, but added that those of us under fifty confidently awaited the day when we should ride in the finest underground trains in the world, and alight in the most up-to-date stations. We may lack the malachite walls and the lapis lazuli columns of the Moscow Metro Stations, but we have it from Mr Arthur Keith, the T.T.C. Architect, that nothing will be spared in the interests of our physical comfort, or our aesthetic pleasure in colour, texture and form. All that is a long way off, but as we walk up Yonge Street, and the logs quiver and shake under foot, we can picture the train of the future below with its hundreds of happy straphangers on their way home from work. Even the journey to work will be sheer joy. We wonder if the T.T.C. has ever thought of omitting seats in the new trains. So few sit nowadays, and so many stand, that it would seem more democratic to omit the seats altogether. The sitter, nowadays, gets no pleasure out of his seat because he feels acutely that he is in the minority who have paid the same fare for their positions of lounging ease as their fellow citizens who stand. It must be for that reason that we saw a man rise to give another man his seat.

The T.T.C. is producing people with a "cad" complex that only the seatless public vehicle will correct. The only people who would write to the papers opposing the seatless train would be those who sit only that they may carve their initials on the seat in front. Progress cannot be halted for so small a group. The savings in seats would be enormous, a greater crowd could be accommodated, a general feeling of égalité would be engendered, and the rise in fare might be postponed indefinitely. For one who "rides" buses and street cars daily, and cannot remember sitting down in either (except for an occasional false start when we all sat down) since the end of the war, the suggestion seems to offer enormous possibilities for which a modest royalty equal to the amount of the abandoned increased fare would seem but fair. We have neglected our stranger to Toronto. We took him in hand the following day and showed him University Avenue. The effect there was even more rural than the log streets because the wide centre strip looked as though it had just been ploughed. The horrid truth was that it had looked like that for a year, but that is a long story.

JAMES GOVAN

THE HOSPITAL FOR SICK CHILDREN

STUDIES FOR the enlargement of the hospital on the College to Hayter Street site were made in 1928-29. The scheme involved closing Laplante Avenue, the ultimate replacement of the main building on College Street and also the O.P.D. and Laboratory Wing on Elizabeth Street. The disturbance of the hospital administration during the carrying out of such an involved reconstruction programme would have seriously interfered with services to patients, and it was, therefore, decided to locate a new hospital on another site which had perforce to be convenient to Toronto University.

The studies made for such a move were the basis of the perspective drawing utilized during the subscription campaign.

Analysis of the floor areas required by the increasing number of departments for which space was requested early in 1946 made it evident that more area was required in the upper floors of the north and south wings. These wings were, therefore, raised to ten storeys above the foundation level, and, to keep the total volume down within reasonable financial limits, the central part of the scheme had to be reduced in height.

At that stage of the development it was thought possible to remove the existing concrete building on Elm Street and to provide all the accommodation needed in new construction. Cost considerations later made it necessary to retain that building for service purposes, either with or without a new veneer exterior as funds might be available.

A brick-veneering scheme was afterwards ruled out to conserve funds for other more essential needs.

The total building volume requirements to provide for over 600 bed patients and the expanding medical, surgical, research, teaching, administrative and record services were ultimately set at approximately 6,000,000 cubic feet, which, at the rapidly rising costs of construction, equipment and furnishing made a second subscription campaign necessary.

The following breakdown of departmental areas shows the proportion allocated to various services and makes comparison with the requirements of the more orthodox type of general hospital possible.

Perspective Used During Fund-Raising Campaign in 1945

Approximate building area allocated to various services.

Note: The following areas include their proportionate allowance of exterior walls, partitions, corridors, elevators and circulation space.

	Areas in square feet
1. Patient areas on floors 4, 5, 6, 7, 8 and 9	135,000
2. Routine and Research Laboratories and associated services Visual Education Genetics Blood Bank Pathological Museum Central Supply and Quarters for Small Animals	40,000
3. Surgical areas and X-Ray Dept for other than O.P.D. patients and including Dental Research and Teaching	40,000
4. Ambulance Entrance Admitting Emergency Out Patient Department Dispensary Orthopaedic Dept and Work Shop Social Services	55,000
Forward	270,000

Forward	270,000
5. Main Entrance	
Rotunda	
Chapel	
Business Administration	
Board Room	
Nurses' Administration	
Library and Museum	
Doctors' Lounges	36,000
6. Consulting suites for Chiefs of Staff	5,000
7. Main Auditorium and Small Lecture Room with their waiting and Coat Rooms	
Nursing School	9,000
(Note: Teaching rooms for Nurses and students on patients' floors are included in the area given for patients)	
8. Quarters for Male and Female Internes	19,000
9. Food preparation and Service including Milk Laboratory	31,000
(Note: Patients' floor pantries are included in patient areas)	
10. Mechanical Equipment Services and Work Shops	43,000
11. Conference and Committee Rooms, Patients' Sun Decks and Covered Pergolas on 11th Floor	10,500
12. Laundry, Linen Storage and Work Room	10,000
13. Pool and Remedial Occupational Therapy	4,000
14. Students, Nurses, Ward Aides and Personnel Entrances, Lockers, Toilets and Lounge Rooms	15,000
15. Goods receiving, issuing and storage	38,000
16. Records and Pneumatic Tube Station	4,500
Total area	square feet, 495,000

The total area of 495,000 square feet for 635 beds equals approximately 780 square feet per bed, which is practically double the generally accepted figure for hospitals that do not provide similar teaching, research, out patient and administrative facilities.

The increase in the size and number of separate departmental areas involved a great deal of study, not only as to the location of departments, but also as to the details of their construction, finish and equipment.

Special features such as power interference, high temperature and humidity requirements in certain patient areas, dust and pollen elimination in others, prevention of cross infection, sound stopping and absorption, reduction of vibration and many others equally important, had a very decided influence on the planning and detailing of the building.

The decision to use well insulated walls and double glazed windows throughout was prompted quite as much by the need to control the temperature at the inside surface of the exterior walls as by the desirability of keeping fuel costs as low as practicable.

In cold weather, under ordinary construction methods, patients close to the exterior wall give up their body heat much more rapidly than do the patients in beds further away from these cold surfaces. With sick children this is a factor to which not enough attention is given.

However, raising these surface temperatures creates other problems, particularly that of condensation in spaces between the inside and exterior faces of walls.

To reduce the possible effects of freezing and thawing in the insulated wall structure, tests of the moisture absorption of bricks of various shale mixtures were made as, under a section of the Toronto Building Code, construction on University Avenue from College to Dundas Streets, must be carried out with bricks or stone of a buff colour.

Efforts were made (unsuccessfully) to have this particular section of the Building Code amended to permit the use of a brick more suitable to the construction methods prompted by the needs of this hospital.

Other details regarding construction methods are dealt with by Messrs Wallace & Carruthers, Consulting Structural Engineers, on the work.

Regarding the very extensive use of terrazzo floor finish throughout most of the hospital, the decision in its favour was made by the administrators after carefully studying the various factors of maintenance, appearance and noise.

The low level of the corridor ceilings was deliberately followed to reduce the volume of these corridors in relation to their length and thereby increase the effectiveness of the sound absorption used at the ceiling.

That arrangement also provided a maximum amount of space above the ceiling to accommodate pipes, ducts, electric services, etc., all of which can be got at by removing the clipped-on metal pans forming the ceiling to whatever extent may be necessary to get at mechanical services.

The quiet results obtained in the hospital have fully justified the studies of corridor treatment which were made over an extended period.

Messrs H. H. Angus and Associates, Consulting Mechanical Engineers, describe, separately, features of the mechanical installation provisions, but it is desirable to emphasize the advantages to be gained by the joint use of power supplied by the plant of the Toronto General Hospital to two other hospitals, viz., New Mount Sinai Hospital and the Hospital for Sick Children.

In practically all hospitals there are evidences of rooms and equipment used for a relatively short period of each day or, if used continuously, carrying an uneconomical load.

The rising cost of constructing, equipping, furnishing and staffing hospitals demands a very careful study of every possibility of the co-operative use of facilities wherever practicable.

Our experience indicates that opportunities for sharing facilities exist quite frequently and all that is needed for their development is recognition of the fact that each department in a hospital should be operated at full capacity to justify its share of the capital and operating funds raised with Federal, Provincial, Municipal and private assistance.

JOSEPH H. W. BOWER

SERVING SICK CHILDREN

THE HOSPITAL was originally founded by Mrs Samuel F. McMaster of Toronto and a group of women in 1875. The work was carried on in an ordinary dwelling-house accommodating only six children. As the number of patients increased, the hospital was moved several times into larger houses. The late John Ross Robertson, proprietor of the *Evening Telegram*, became very interested and devoted a great deal of his time, talent, and money, toward this work. At his death in 1918 he left a most generous bequest to the hospital.

Through Mr Robertson's leadership, the present building at 67 College Street, Toronto, was opened in 1892 and accommodated 190 patients. As the work continued to expand, other units were added from time to time so that now the capacity at the old site is 320 beds. Shortly after the death of Mr Robertson, H. H. Williams succeeded him as Chairman of the Board and under his leadership the Country Branch of the hospital was opened in 1928. This replaced the temporary accommodation of Lakeside Home which had been used only during the summer since its opening in 1883.

Thus the Sick Children's Hospital began with a simple faith in Providence. From its humble beginnings it quickened and prospered so that today it stands, in respect to the number of patients treated, as the largest institution of its kind on the North American continent.

That the interest of charitably-minded men and women has continued was evident in the early summer of 1945 when a campaign for funds to build a new hospital was launched. With government assistance the large sum of about $8,000,000 was raised. This same interest, coupled with the spirit of giving, was further exemplified when, because of increasing construction costs, an additional sum of $4,000,000 was raised, again with government assistance, in 1949. To our knowledge, there has never been an appeal for any similar purpose which has touched the hearts of men and women so deeply and so spontaneously as did the call made during these two campaigns. The contribution made by the press, the radio, and the movies, by way of publicity, was magnificent. In every way the story of the work of this hospital was spread throughout the country.

Over-all studies for the new project were begun as early as 1929 and continued during the early thirties. Because of the depression, however, and later the advent of World War II, nothing could be done, and it was not until the termination of the European phase of the war early in 1945, that definite steps could be taken toward the final accomplishment of the plans which had been in the minds of all of us for so long.

In the meantime, the number of patients treated in the hospital had almost doubled, increasing from about 6,000 in 1928 to about 10,000 in 1945. At the present time the turn-over is about 13,000 per year. This very greatly increased volume of work could not possibly have been carried on in our present accommodation had it not been for the steady and persistent drop in the average patient-day stay due largely to improved methods of treatment. During those years of stress, every available space in the old buildings was brought into use and the crowded conditions for patients and staff alike had to be seen to be understood.

SITE OF NEW BUILDING

We are frequently asked why the new hospital was not built away from the congested area of down-town Toronto. There are several reasons why the present site was chosen. The Hospital for Sick Children is a teaching centre for children's diseases and is closely related to all medical teaching and research carried on at the University of Toronto. It must, therefore, be readily accessible for student teaching. The medical staff of the hospital is a voluntary one. The doctors give, without charge, their service to all those on the public wards who represent by far the largest percentage of our patients. The hospital must, therefore, be easily accessible to the doctors. When the matter of site was being decided upon, very careful analysis was made of how those attending our out-patient department arrived at the hospital. During the middle thirties, we had as many as 98,000 visits and examinations in one year. Eighty-five per cent of these people came to the hospital by street car or bus, and it was found that the location in and around the University vicinity was the most convenient to those using this means of transportation.

Again, the great deal of research that is carried on at the hospital makes it necessary that our laboratories be in a location near the University because much of this work is carried on in co-operation with the Connaught Laboratories, the Department of Hygiene, the Banting Institute, and other departments of the University.

BASIC PLANNING

With money available for construction, after the campaign in 1945, the studies which the hospital had made in the early thirties were brought under review. In the meantime, construction costs had been climbing to much higher levels. Study after study of our requirements in an over-all way was made and, by the summer of 1947, it was apparent that our space requirements could not be built under 9 or 10 million. The trustees felt that, in spite of increased costs, a start must be made and on November 17, 1947, the first sod was turned. So much time was spent in over-all studies of volume and space requirements that very little detailed planning had been done up to this time. Therefore, the three years that followed were busy for everyone and involved work with our architects and associated engineers on the detailed designing of this large structure.

In planning for an undertaking of this size and magnitude, it is general practice for the architects, the key persons in the administrative, professional, and lay staffs of the hospital, to make extensive tours of other hospitals to see and study the latest design and devices that are presently in use. While this was done to a certain extent in our case, it has to be remembered that nothing very new on a large scale had been done in this country, the United States, or even abroad, for many years and what had been done was not specifically or directly related to the problem with which we were faced. Quite a number of individuals, heads or sub-heads of departments, visited other centres, principally in the United States, and brought back valuable information and ideas. What we were chiefly concerned with, however, was what others would do if they had the opportunity presented in our case – i.e., planning and constructing a completely new building in which it was hoped to incorporate every possible feature and service which would be advantageous to the type of work that this hospital has been carrying on for so many years. To this end, therefore, and in addition to the trips which were made by individuals, a team was formed, consisting of three senior physicians and the superintendent who visited such places as Boston, New York, Philadelphia, Baltimore, Chicago, and Montreal. They met with the best authorities in the children's hospital field, discussing with them point by point the basic principles that would seem to apply to a problem of this kind. These meetings were in the form of round table conferences. It was perhaps this procedure as much as anything else that helped to crystallize the many ideas which have been incorporated in our new building.

During the period of planning, there was a high spirit of team work throughout the whole hospital. Innumerable conferences and discussions took place. The architects were most generous in the vast number of sketches and alternate sketches which were submitted for scrutiny and study before being put into the final form of working drawings. Everyone co-operated with everyone else in a sincere effort to bring into being the very best that it was possible to produce.

In order to determine the bed capacity a very complete statistical study as to population trends and other factors was carried out. In the matter of room sizes and arrangements, full-size dummies were set up and carefully studied and from these the final drawings were prepared.

The hospital, for a matter of twelve years or more, had conducted in a very practical way a study of the value of ultra-violet germicidal lamps in the care and treatment of infants. However, improved types of germicidal lamps have been developed and, in order to study the application of the newer types, a complete bank of six infant cubicles was set up, lights put in place and studied for a considerable period of time in reference to intensities and all other factors concerning their use.

The matter of flexibility of design was another problem which was very much discussed and studied. It will be found, on all patient floors of the hospital, that the accommodation has been so planned that when the seasonal peaks occur in one service, unoccupied space on other services on the same floor can be brought into use without the operation of one service interfering to any extent with the other.

Teaching facilities for medical students and nurses have also been considered as very important functions of the new hospital. Special teaching rooms have been provided on every patient floor of the building with all the facilities required for the proper conduct of this work.

The question of how many beds form an economical and satisfactory nursing unit came under very careful review. The decisions arrived at in this matter were applied to the designing of the ward areas and the services related thereto.

The proper relation of one floor to another came in for very careful study. At the outset the general principle was established that the patient accommodation should preferably be on the upper floors of the hospital and, in studying the plans, one will find that patient accommodation starts at the fourth floor and continues through to the tenth. All other services, such as operating rooms, routine and research laboratories, x-ray, together with administrative facilities, dining-rooms, and other general services are located on the lower floors.

In this hospital, professional services are divided into four distinct branches, the two major services in respect to volume being paediatrics and surgery, the other two branches being otolaryngology and ophthalmology. It was decided that surgery patients (including otolaryngology and ophthalomology) would occupy the north half of the patient accommodation, the southerly half being allocated to paediatrics and immediately related branches. The age grouping of patients were kept as nearly uniform as possible for each of the floors so that the flexibility and interchange of bed-space could be accomplished more easily.

Now that we have considered the basic ideas underlying our planning at considerable length, perhaps a brief description of the building floor by floor will more quickly indicate how the whole structure has been laid out.

Pipe Space and Storage

This area, largely below ground, contains most of the mechanical equipment for the entire hospital insofar as heat, light, power, and other related services are concerned. Our steam for heating and other purposes is purchased from the Toronto General Hospital which is near by. Bulk storage space for all departments is also provided underground.

Service Floor

This floor contains the main kitchen and storage which serves the whole building, together with a cafeteria for personnel and a snack room where visitors and staff may obtain the lighter varieties of refreshment. A hydrotherapy pool and its subsidiary equipment, such as whirlpool and Hubbard bath, is located here as part of the main physiotherapy department which is on the floor above. Also on this floor are rest rooms and locker space for all hospital personnel, including facilities for university students, private duty nurses, and so forth. The central record room is located at this level so as to be easily accessible to incoming and outgoing physicians, as well as to its own storage area which is in the pipe space immediately below. This room is connected with all departments by means of a pneumatic tube system.

Main Floor

Admitting, emergency, and out-patient departments are on the main floor. Admitting and emergency are reached from Gerrard Street (on the north side) through a covered, double, porte-cochère type of structure; while the out-patient department, which is a very large service, is reached from the west through a University Avenue entrance. One of the unusual features of this department is the inclusion of an x-ray division. This will obviate for all time the undesirable feature of out-patients intermingling with in-patients, and thus avoid not only the fear of cross-infection but also much confusion.

In connection with the department of otolaryngology, there is a very specially designed set-up on this floor for continued research in aid of hard-of-hearing children. This is a privately sponsored project and no efforts have been spared to make the physical facilities as complete as possible.

Milk laboratories for the entire hospital are on this floor, so located that distribution of milk products throughout the building is easily accomplished. In this connection, teaching rooms for parents have also been provided.

First Floor

The so-called first floor of the hospital is reached through the main entrance on University Avenue. Main business offices, as well as those for the heads of the major clinical services, and consulting rooms for full-time medical men, are located here. There are also a nurses' administrative office and nurses' demonstration and teaching rooms. Two auditoria are located here, a larger one which will seat approximately 275 and a smaller one with a capacity of about 85. This floor also contains a library, a medical museum, and the main dining room. The latter is laid out as a cafeteria but table service can be given when the occasion demands.

Second Floor

Operating rooms for general and orthopaedic surgery, otolaryngology, and ophthalmology are found on this floor. They are on the north side, in the centre section of the building, immediately below the surgical floors, and are serviced by an elevator in the north wing. The x-ray department occupies about a third of the floor area and includes angiocardiography and electroencephalography. The dentistry section is also located here and has complete facilities for in- and out-patients, research, and teaching. All these services are closely related with one another.

Third Floor

This floor is devoted exclusively to routine laboratories and research. In addition, a very complete department of visual education with accommodation for photography and medical artists has been set up. The department of genetics is here and also the central supply department which is connected directly with patient floors above by two electric dumb waiters.

Fourth to Seventh Floors

Patients at the public ward level are located on these floors. Generally speaking, there are four wards per floor, each pair of wards serviced by a double nursing station. Every ward unit is complete in all respects and requires no inter-change of personnel or equipment.

The fourth floor is largely for infants up to two years of age. Each child has a separate cubicle, complete in every respect, and equipped with an ultra-violet germicidal lamp. The cubicles are planned in units of two, four, and six, with glassed-in visiting corridors between so that parents may see but not come in contact with the patient at any time.

For the older patients, there has been a liberal distribution of single rooms where seriously ill cases requiring isolation and special attention may be accommodated. Besides these, the balance of space varies, with rooms accommodating two, four, and six patients. Surgery has the largest number of multiple bed rooms as cross-infection in the surgical division is less frequent than in the medical division. Every patient room in the hospital is equipped with a basin and with one or more outlets, supplying piped-on oxygen, and piped-on suction or vacuum. These two services will eliminate for all time the cumbersome distribution of oxygen tanks and the equally unwieldy distribution of suction tables and their maintenance.

While our number of up-patients is relatively few, since most of these are located at our Country Branch Hospital at Thistletown, special rooms for up-patients together with facilities for their instruction and amusement have been provided. One-half of the seventh floor is set aside for infectious cases. Special planning of facilities provide for complete isolation of everything relating to the care of these patients.

Eighth and Ninth Floors

These floors are for private and semi-private cases. There is nothing different in the way of hospital service but physical accommodations are more attractive and space allotments somewhat more liberal.

With the ever-increasing number of patients who have benefits under some prepaid hospital and medical care plan, we feel that the sharp distinction between public and private patients will gradually lessen and possibly disappear altogether. This has always been uppermost in our minds in the planning of patient accommodation and we think that in the future such accommodation will be based more on the type of space that the patient wants and can afford to pay for rather than on any other distinctive classification. We believe that the layout in our new hospital will suitably meet this condition as it arises.

Tenth Floor

There are two sections on this floor. A ward for premature infants is on the north side and has been located at this high level so that it may be as free as possible from general traffic conditions prevailing on the floors below. Premature infants will be treated in incubators in individual cubicles protected by ultra-violet germicidal lights and piped-on oxygen and suction. The planning of this area has had special care and is, we believe, somewhat unique.

The southerly half of this floor is devoted exclusively to the care of infants at the private patient level. The accommodation is exactly similar to that of the public ward except that instead of individual cubicles, each baby has an individual room equipped with complete services as a nursing unit.

Eleventh Floor and Penthouse

This top floor is designed as a large conference room which will be used to hold meetings. In addition, there are three smaller rooms suitable for small gatherings.

The penthouse, approximately two storeys in height, rises above the eleventh floor and contains machinery for the main bank of elevators, fan rooms, and so forth.

Additional Features

In the foregoing general description there has been occasional mention of special features. By way of conclusion to this article, it might be well to summarize some of the more outstanding and interesting items relating to this project.

The building is utilitarian in design and little attempt has been made at architectural embellishment, by the way of stone trim, et cetera, because of the cost involved. The framework is of structural steel, all joints being welded on the job to avoid noise and disturbance to the patients in the Toronto General Hospital which is near by. The walls and partitions are of brick and tile. Floors are constructed with bar joists, finished in terrazzo throughout, except in special areas. The building is equipped with five high-speed elevators, two service elevators, electric dumb waiters, with space available for two additional elevators if and when required. All outside walls are heavily insulated against heat transmission and all windows are of the reversible, double-hung, double-glazed type.

Except in certain special areas, the building is heated by a forced hot water system and steam for this and all other purposes is purchased from the Toronto General Hospital power plant. This arrangement has resulted in substantial savings in capital and operating costs and minimizes smoke nuisance in the immediate area.

Oxygen and suction are supplied from central sources and piped throughout the hospital to every patient room in the building where there are one or more combination outlets for these services. Air pressure is also piped to other areas where it is required.

The telephone arrangement is the "internal dial system". The doctors' call is of the audible type. A pneumatic tube system, having twenty-five stations throughout the hospital, assures quick transportation of histories, records, dispensary supplies, specimens, office memoranda, et cetera, to all departments.

A laundry chute servicing all floors assures quick delivery of soiled linen to the laundry.

An existing four-storey, re-inforced concrete building has been made part of the layout and adjoins the main hospital structure. In it are located the laundry, orthopaedic and maintenance workshops. The top floor of this building will serve as quarters for experimental animals which will be used in connection with research and routine laboratory work.

The patient section of the hospital provides accommodation for 635 beds, divided into the various services and age groups already mentioned. Future expansion has been provided for and the steel used in construction has been designed heavy enough for vertical expansion should the need arise. By this means, anywhere from 100 to 200 beds can be added at any time without change or interference with the general planning of the major services in the hospital.

Public ward accommodation varies from single-bed units to a maximum of six-bed units. Each and every unit is equipped with elbow-control hand basin and one or more combination outlets for suction and oxygen.

In the older age groups, all beds in the multiple-bed rooms may be separated one from the other by means of draw curtains.

Teaching rooms for medical students and nurses are provided on all patient floors.

Spark-proof floors and explosion-proof electric outlets have been provided in all operating rooms and other areas where explosive anaesthetic gases may be used.

There are two major operating room theatres with observation galleries and a two-way talking device for instruction purposes.

Conduit for the future installation of television equipment is provided from one of the major operating rooms to the two lecture theatres.

Emergency lighting is obtained from a stand-by unit in the power plant of the Toronto General Hospital. Should this fail to operate, a semi-automatic lighting plant for all operating room areas and a semi-automatic emergency suction unit, have been installed in the mechanical control room of our own hospital.

The central supply department services all patient floors, which lie immediately above, by means of two directly connected electric dumb waiters, as well as all requirements of the out-patient floor.

Sterilization and preparation of all instruments and supplies required in operating rooms is done in rooms separate from the central supply and closely related to operating rooms.

(continued on page 191)

THE HOSPITAL FOR SICK CHILDREN, TORONTO, ONTARIO

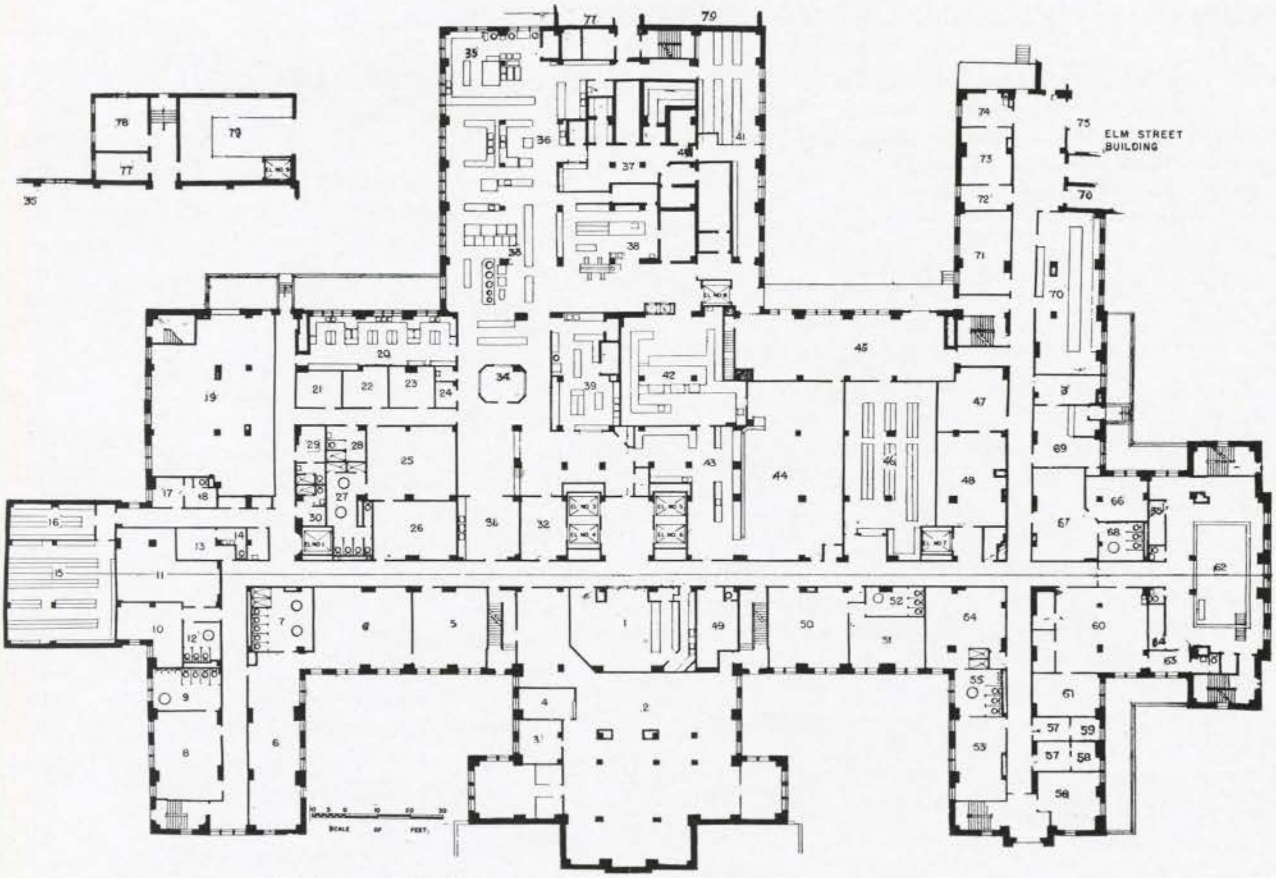
GOVAN, FERGUSON, LINDSAY, KAMINKER, MAW, LANGLEY, KEENLEYSIDE, ARCHITECTS

Wallace, Carruthers and Associates Limited, Structural Engineers
H. H. Angus and Associates, Mechanical Engineers
Anglin-Norcross Ontario Limited, General Contractors
Foundation by Foundation Company of Ontario Limited

PANDA

HYDRO THERAPY POOL (Room 62)

1. Snack Bar
2. History and Records
3. Office
4. Pneumatic Tubes
5. Graduate Nurses' Lounge
6. Graduate Nurses' Lockers
7. Graduate Nurses' Lavatory
8. Male Students
9. Male Students' Lavatory
10. Female Clerical Staff Lounge
11. Female Clerical Staff Lockers
12. Female Clerical Staff Lavatory
13. Female Students
14. Female Students' Lavatory
15. Film Filing
16. Pathological Stores
17. Male Clerical Staff
18. Male Clerical Lavatory
19. Upper Part of Tank Room
20. Students' Laboratory
21. Glass and China Storage
22. Uniforms and Towels Storage
23. General Storage
24. Chef's Office
25. Female Dietary Staff Lockers
26. Female Dietary Staff Lounge
27. Female Dietary Staff Lavatory
28. Male Chefs' Lockers
29. Female Chefs' Lockers
30. Chief Chef
31. Truck Park and Container Wash
32. Service
33. Main Kitchen
34. Dietitian's Office
35. Bake Shop
36. Butcher's Shop
37. Ingredient Control
38. Vegetable and Salad Preparation
39. Special Diets
40. Refrigerators
41. Food Stores
42. Dish Wash
43. Preparation Room
44. Cafeteria
45. Goods Receiving
46. Issuing Office
47. Stores
48. Special Stores
49. Soiled Linen
50. Female Employees' Lounge
51. Female Employees' Lockers
52. Female Employees' Lavatory
53. Male Employees' Lounge
54. Male Employees' Lockers
55. Male Employees' Lavatory
56. Time Keeper
57. Uniforms
58. Housekeeper
59. Chief Orderly
60. Occupational Therapy Remedial
61. Preparation
62. Pool
63. Staff Room
64. Girls' Shower
65. Boys' Shower
66. Ward Aides' Lounge
67. Ward Aides' Lockers
68. Ward Aides' Lavatory
69. General Office
70. Linen Work Room
71. In-Patients' Clothing
72. Reposing
73. Morgue
74. Undertaker
75. Entrance to Soiled Laundry
76. Entrance to Clean Laundry
77. Refrigerator
78. Can Washing
79. Loading Platform

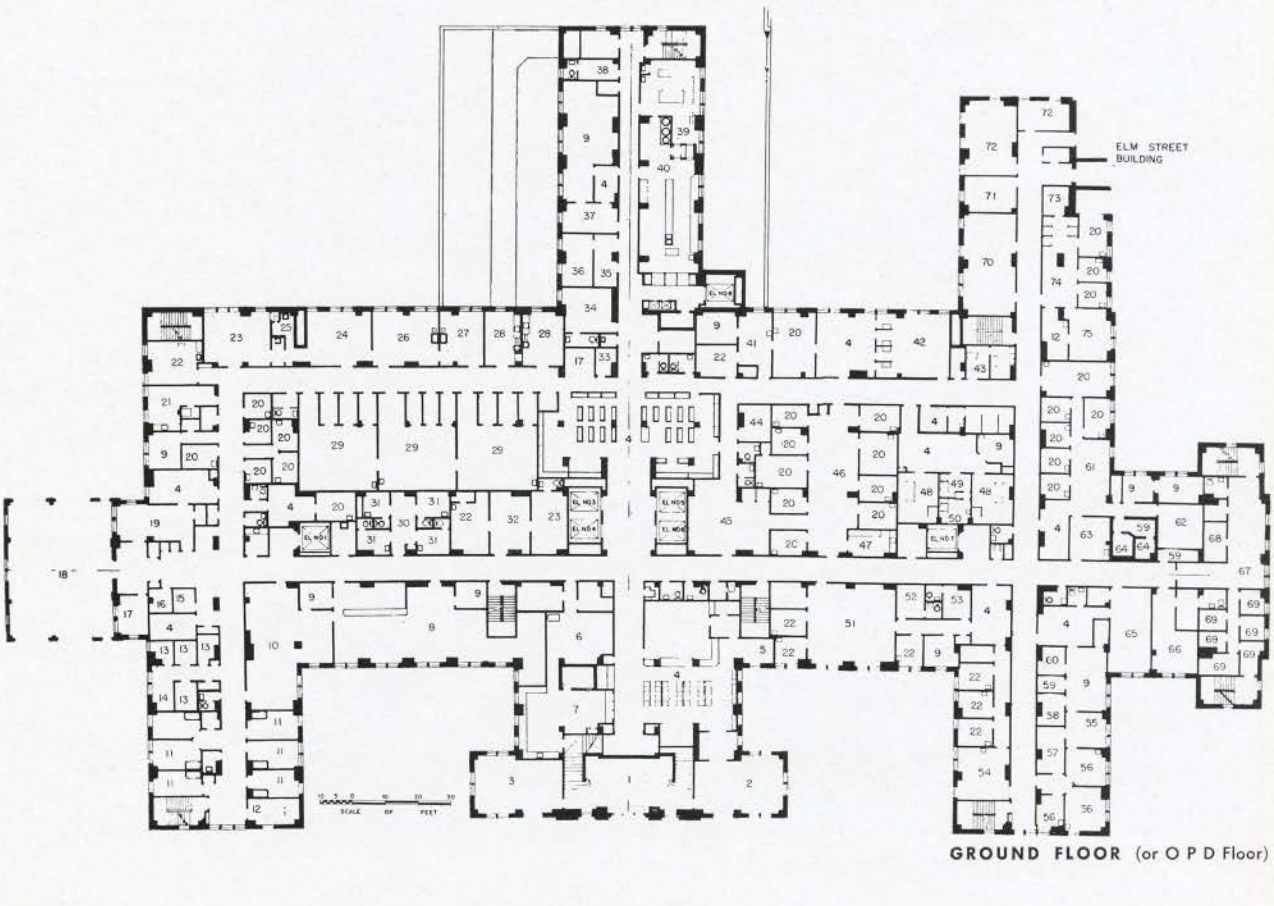


SERVICE FLOOR (Kitchen, Physiotherapy, Staff Lockers)

NOTT & MERRILL

MAIN ENTRANCE

1. Main Entrance Hall
2. Perambulator Parking
3. Unassigned
4. Waiting Room
5. Screening
6. Manufacturing
7. Dispensary
8. General Office
9. Office
10. Private Accounts
11. Admitting
12. Fluoroscopic
13. History
14. Admitting Department
15. Supervisor
16. Registration
17. Stretchers
18. Ambulance Entrance
19. General Admitting
20. Examination
21. Nurses' Work Room
22. Treatment Room
23. Recovery Room
24. Emergency Operating
25. Utility
26. Plaster Room
27. Fluoroscopic Room
28. Dresser Room
29. Clinic
30. Isolation
31. Patient Room
32. Syphilis and Allergy
33. Nursing Supervisor
34. Nurses' Room
35. Milk Dietitian
36. Instruction Room
37. Dietitian's Office
38. Male Coats
39. Bottle Washing
40. Milk Laboratory
41. Students' Dark Room
42. Refraction
43. Optician
44. Medical History Room
45. Weighing and Temperature
46. Medical Examination
47. Laboratory
48. X-Ray
49. Viewing Room
50. Dark Room
51. Gymnasium
52. Boys' Dressing Room
53. Girls' Dressing Room
54. Massage Room
55. Worker
56. Doctor's Office
57. Students
58. Psychometric
59. Observation
60. Speech Therapy
61. Direction and Sterilization
62. Hard of Hearing
63. Dressing Room
64. Sound-proof Room
65. Play Room
66. Junior League
67. Social Service
68. Files
69. Consulting
70. Skin, Cardiac and Dental Hygene
71. Linen Storage
72. Storage
73. Cardiograph
74. Skin and Cardiac
75. Special Examination

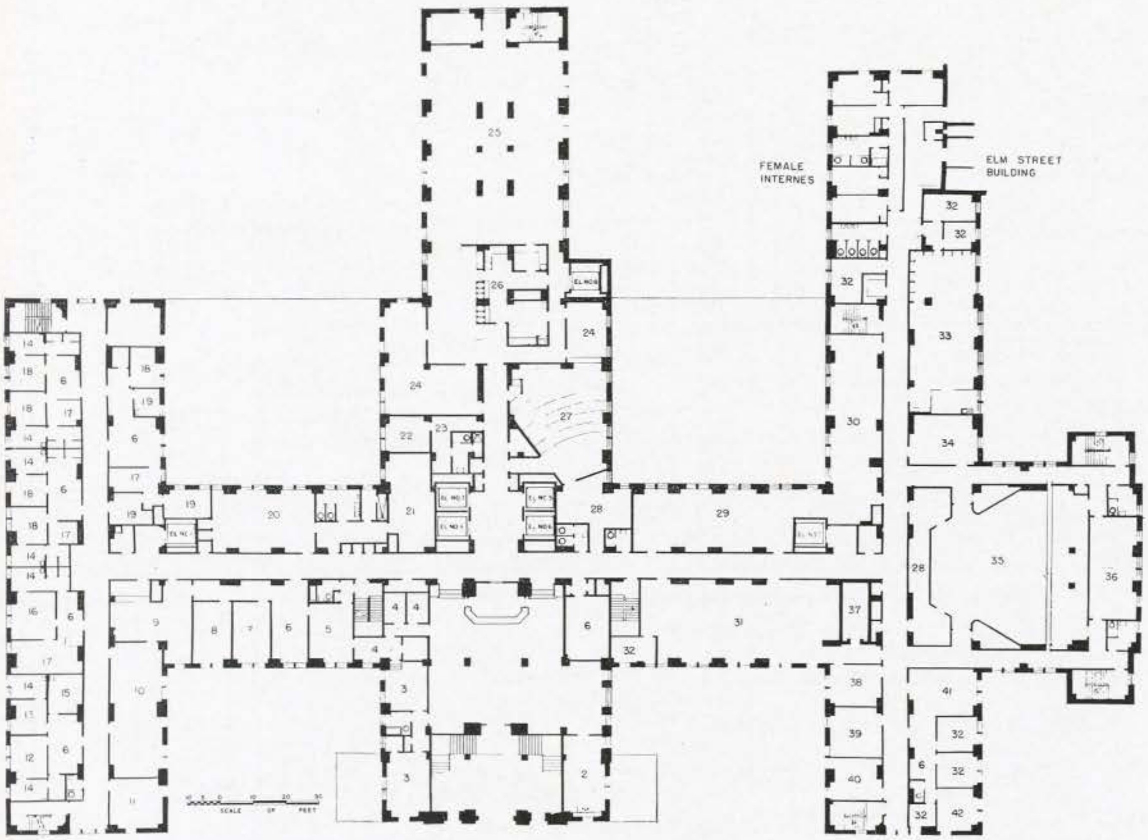


GROUND FLOOR (or O P D Floor)

PANDA

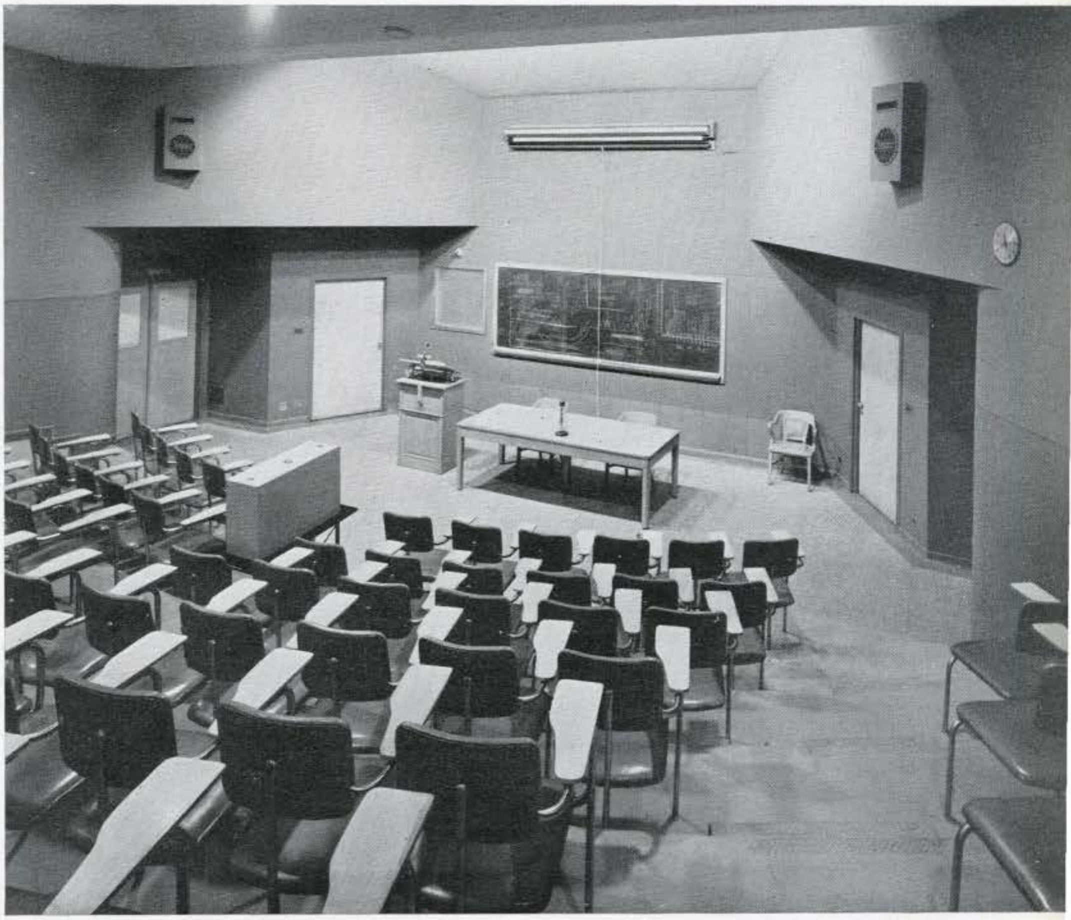
ROTUNDA

1. Main Rotunda
2. Chapel
3. Guest
4. Interviewing
5. Superintendent's Office
6. Waiting Room
7. Assistant Superintendent of Administration
8. Assistant Superintendent of Buildings
9. Office
10. Appeal Office
11. Committee Room
12. Surgeon-in-Chief
13. Assistant Surgeon
14. Examination Room
15. Plaster Room
16. Physician-in-Chief
17. Secretary
18. Consulting Room
19. Treatment
20. Doctors' Lounge
21. Doctors' Lockers
22. Women Doctors' Lounge
23. Women Doctors' Lockers
24. Private Dining Rooms
25. Main Dining Room
26. Preparation Room
27. Small Lecture Room
28. Patients' Waiting Room
29. Library
30. Museum
31. Accounting Office
32. Office
33. Nurses' Training School
34. Cloakroom
35. Auditorium
36. Board Room
37. Vault
38. Secretary-Treasurer
39. Auditing
40. Endowment
41. Nursing Administration Office
42. Nurses' Superintendent



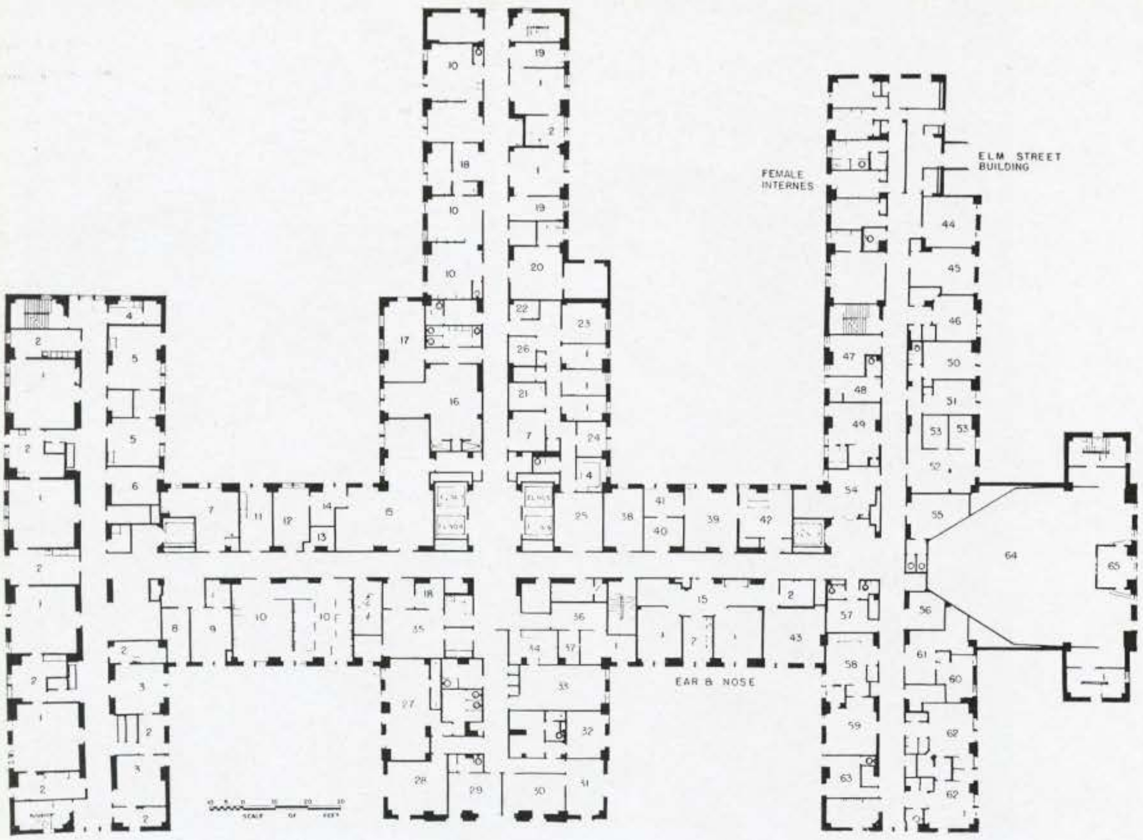
FIRST FLOOR (Administrative, Lecture Rooms, etc.)

MAIN DINING ROOM (Room 26)



MAIN AUDITORIUM

1. Major Operating
2. Utilities
3. Minor Operating
4. Laboratory
5. Plaster Room
6. Spinal Anaesthetic
7. Patients' Waiting Room
8. Supervisor
9. Genito-Urinary
10. Recovery
11. Instruments
12. Sterile Supplies
13. Autoclaves
14. Sterilizing
15. Work Room
16. Surgical Nurses' Lockers
17. Surgical Nurses' Rest Home
18. Nurses' Station
19. Anaesthetic
20. Preparation Room
21. Director
22. Rest Room
23. Surgery
24. Sterilizer Room
25. Research Project
26. X-Ray Room
27. Surgeons' Lockers
28. Surgeons' Lounge
29. Chief Surgeon
30. Surgical Secretary
31. Surgical Staff
32. Women Surgeons' Lounge
33. Coffee Room
34. Pantry
35. Eye Operating
36. Encephalograph
37. Shielded Room
38. Seminar
39. Cardiac Room
40. Electro-Cardiograph
41. Secretary
42. Angino-Cardiograph
43. Bronchoscopic
44. Patients' Library
45. Miniature Chest
46. Superficial Therapy
47. Students
48. Male Technicians
49. Urology
50. Radiologist
51. Assistant Radiologist
52. Stenographer
53. Reporting
54. Office
55. Private Waiting
56. Stretchers
57. Public Waiting
58. Chest X-Ray
59. General Radiographic
60. Dark Room
61. Drying and Sorting
62. Gastrix X-Ray
63. Female Technicians
64. Upper Part of Auditorium
65. Projection Booth



SECOND FLOOR (Operating, X-Ray)

MAJOR OPERATING ROOM

PANDA

PANDA

CENTRAL SUPPLY

1. Lobby
2. Sterile Storage
3. Central Supply Work Room
4. Washing and Sorting
5. Office
6. Gloves
7. Cutting and Sewing
8. Solutions
9. Sterilizing Room
10. Autoclave
11. Director's Office
12. Secretary's Office
13. Routine Laboratory
14. Balance Room Stores
15. Balance Reagent
16. Instrument Room
17. Main Laboratory
18. Special Laboratory
19. Director's Laboratory
20. Cold Room
21. Workshop
22. Operating Gallery
23. Workroom
24. Female Rest Room
25. Library
26. Preparation Room
27. Glass Storage
28. Staff Laboratory
29. Manual Exchange
30. Automatic Exchange
31. Studio
32. Moulage Room
33. Blood Chemical Ward
34. Waiting Room
35. Assistant's Office
36. Laboratory
37. Dark Room
38. Photographic Room
39. Urinalysis
40. General Office
41. Blood Bank
42. Rest Room
43. Museum
44. Pathologist's Laboratory
45. Pathologist's Office
46. Fellows' Laboratory
47. Internes' Laboratory
48. Men's Lockers
49. Special Research
50. Virologists' Office
51. Virologists' Laboratory
52. Virologists' Workroom
53. Entrance to Penthouse
54. Post Mortem Room
55. Storage
56. Histopathology Laboratory
57. Haematology Laboratory
58. Women's Lounge
59. Bacteriologist's Office and Laboratory
60. Routine Workroom
61. Internes' Workroom
62. Fellows' Workroom
63. Glassware Washing
64. Media Preparation Room
65. Media Pouring Room
66. Examining Room

THIRD FLOOR (Laboratories, Central Supply)

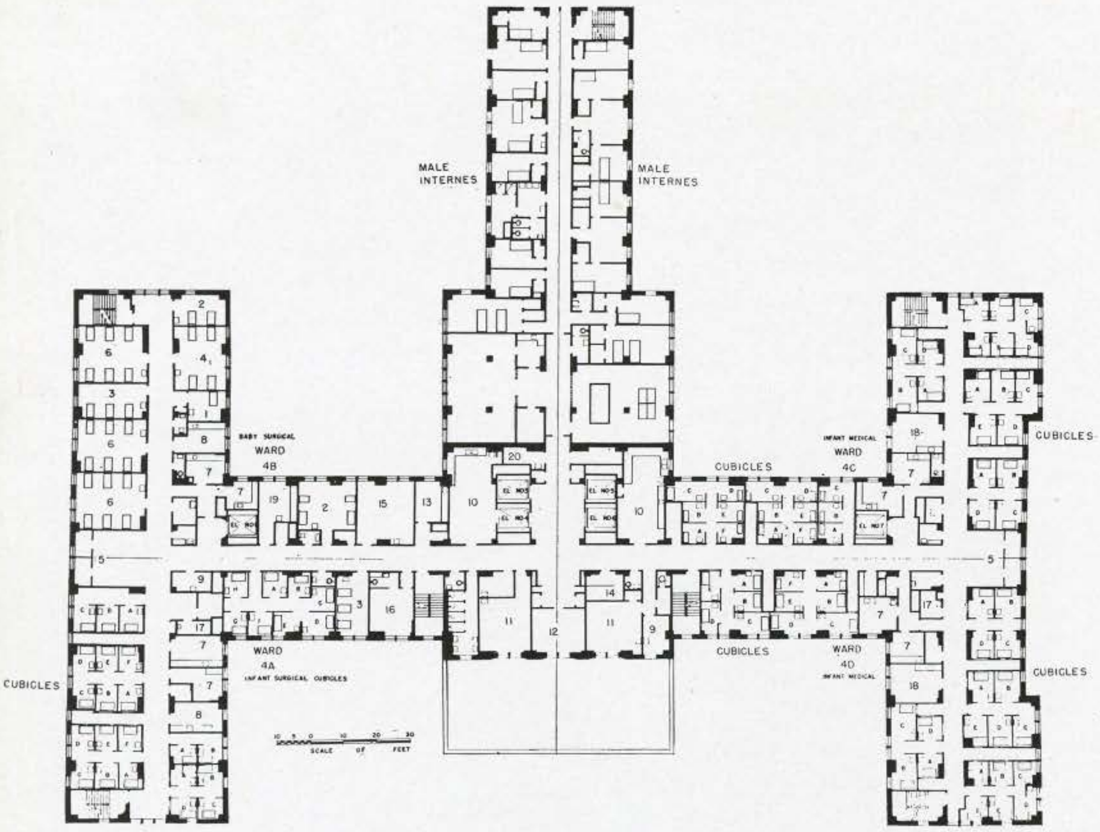
AUTOPSY ROOM (Room 54)

PATHOLOGICAL MUSEUM

NOTT & MERRILL

CUBICLES A.B.C.

1. One Bed Room
2. Two Bed Ward
3. Three Bed Ward
4. Four Bed Ward
5. Nurses' Station
6. Six Bed Ward
7. Utilities
8. Dresser
9. Nursing Mothers
10. Diet Kitchen
11. Nurses' Teaching
12. Waiting Room
13. Laboratory
14. Nurses' Capes
15. Medical Students
16. Up-Patients Room
17. Milk Room
18. Treatment Room
19. Linen Room
20. Instruction and Discharge



FOURTH FLOOR (Surgical, Medical Wards, Cubicles)

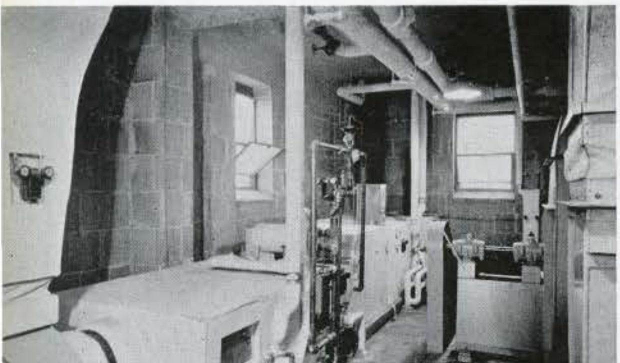
PANDA

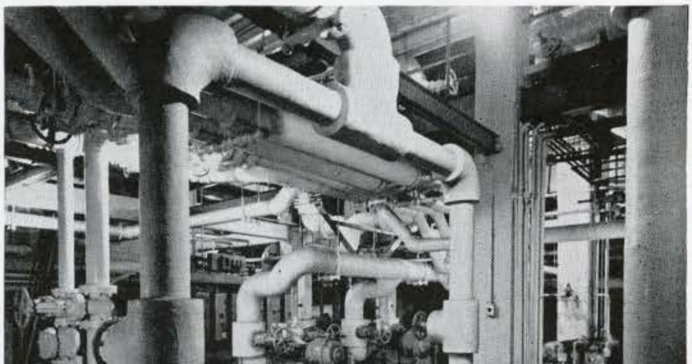
NURSES' STATION (Room 5)

6 BED WARD (Room 6)

1. One Bed Room
2. Two Bed Ward
3. Nurses' Station
4. Four Bed Ward
5. Special Nurses
6. Sun Room
7. Diet Kitchen
8. Waiting Room
9. Interviewing Room
10. History Room
11. Treatment Room
12. Utility
13. Linen

EIGHTH FLOOR (Private & Semi-Private, Surgical & Medical)

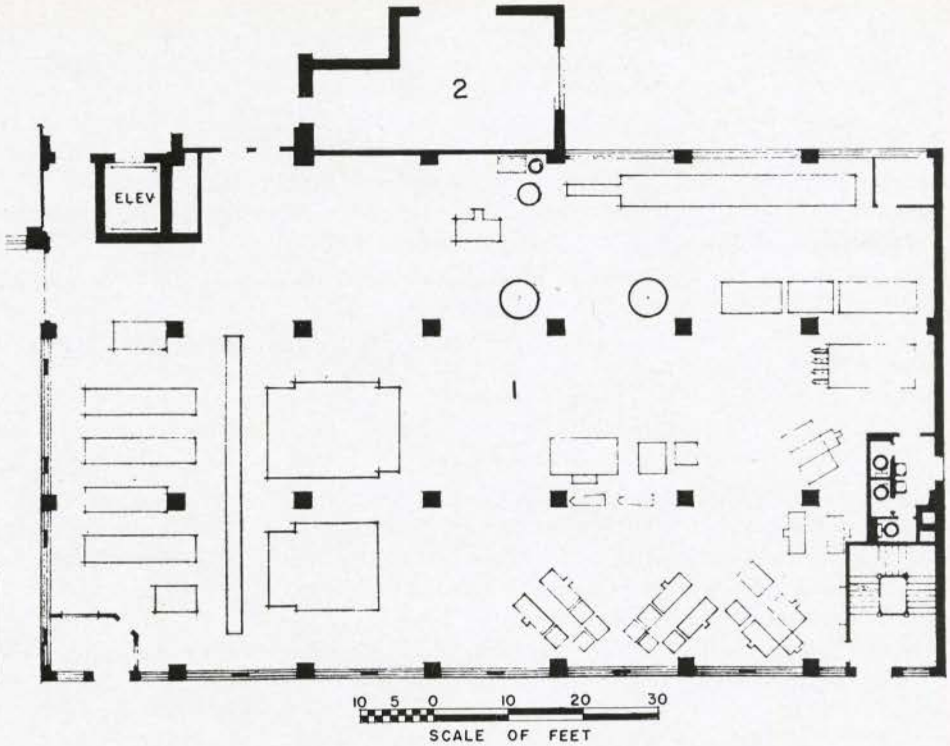




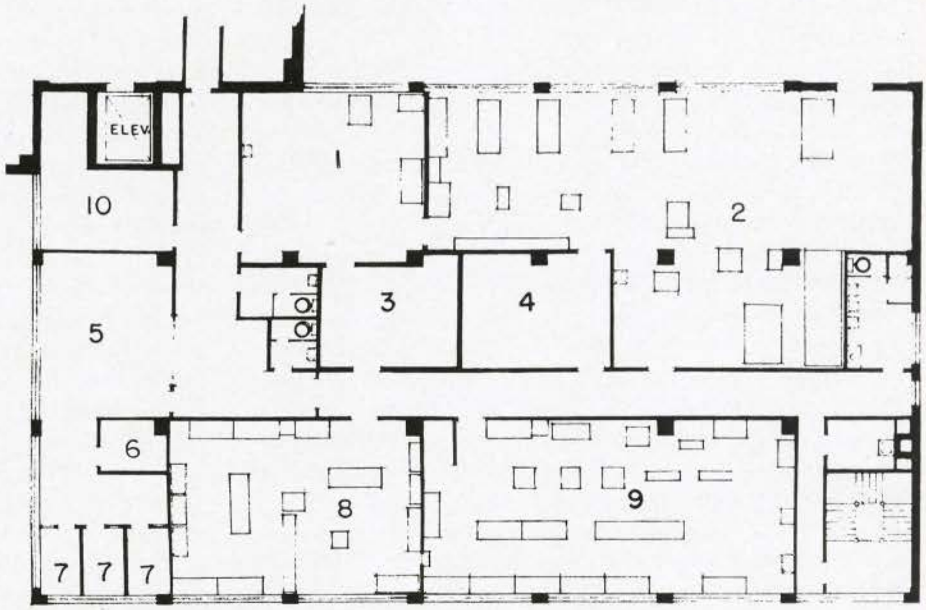
PANDA

FAN ROOM (9th Floor)

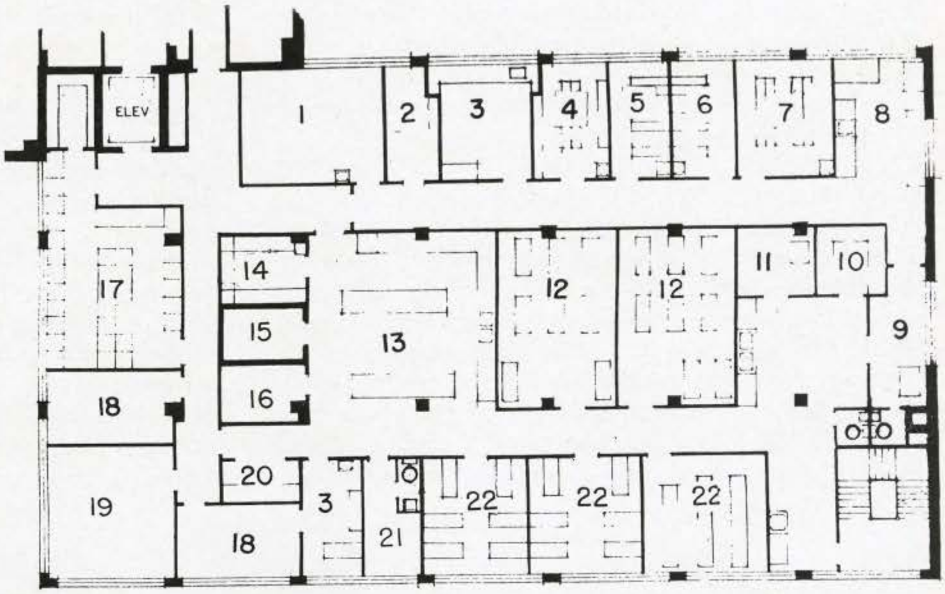
PUMP ROOM (Room 19, Service Floor)



SERVICE FLOOR (Laundry)
1. Laundry
2. Linen Sewing Room



MAIN FLOOR (Workshops)
1. Paint Shop
2. Carpenters' Workshop
3. Drying Room
4. Furniture Storage
5. Orthopaedic Office
6. Interview and Cubicle
7. Cubicle
8. Leather and Splint Room
9. Orthopaedic Workshop
10. Storage



SECOND FLOOR (Animal Laboratory)
1. New Stock
2. Feed and Stores
3. Operating Room
4. New Isolation
5. Clean Test Animals
6. Isolated Animals
7. Guinea Pigs
8. Cage Washing
9. Incinerator
10. Equipment Stores
11. Can Washing
12. Breeding Colony
13. Feed Mixing
14. Feed Supply Stores
15. Prepared Diet Stores
16. Feed Mixing
17. Nursing Students' Lab.
18. Office
19. Research Staff Office
20. Diet Supplement
21. Rest Room
22. Cages

GORDON L. WALLACE and CLARE D. CARRUTHERS

OUTLINE OF STRUCTURE

Foundation

Structurally the Hospital for Sick Children presented some rather interesting problems although the building in itself was not complex in engineering design. Most of the problems were imposed by reasons external to the site itself, some of which were as follows:

(a) The possible disturbance to patients in the Toronto General Hospital if piles were driven or structural steel was rivetted.

(b) The avoidance of differential settlements both as the building is now built and in future when certain additions are made.

(c) The urgent necessity of facilitating speed in construction and particularly of obtaining an early steel design to allow for placing an order.

(d) The providing of a structure which was as free as possible from vibration because of the delicacy of certain laboratory techniques in Hospital operation.

Because of the proximity of the "Taddle" or what is sometimes referred to as University Creek, the ground conditions were suspect, and for this and other reasons very extensive investigations as to sub-soil conditions were carried out. Several test pits were dug to levels well below the proposed foundation elevation and various types of borings were extended to rock. Both test pits and borings indicated a moderately good blue clay bed of considerable thickness although the clay had a somewhat higher moisture content than would have been desired. No evidence was found to warrant any conclusion that the "Taddle" was a factor in the soil consideration. As a result of the investigation it was concluded that the clay would safely support a load of two tons per square foot, or, allowing for the removal of load by general excavations, a somewhat higher value if desired.

It became a matter of consideration as to the use of three possible types of foundation:

(a) Caisson

(b) Steel piles

(c) Spread or Mat footing.

Serious consideration was given to the use of steel piles but this was finally ruled out because of the noise incidental to driving, and to the fact that large boulders exist in the clay strata and this might cause complications in driving. The use of caissons would have been attractive except that a bed of water-bearing sand exists below the relatively impervious clay layers, and the water at this level is under a head pressure such that when the clay stratum is punctured the water rises to a much higher elevation in the test boring. Naturally this makes for slow and expensive construction since close shoring must be placed in all caissons and continuous pumping would be necessary.

Finally, it was decided to found the building on the clay strata immediately below the lowest basement level. It was found that, for the sections of the buildings having the most storeys the spread footings at two tons per square foot would be of a size such that relatively little of the area would remain unoccupied by footings. A mat foundation would give greater assurance against unequal settlements and be generally more acceptable than spread footings, therefore for the higher portions of the building a mat foundation varying from 3 feet to 4 feet in thickness was used. For the lower storey sections spread footings or continuous wall footings were used. As a matter of record it may be stated that to date the settlements have been practically negligible and no problem has arisen about any possible differential settlement. Some settlement was naturally to be expected and the fact that settlement is so slight may be partially due to the fact that the use of a mat foundation reduced the soil pressure to somewhat less than two tons per foot.

In all of the soil investigaton Mr R. Leggett, who was at that time Professor of Engineering at the University of Toronto, collaborated with the Architects and Engineers and his advice and counsel was much appreciated. All of the data were also submitted to the Engineers of the Stone and Webster organization in Boston and they were a party to and approved of all decisions in a solution of these foundation problems.

Superstructure

In the choice of the type of superstructure the problem of speedy erection with the minimum amount of noise was one of the most important factors. Economy was almost of equal importance. For these reasons a structural steel frame with open web bar joist floors in general was adopted. For the lower floors where heavier live loads were required or where there were no ceilings below one and two way concrete slabs were used.

Since it was not possible to determine the location of partitions at the time when the floor systems were designed, it was decided to provide for the partitions being located in any position. While this did add a small percentage to the cost of the building, this cost was more than offset by the flexibility it allowed in the possible re-arrangement of partitions. Another factor favouring the use of the open-web joist floors was the ease of cutting holes for pipes through the thin two and a half-inch slabs when it was necessary to move pipes from one point to another due to changes arising from the fact that the structural plans were developed before the final layout was approved by the Hospital authorities.

The structural layout was relatively regular and straightforward for this particular Hospital and this fact contributed considerably to the economy of the structural frame. Columns were used on both sides of corridors. All corridors were one way slab construction with tie beams across the corridors being reduced to a minimum. This allowed a maximum possible depth over the corridor ceilings for pipes and ducts.

The shape of the building was such that the problem of wind-bracing was reduced to a minimum, the exterior masonry walls being effective in resisting most of the wind stress. Only in the lower floors in the ends of the wings and the lower floors of the central tower sections was special wind-bracing required. This took the form of rigid connections to the columns. Space requirements did not allow for the more structurally-economical but space-consuming K or X bracing types of wind-bracing.

Generally, the structure was a typical beam and column job, however, the framing of a therapeutic pool on the Service Floor and a Lecture Theatre on the Second Floor provided a few problems in design. Space does not permit any detailed information respecting these.

The most interesting problem was a general one. This building was the first major-sized all-welded steel building in the City of Toronto. The use of either welding or turned-bolts in reamed holes was necessary in order to avoid the noise of field rivetting in such close proximity to the Toronto General Hospital. The structural steel fabricators were consulted and the decision was made in favour of welding as the most economical method to use in making connections. We believe that if the same problems were to occur again under similar conditions the same decisions would be reached even with the added experience gained from the actual fabrication and erection.

Throughout the job scarcity of, or length of delivery time on, certain materials entered into the decisions made. For example, all structural steel beams which required fireproofing were fireproofed with concrete due to the scarcity of tile for this work. The structural steel contract was divided among seven fabricators in order to speed up the fabrication; the erection was carried out by one steel contractor.

From the time final sketch plans were approved and working drawings started a high rate of speed was maintained. Every effort was made to use types of construction which would speed up the work. For example, the foundation walls were designed as vertical retaining walls to allow early backfilling of the earth outside the walls of the building. This speeded up the erection of steel.

Drawings for the Foundations were ready for construction three months after the design was started and drawings for the structural steel five months after the start of the design. For a building of this type that was a tight time schedule and was only made possible by the co-operation of the Architects, Structural Contractors and other Engineers. It also required a maximum assistance from the Hospital staff and the fullest of co-operation on the part of the Building Committee and the project managers' representatives (Stone and Webster of Boston, U.S.A.). Altogether the project was a very interesting one and every effort was made to expedite the work in the field despite many handicaps. While at times it seemed that greater progress would have been desired, nevertheless, under conditions as then existed in the construction industry, and taking into consideration the problems arising from the fact that this was not an ordinary Hospital building, the structural work was completed as rapidly as was consistent with the many administrative problems that had to be studied and decided upon while the structural work was under way.

HARRY H. ANGUS

MECHANICAL AND ELECTRICAL EQUIPMENT

MECHANICAL SERVICES

WHILE preliminary plans were being made a careful study of the mechanical equipment was undertaken. One of the main matters to be decided was the supply of the utilities required for operation of a hospital of this size and type.

The original design for all mechanical trades was executed under a considerable handicap because actual construction on the site was begun while building planning was still in a rather preliminary state. In addition soil conditions dictated a very heavy mat in place of normal footings and this interfered materially with normal drainage procedure. Because of this and the great variety of service requirements of all types it was decided that a completely excavated area would be required under the building to distribute the mechanical and electrical services.

It was decided to make this of sufficient height to allow walking passage to all parts. This procedure was very successful and after services had been installed it was found that most of this space could be given back to the hospital for use as storage space. Storm and sanitary sewers were run outside around the periphery of the building, manholes being installed at convenient points to receive all drainage lines from the building. These main trunk sewers were connected to the City sewers on Elm Street. Water supply was taken from the City mains and in order to be sure of a constant supply in case of any break in the City mains, services were brought in from two streets and connected together with a system of valves so that the water supply could be taken from the underground mains from either street.

The supply of steam for heating, sterilizing and other purposes was given exhaustive study and several reports prepared and discussed with the Building Committee of the Board. There were two solutions, one to purchase steam from the power plant of the Toronto General Hospital and the other to build a new power plant for the Hospital for Sick Children. During the study of this problem the directors of Mt Sinai Hospital decided to build a new hospital on University Avenue. The accompanying plot plan shows the locations of the three hospitals and the Toronto General Hospital power plant.

Studies were made of the steam requirements of each of the hospitals and estimates made of the capital and operating costs of different schemes, also of the different locations of the power plant if it was decided to have a separate one for the Hospital for Sick Children. It was necessary in these studies to make provision for possible additions and extensions to all three hospitals and it was also necessary that there be a spare boiler in any power plant to be used in case of breakdown of one of the boilers in use.

There were in the power plant of the Toronto General Hospital five water tube boilers in fair condition but about 35 years old which is considerably over the average useful life of a boiler. While there was some surplus capacity the directors of the hospital were not willing to add any extra load to such an old plant. The building and auxiliary equipment however was in good condition.

Studies were made therefore on the basis of replacing the existing boilers with new, larger and more efficient boilers and it was eventually decided that by installing three boilers each of about 60,000 pounds capacity that any two of them could produce all the steam required by the three hospitals and any extensions contemplated for the next 10 or 15 years. These three boilers could be placed in the existing building without very extensive changes. In case the hospital extensions were larger than contemplated then a fourth boiler could be added by making some changes to the building.

The capital cost and the cost of operation of this was compared with that of separate plants for each hospital and this included the cost of tunnels and pipe lines as well as the power plants. A study of these definitely proved that the Toronto General Hospital power plant should be increased to supply the other two hospitals for the following reasons:—

1. The capital cost would be less.
2. There would be a large saving in cost of labour as two extra men only would be required at the Toronto General plant while with the separate plants at least 12 extra men would be required.
3. There would be a saving in fuel to the Toronto General Hospital due to the installation of modern, more efficient boilers and the low cost of producing steam would be shared by the other hospitals.

After all parties were satisfied that this was the proper solution to the problem, it was decided to proceed on this basis. A walk-through tunnel was built under Gerrard Street, and pipes installed so that the whole line from the Toronto General Hospital to the Hospital for Sick Children can be inspected at any time and kept in good condition. One of the new boilers in the power plant is now in use and the others being installed.

In order to make proper charges for the steam used the total amount of steam produced by the boilers is measured by steam meters. The cost of coal, labour, repairs, etc., are kept accurately so it is a simple matter to find the cost of producing a pound of steam. To this of course are added the fixed capital charges. A meter is installed in the steam line to the Hospital for Sick Children so it is an easy matter to calculate their monthly charges for steam.

In order to supply emergency electric power to the Hospital for Sick Children a steam turbine driven generator has been installed in the power plant of the Toronto General Hospital and electric lines carried through the tunnel. This generator starts automatically on failure of the Hydro current and is under the supervision of the power plant staff. In addition to supplying power to the Hospital for Sick Children it also supplies power in case of emergency to all electrical equipment in the power house and thus assures the regular operation of the plant in case of Hydro failure. The steam to this turbine is also metered so proper charges can be made. The generator is not sufficient to supply all power required in the Hospital for Sick Children but is connected only to such equipment as it is necessary to have in operation at all times.

Steam is carried to the Hospital for Sick Children at around 125 pounds. In the sub-basement of the hospital there is an equipment room containing converters and circulating pumps for heating as the hospital is heated with hot water also domestic water heaters, reducing valves return pumps and other auxiliary apparatus. Steam at high pressure is also carried to the laundry.

HEATING, VENTILATING & PLUMBING

Heating

THE HEATING SYSTEM for the new hospital building in general, consists of a forced hot water heating system with concealed convectors. The convector enclosures and "fronts" were specially designed for this project, the front consisting of a 14 gauge furniture steel plate with inlet and outlet grilles stamped in same. The complete convector was flush mounted above the baseboard and in practically all cases, was made the full length of the window opening thus presenting a neat, clean appearance in the room. The outlet grille is fitted with a damper actuated by a knob so that the heat output can be readily regulated manually. In addition to this volume damper, the supply and return water connections to each convector are fitted with a hand valve and a lockshield valve for final adjustment and for maintenance purposes. All convectors for operating rooms are thermostatically controlled and are on a separate low pressure steam heating system so that these rooms can be kept heated in the spring and fall of the year while the main hot water system is not in operation.

The main hot water heating convertors, circulating pumps, expansion tank, compressor and control equipment together with all other auxiliary apparatus are situated in the main equipment room located in the north east corner of the sub-basement. All main heating convertors, circulating pumps, etc., are provided in duplicate for stand-by service. This location was chosen as it was adjacent to the main heating tunnel passing under Gerrard Street, and containing the main steam and return service piping from the Toronto General Hospital Power Plant. From the heating and pumping equipment in this equipment room, main 8 inch supply and return lines run over to distribution headers in the "Header Room" located in the centre of the sub-basement of "Pipe Space" and from these headers separate lines continue to the various zones. In this way, it is possible to balance the entire heating system, as with thermometers and lockshield valves on all return branches the proper amount of water can be circulated through the various zones. All sides and wings of the building are on separate branches or zones which makes the entire system very flexible and easy for final adjustment.

The heating system for the Elm Street Building, containing the Laundry, Shops, Pathology laboratories etc., consists of a low pressure steam, gravity return system using exposed convector cabinets and unit heaters.

Ventilating

There are approximately 24 fresh air supply systems and 48 exhaust systems throughout the entire hospital building. The supply systems deliver filtered, preheated air to the various spaces and with the exception of the system for the main auditorium, deliver 100 per cent fresh air, i.e. no air is recirculated. Practically all supply air equipment is arranged for future installation of cooling equipment including direct expansion coils and refrigeration compressors. The supply systems for the operating rooms deliver air at 80 degrees D.B. with a relative humidity of 60 per cent thus eliminating the hazard of physical shock to the patient and danger of anaesthetic gas explosion due to static electricity. In addition, operating room supply air is passed through electronic precipitrons, thus delivering practically 100 per cent dust free air. Supply air, in general, is delivered to the rooms through directional flow wall grilles and special ceiling distributing outlets but in large spaces such as the Out Patients' Department on the Ground Floor, air is supplied down through perforated ceilings. The latter system promotes a very flexible method of dealing with the supply of air to spaces when locations of partitions may be changed due to various department revisions.

The exhaust systems are too numerous to tabulate in detail, but, in general all service areas, kitchens, serveries, toilet rooms, locker rooms, laboratories, operating rooms, stores etc., are mechanically exhausted. In addition the entire third floor is occupied by laboratories of all types which are equipped with numerous fume hoods, each being connected to separate mechanical exhaust systems. All exhaust air is discharged under pressure through discharge louvres located on the roof of the building or through the outside wall of the building away from any windows or openings where contaminated air could be drawn back into the building.

All fans, including supply and exhaust, are remotely controlled from one control panel in the main Equipment Room. Each fan is controlled at this panel with a switch combined with a pilot light so that the Engineer in charge has complete supervision of the entire ventilation of the hospital. Adjacent to this remote control panel is a remote indicating temperature recorder so that the Engineer can by actuating switches obtain the exact room temperature at practically any location in the hospital. He can also obtain at this same recorder the prevailing outside temperature and the main flow and return hot water temperature for the heating system and in addition the main steam pressure, etc.

PLUMBING

As mentioned previously, the main water supply to the hospital is installed in duplicate from two separate sources, Elm and Gerrard Street water mains. It was found that the city water supply had only sufficient pressure to supply water to the Third floor of the hospital so it was necessary to boost the pressure to supply water above this level. To accomplish this, booster pumps together with a pneumatic tank were installed in the main equipment room in the Sub-Basement. The domestic water supply for the entire hospital was divided into two zones, one up to and including the Third Floor and the other including the Fourth Floor and the floors above. Domestic hot water storage tanks and convertors for both the high and low pressure systems together with respective hot water recirculating pumps are also located in the main equipment room. From all this equipment, main lines were run over to distribution headers in the "Header Room" and from the respective headers, mains were continued to the various parts of the building. All these service mains for both high and low pressure systems were run at the ceiling of the Sub-Basement (Pipe Space). Booster pumps, hot water convertors, recirculating pumps etc., are provided in duplicate for standby service.

There is a great variety of plumbing fixtures in the Hospital for Sick Children, too numerous to describe in detail. Each bedroom and ward is equipped with a lavatory with wrist action combination faucet to prevent cross-contamination by the "floor nurse." Miniature water closets are installed on some floors in addition to lavatories mounted low for the use of younger patients. Special bathtubs, showers, etc., are installed for the same purpose. All sinks and drainboards in kitchens, serveries, utility room etc., are stainless steel.

Practically all bedrooms in the hospital are equipped with oxygen and vacuum outlets in a locked, flush mounted cabinet for the use of the patient. Each such cabinet is fitted with an oxygen flow meter always ready to supply oxygen to a needing patient. Oxygen is supplied to the hospital from an outside storage vault which is always kept up to capacity with ample reserve, by the oxygen supply company. Oxygen, compressed air and vacuum are piped to all operating rooms, controlled from a regulating panel on the main wall adjacent to X-ray view boxes, clocks, etc. Some of the main operating rooms have a small "island" under the operating table with outlets for the three services mentioned, controlled from the regulating panel on the wall. The advantage of this installation is self evident as it obviates the necessity of long flexible hoses from the wall outlets with the danger of personnel tripping over same. As a third source of emergency vacuum, these pumps may be steam turbine driven.

There is a complete system of fire protection throughout the building, consisting of fire hose cabinets containing fire hose rack and one and half-inch hose, two and half-inch fire department valve in case the city fire department wish to connect their hose and a 5 pound CO_2 extinguisher for small fires. In addition each cabinet has a remote starting switch (with pilot) which controls the fire pump located in the main equipment room. This pump is so connected to provide ample pressure on the one and half-inch fire hose. A sprinkler system was installed to protect the contents of storage rooms in the Sub-Basement.

The hospital has a four-inch pneumatic tube system which is large enough to convey necessary drugs, instruments, dressings, samples, case histories, etc., to any part of the building.

A complete swimming pool with all necessary filters, water heaters, circulating pump, etc., is installed at the south end of the Ground Floor for hydrotherapy treatment. A special hydraulic elevator was installed to raise and lower patients suffering from paralysis. A hydro-treatment bath and a leg and arm bath are installed adjacent to the pool which assist in the wide range of therapeutic treatment now carried on in the hospital.

There is a wide variety of plumbing services installed for the laboratory section which takes up the entire third floor. Distilled water, city water (hot and cold), illuminating gas, compressed air, vacuum and oxygen are piped to service all laboratory tables, fume hoods, etc. Sinks of all types have been installed throughout the laboratory floor together with a variety of faucets, goosenecks, valves, traps, etc.

The laundry in the Elm Street Building has its own separate water and drainage system. All water is softened for the laundry equipment. The drainage water from the washers is run through a heat reclaimer to preheat the water piped to the laundry hot water heater. Actual tests made on the job show that city water delivered through this heat reclaimer picks up about 40 degrees which is a real saving in steam used to heat the laundry hot water.

It was with great satisfaction to all concerned that the entire installation of all mechanical trades were brought to a successful conclusion, notwithstanding all the difficulties encountered with the engineering design for a building of this type and size.

ELECTRICAL

THE DESIGN of the electrical facilities for the new Hospital for Sick Children in Toronto, provided a most interesting and rather difficult and unusual problem. This was due to several factors, chief among which was the fact that construction was proceeded with before the planning of the building was finished. A secondary problem was that while 60 cycle supply was very desirable and in fact almost essential to this hospital it was not possible to determine whether or not this could be supplied by the local utility.

In a building of the enormous complexity of this hospital, this called for a system which could provide the maximum flexibility so that as loads developed in the structure during planning period, they could be accommodated without change in the basic distribution.

The utility advised that power would be sold to the hospital at a potential of 120-208 volts, so that this building could be tied into the low voltage network which was developing in this part of the city.

Since no information on 60 cycle power was available and a survey showed that it was economical to design on this frequency, it was decided to purchase frequency changers. This was done, but very fortunately due to the combined efforts of all concerned, the utilities were able to bring in a 60 cycle feeder and the motor generator sets were then disposed of without loss.

The large area of the building coupled with the relatively large loads at ends of runs made it essential to choose a distribution system with a minimum of voltage drop. This is perhaps the greatest disadvantage of the combined power and lighting service of 120-208 volts in large structures.

It was decided that distribution should be confined to three points in the building on all floors and it was decided to place these adjacent to the end elevators at both ends and beside the laundry chute which is close to the exact centre of the building. At these points a solid 1,000 amp low-reactance duct was run vertically. All lighting and power loads were then fed from these risers. Telephone, intercommunication and emergency lighting panels were also combined in the same group which made a very neat flush mounted assembly.

This installation was the first in Canada of this duct but quite a few other buildings have since been designed on this basis.

The main switchboard feeding the building is a dead front air circuit breaker assembly with a 3,000 amp. main breaker and several feeder breakers. In addition, the board contains two electrically interlocked breakers which are used to automatically transfer a portion of the load to emergency supply during periods of power failure.

Emergency power is generated at 2300V in the power house of the Toronto General Hospital and is carried to the Sick Children's Hospital at this potential and then transformed down to 120-208V. The emergency system is divided into two parts —

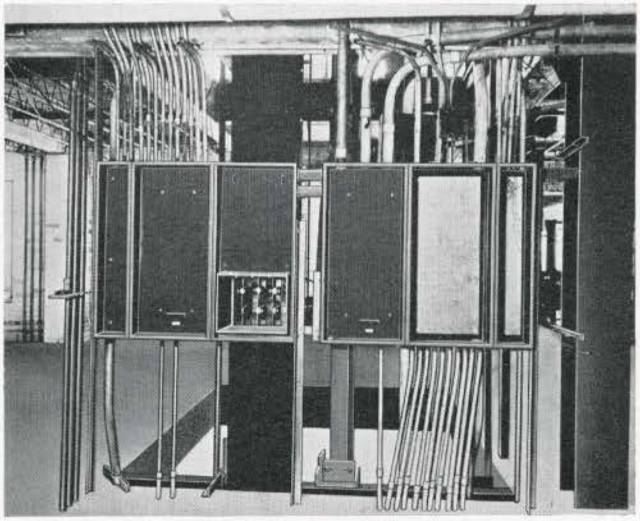
(a) Direct Emergency which is a separate system of distribution, wiring and low wattage outlets which are connected to the emergency generator at all times. This system is used in corridors, stairs and other areas where low lighting levels are satisfactory. All outlets on this system are panel switched and operate completely independent of the main lighting fixtures. This system was used to be able to provide a maximum of coverage of non-critical areas with the lowest possible electrical load.

(b) Change-over Emergency which consists in changing over the supply from regular to standby for certain lighting and power loads. This provides full intensity illumination for all operating rooms and their accompanying utility rooms. In addition, elevators, sterile vacuum pumps, heating circulating pumps and other essential power loads are connected to this service.

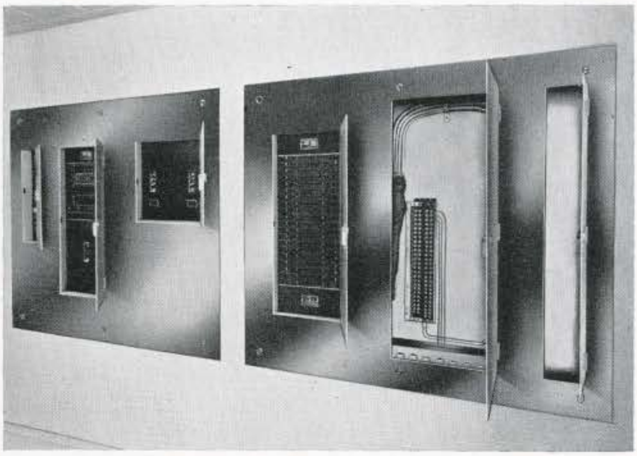
(c) As a third source of power, the operating lights in emergency may be switched to a storage battery system.

Tests have shown that the delay between power failure and full emergency supply averages less than 60 seconds.

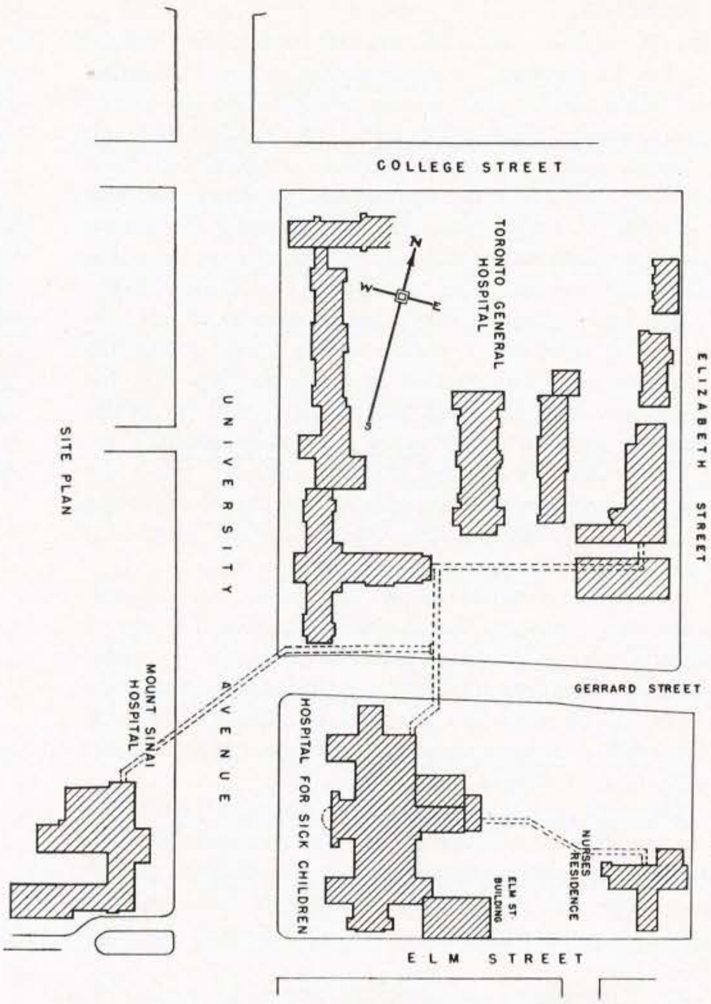
A private phone connection is installed between the



Bus-duct riser and panel assembly during construction



Same assembly complete
Sections are L to R:
1. Emergency panel 2. Lighting & power panel
3. Bus duct & main breakers controlling lighting panels
4. Lighting panel 5. Telephone panel
6. Intercommunication panel



SITE PLAN

mechanical room in the Hospital for Sick Children and the power house of the Toronto General Hospital so that the operation of the generator can be controlled even if the automatic starting feature should fail. This generator also provides emergency power to all lights and apparatus in the power house.

Lighting in the hospital of necessity was varied due to the usages of the various areas.

In general it may be said that fluorescent lighting was employed in offices, laboratories, workrooms, laundry and other areas where a high illumination level was required to do efficient work.

Incandescent lighting was used almost entirely in patients' rooms, operating rooms, corridors, stairs, and other areas where high illumination was not needed or where the spectral quality of incandescent light was thought more suitable.

Night lights were provided in patients' rooms and these were all controlled by silent mercury switches.

The main lobby was treated with an indirect cove of incandescent light accented by recessed down lights at certain locations.

The use of germicidal or ultra-violet lamps in the hospital was very widespread, especially in accommodation designed for infants and children in the low age group. The fundamental design on this was done by members of the hospital staff who are well known as authorities in this field. Fixtures were installed according to these recommendations and it is expected that these will very materially reduce the number of cases of cross infection between patients.

Lighting of grounds and parking areas was done in the usual manner and in addition, two tennis courts were lighted. All ground lights are controlled by a time switch, while tennis court lights have push button control.

Several types of signal systems were used in the building including nurses call, audible doctors paging, orderly call, doctors "In & Out" annunciator, etc. In addition, empty conduits were run from major operating rooms to lecture theatres. These will later be used with wired television so that operative techniques may be viewed by larger numbers of students than is now possible.

In spite of the handicaps under which this work was designed and installed, the wholehearted co-operation of all those working on the project has resulted in a job which is proving very satisfactory in service.

ANDREW N. McLELLAN

TELEVISION BROADCASTING STATIONS

INTRODUCTION

FEW CANADIAN architects and builders have thus far been called upon to cope with, in a practical way, the problems and potentialities of television broadcasting station design. Few broadcasters in this country, let alone architects, are even remotely familiar with the complex operational requirements of television facilities housing.

We are all very well aware that television in Canada has been somewhat neglected or, perhaps we should say, *retarded*. However, on December 6th, 1949, Parliament voted the Canadian Broadcasting Corporation a loan of $4,500,000, repayable with interest, for television development. In consequence, the CBC is now proceeding with its long delayed plans for the establishment of video outlets in Toronto and Montreal. The country's private broadcasters (and many of them are also anxious to enter the field of sight-and-sound broadcasting), are still very much in the dark as to their future stake in the medium.

According to the Hon. J. J. McCann, minister of national revenue, it is hoped that the $4,500,000 loan to the CBC will cover part of the first phase of television development, although it may become necessary to ask for further loans. Over a period of years it is expected that the total cost will be about $10,700,000. The transmitters and studio equipment purchased during 1950-51 will amount to something over $1,000,000 for the two outlets. Research will cost an estimated $70,000 and $125,000 will be spent on training. Station operations up to 1955 will probably cost about $9,000,000, with network facilities budgeted at an additional $875,000, leaving $235,000 for so-called contingencies.

"We are also looking at the revenue side," asserts Dr McCann. "In the first year there might be 2250* receiving sets. In the next year we expect that that will go ten times as high. By 1952-53 it will be probably 56,000 sets, by 1953-54, 111,000 and by 1954-55, 168,000. If we count on the revenue from those sets, they should bring in $3,600,000, and from commercial operation revenue, $1,817,000. Our total expenditures would run as high as $14 million over the years and our revenue $5,400,000, leaving a net capital cost in the neighbourhood of $10 million.

"Let me point out that we do not wish to go into this business with our eyes shut. Over a period of years it is going to cost a lot of money. I feel we have followed a wise policy in not being too hasty."

*Current figure is in excess of 50,000

J. Alphonse Ouimet, CBC assistant chief engineer and co-ordinator of television, has stated that Canadian television would be based on a combination of British and American systems and would strive to retain the best technical features of each. Technical standards will, of course, be based on American practice, necessitating no change in present receiving-set design and permitting interchange of programs between both countries. According to Mr Ouimet, British standards will be aimed at in "maturity and professional polish."

It is perhaps only a matter of time before the private broadcasters will be granted their democratic right to participate with the CBC in the costly and complicated business of bringing the television art to Canadians from coast-to-coast. One thing is certain, however, the CBC cannot be expected to do it alone! The Radio Manufacturers' Association of Canada recently indicated that Canada could have, by international agreement, frequency allocations for more than 90 television stations right now – nearly all of which could be established without governmental loans. The Association points out that CBC policy of refusing private concerns the right to set up television is keeping a 50 to 100-million dollar a year industry out of the Dominion.

The Canadian architect will be wise indeed to conscientously concern himself with the many technicalities of design and construction peculiar to the *videographic* medium. Architecturally – and in many other ways, too – television inherits much from the accumulated experience of the theatre, motion pictures and *blind* radio but, it also brings forth a great many new problems with which the three older media never had to contend.

Television is certainly big business in the United States and it promises to be comparatively big business in Canada, too. In 1946 there were only six commercial stations in operation south of the border with roughly 10,000 receiving-sets in use. At the present time there are 107 stations serving more than 12 million set owners in 63 cities from coast-to-coast. With the average station costing approximately $300,000, this indicates a capital expenditure totalling well over $30 million for operating facilities alone.

I will willingly go out on the proverbial limb at this point and predict that if the private broadcasters of this country are given the green light to enter the television field during the next six months, within ten years there could be as many as 30 stations in operation, representing a capital investment of at least $15 million in plant and equipment; and as many as 900,000 receivers in use for which the public will have paid over $300 million. This prophecy is, however, contingent upon the establishment of a *free* and *competitive* system of television broadcasting in Canada.

Types of Stations

There are four basic types of television stations in the United States, each designed to offer a specific kind of service. Many factors will determine the choice of type, including: (a) capital investment available, (b) immediate and probable operational requirements, (c) scope of service to be rendered and, (d) availability of network programs.

There appears to be no consistency to the nomenclatures given to types, varying according to equipment manufacturer, governmental authority, etc. The following table indicates the approximate relationship of different arbitrary designations in the U.S.A.:

FCC*		RCA	GE	DuMont
Metropolitan	Class A	Master	Network – Originating	Full Service
Community	Class B	Standard	Intermediate	—
Rural	Class C	—	Very Small	—
Booster	—	Small	Satellite	—

Function and Operations

Metropolitan Station: Designed primarily to render service to a single metropolitan district or a principal city, and to the surrounding rural area. In the U.S.A. the main studio of a metropolitan station must be located in the city or metropolitan district with which the station is associated, and the transmitter must be located so as to provide maximum service to the area served. The plant should provide complete facilities for the production and broadcasting of all types of local programs – live-talent, film and remotes – and for the origination and re-broadcasting of network shows.

Community Station: A local station designed for rendering service to the smaller metropolitan districts or principal cities. In the U.S.A. the main studio of a community station must be located in the city or town served and the transmitter must be located in the city – as near the center as practicable. A community station will differ from a metropolitan station mainly in size and extent of facilities. It is rarely planned for the origination of network programs.

Rural Station: A station which serves an area more extensively than that served by a metropolitan or community station and predominantly rural in character. In the U.S.A. the service area assigned to a rural station is individually determined by the licensing agency (FFC). Although rural stations will rely chiefly on network and film programs, a small modestly equipped live-talent studio is also provided for local originations.

Satellite (Booster) Station: A satellite station is one which is not designed to originate local live-talent programs, but serves its locality by rebroadcasting the programs fed to it by a television network (or nearby rural, community or metropolitan station). A basic satellite station may be expanded to allow for the origination of film programs, if desired.

*Federal Communications Commission

Location of Station

While there are certain factors which must always be considered in choosing the location for a television station, it is impossible to lay down hard and fast rules which will apply in every instance.

Many television stations will, of necessity, be set up in existing buildings, such as arenas, theatres, radio stations, factories, etc. In such cases many limitations will be imposed at the outset and numerous compromises will have to be arrived at. Although excellent use has already been made of existing buildings for television facilities housing throughout the States, there is absolutely no doubt that a specially designed and constructed building provides the most satisfactory overall solution to the problems in choosing a suitable location – and a multitude of other problems as well.

Of course, the initial capital expenditures must be taken into account and the broadcaster may find it far more practicable to locate on an interim basis in an existing building. The danger is that he will be "penny-wise and pound-foolish" as so many radio broadcasters have been in the past.

The two principal considerations in selecting a television station site are: (1) adequate space for efficient operations and, (2) provision for future expansion.

Television operations are very complex. The practical and economical coordination of highly specialized services, facilities and technical equipment requires the most careful planning. Because of the newness of the production of the videographic art, great changes must be anticipated and, wherever possible, planned for.

Other factors affecting the location of a station include:
(a) Freedom from interference: external noises (trains, streetcars, airplanes), electrical disturbances (machinery, high-power circuits, X-ray machines), vibration (printing presses, pumps, fans, subways).
(b) Consumer services: hydro, water, transit, heat, etc.
(c) Availability of remote program sources: theatres, night clubs, sports arenas, large stores, civic centres, etc.
(d) Relationship to transmitter: in same building, in another building, located nearby, located at some distance (in country).

Transmitter Building

The transmitting equipment of a television station may be located as indicated above – in the same building, in an existing building, or in a specially constructed transmitter building located nearby or at some distance. The choice of location depends upon several economic and technical considerations which we will not concern ourselves with here.

There are certain fundamental requirements of transmitter facilities housing whether it involves remodelling existing structures or building new ones. Actually, many of these requirements are similar to those which apply to the design of radio transmitter buildings. Certain space-areas must be provided, regardless of the location and power of the transmitter. They are:

1. Equipment Room: It contains the audio transmitter, video transmitter, filter unit, antenna unit, operator's console, monitoring and test equipment racks, etc. The room should be designed with the physical dimensions and function of each unit of equipment foremost in mind. It should be large enough (approximately 40 x 25 x 10 feet) to allow for the installation of additional equipment, as required.

2. Workshop: For routine test and emergency repair equipment.

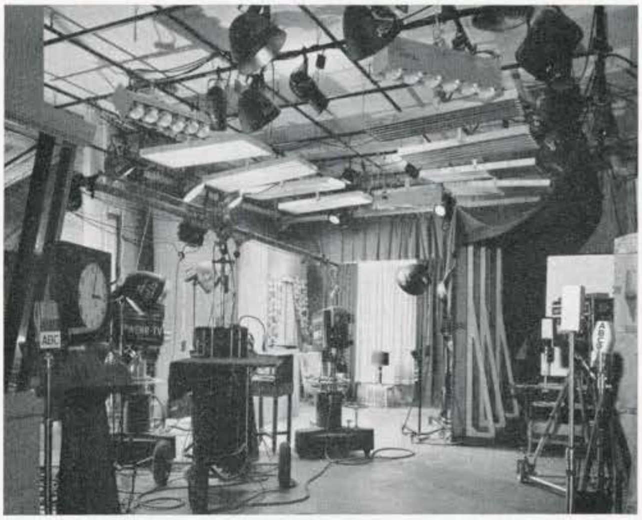
3. Storage Room: For spare tubes, spare parts, wire and cable, etc. Many transmitter tubes are quite large and require very careful storage so the space provided should be more than just a closet. Ample space for shelves and bins should be considered.

4. Lavatory: Preferably with shower and dressing room.

5. When a transmitter building is remotely located it is usually desirable to provide such accommodation as a single bedroom, lounge, kitchenette, garage and visitor's lobby. Heating, ventilating, water and hydro facilities must also be provided for.

Types of Studios

The three types of television studios are: live-talent, film and rehearsal. Each has individual physical requirements, and each is designed for a specific function:



WENR-TV. CHICAGO.

A very typical television studio. Note various types of lighting fixtures suspended from pipe grid. Few studios are much larger than this one so an idea of the congestion problem is not difficult to imagine.

Live-Talent Studio: All television stations (with the exception of satellites and relays) should be designed around the live-talent studio or studios. They are truely the "heart" of any well programmed station. It is reasonably safe to say that a live-talent studio can never be too big. Most live-talent studios in use today are miserably inadequate. A room 25 x 40 x 18 feet is the smallest practicable; 30 x 50 x 22 feet is a desirable minimum; and at least 40 x 60 x 25 feet is preferred. (A station may have two or more of different sizes.) If the live-talent studio cannot be sound-isolated it should be surrounded by a corridor or offices to reduce external noise penetration.

Film Studio: The film studio or, Telecine Room as it is sometimes called, is as vital to a station's operations as the live-talent studio but considerably less complex in facilities and function. Since a great deal of programming is from motion picture film, (the average is about 30 per cent), it is necessary to have at least one room planned for this purpose. In small stations the film studio should be large enough to permit cutting and rewinding work space and, possibly, film processing. In larger stations a separate room or rooms should be alloted to these functions. Since much of the film stock used is highly inflammable, fireproof storage vaults with vents to the outside of the building should be considered.

Rehearsal Studio: Ample rehearsal space is needed when a station is scheduling any number of live-talent program originations, particularly with shows that require complicated staging. Well ventilated bare rooms are all that is necessary for this purpose.

Number of Studios

The number of studios, like so many other considerations, depends upon the immediate and probable future requirements of the station. The type of station is also a determining factor. A metropolitan type station usually requires a minimum of three live-talent studios, one film studio and two or more rehearsal studios. A community station layout should include two live-talent studios, one film studio and two rehearsal studios. A rural station can operate efficiently with one live-talent studio, one film studio and one rehearsal studio.

Equipment

In the design and layout of television stations and studios the size and function of numerous items of equipment must be considered. Every studio, control room and service area should be planned with certain basic requirements in mind.

A great deal of the equipment used in television (consoles, monitors, racks, etc.) is highly compact and is built as sectional units. However, most studio equipment (cameras, dollies, microphone booms, lights, etc.) is awkward and cumbersome and requires as much operating space as possible.

Telecine (film projection) equipment has been greatly simplified and can be permanently installed according to many unique arrangements.

Garage facilities will often be needed for a mobile "field" unit which is generally a converted bus and requires the space normally occupied by at least two cars. It is wise to make provision for such equipment in the original plan for very few stations will operate long without recourse to remote programming.

Lighting

The introduction of the super-sensitive image-orthicon camera in 1946 brought about many changes in television studio lighting requirements. For many years the chief difficulty in producing satisfactory studio pictures under artificial illumination was the intensity of light required.

Iconoscope cameras, the type previously used (and still used in the film studio), demanded incident light values of from 800 to 1000 foot candles. Such light intensity was not too difficult to attain but it was essentially uneconomical and the large banks of lamps required produced almost unbearable heat.

With the image-orthicon a basic lighting of 20 foot candles of reflected light is required, but the incident illumination should have a value of 100 to 250 foot candles for a really good picture.

Lighting for television is decidedly more complex than that used in motion pictures, the theatre or any other field. The equipment therefore, must be completely flexible in both design and installation. Several different types of fixtures are in current use, employing a balanced mixture of fluorescent and incandescent lamps. Most of the units are suspended from a pipe grid, others are mounted on moveable standards. Positioning and angling is done either manually from a ladder, catwalk or light-bridge, or by means of pulleys and ropes.

Structurally, the pipe grid should be capable of supporting approximately 40 lbs per square-foot of floor area. Wherever costs permit, a catwalk or light-bridge above the grid is particularly desirable.

A large number of wall-receptacles is essential. It is recommended that there by three-outlet units ten feet apart at two levels around the studio – one 2 feet above the floor level, the other just above the pipe grid. Dimmers are not yet in general use but probably soon will be. Their use should be encouraged.

Acoustics

Sound control and acoustical perspective is a very special problem in television studio design. The need for complete flexibility in program staging precludes the possibility of any absolute solution. Experience has indicated that it is more desirable to have a "dead" studio than a "live" one, since reverberation can be reasonably controlled by scenery and temporary panels.

Ideally, every studio should be isolated from the rest of the building. The studio-within-a-studio (floating) arrangement is particularly recommended, though economy or structural limitations may rule such an idea out. Sound locks between entrances to studios and control rooms are not generally used but should be thoroughly considered when designing a building specifically for television.

Air Conditioning

Proper air conditioning and ventilating of a television station, especially the studios and workrooms, is not only desirable but imperative. The confined working areas and extensive lighting used in most studio productions creates dead, dry air which causes performers and technicians great discomfort and reduces their physical and mental efficiency. Most electronic equipment (including cameras) generates a great deal of heat and performs more reliably in a conditioned atmosphere.

In audience studios air conditioning is necessary to prevent undesirable restlessness. Of special consideration is the conditioning of the seemingly unimportant space above lighting grid level. All air conditioning apparatus must be isolated against sound and vibration transmission.

Flooring

Most existing television studio floors are of concrete construction, finished with mastic tile, battleship linoleum, or some other type of covering. Such a flooring is neither practical or sensible for television and should be avoided.

It is often necessary to *spike* scenery and other items to the studio floor which means that wood is the only logical answer. At the same time, however, studio floors must be capable of supporting very heavy objects – occasionally two tons or more.

An ideal type of floor for television studios might be one of laminated wood construction supported on steel beams with at least 30 inch centres. The wood would be laid as readily removable panels about 3 feet square in size. A *false* floor would be constructed about four or five feet below the level of the main floor, and the panels utilized as *traps* for access to the lower floor. This plan would permit cameras and lights to work at extremely low elevation (angle) and would make possible many kinds of special effect techniques.

Mastice tile is perhaps as satisfactory as anything for flooring throughout the rest of the station, except in the workrooms where the floors get very rough use. Heavy carpeting is recommended for offices, lounges, dressing rooms and audience areas. But remember, it is ridiculous to have a permanent, highly polished attractive surface on studio floors.

Control Room

Each live-talent studio should be provided with its own control room. A multi-control arrangement whereby two or more studios are served by one control room has been used in radio broadcasting, but is definitely not desirable for television.

Equipment is generally set on two levels, with the director's console and audio equipment 2 feet above the video equipment. The room itself may be on the studio level or a full storey above the studio floor. A large double-glazed window, either mounted flush or inclined, allows the director a direct view of the entire studio. This is largely a hold-over from radio and is not absolutely necessary in television.

A control room should be at least 14 x 16 x 10 feet with the most efficient ventilation possible.

Announce Booth

The announce booth is a sound-proofed one-man studio usually placed so that the occupant can see into both the studio and control room although, if necessary, it can be completely separated from the studio and control room. In any case it will be equipped with an audio and video monitor for "blind" operation.

Client's Booth

Often referred to as "a necessary evil," a client's booth (or gallery) is included in the layout of most stations. Generally, a direct-view into the studio is provided.

Though this may be desirable it is not really necessary and an isolated viewing-room will be equally satisfactory. In small stations the manager's office may be equipped for sponsor viewing.

In the new WCBS-TV studios in New York, the sponsor's gallery is located in the control room behind the production personnel – a very unwise arrangement.

Audience Accommodation

In the majority of existing studios audience accommodation is not possible. Floor space is always at a premium and the congestion of equipment and personnel is so great that an audience actually benefits very little from being present. When a studio audience is definitely required by the nature of the show, temporary seating can be provided.

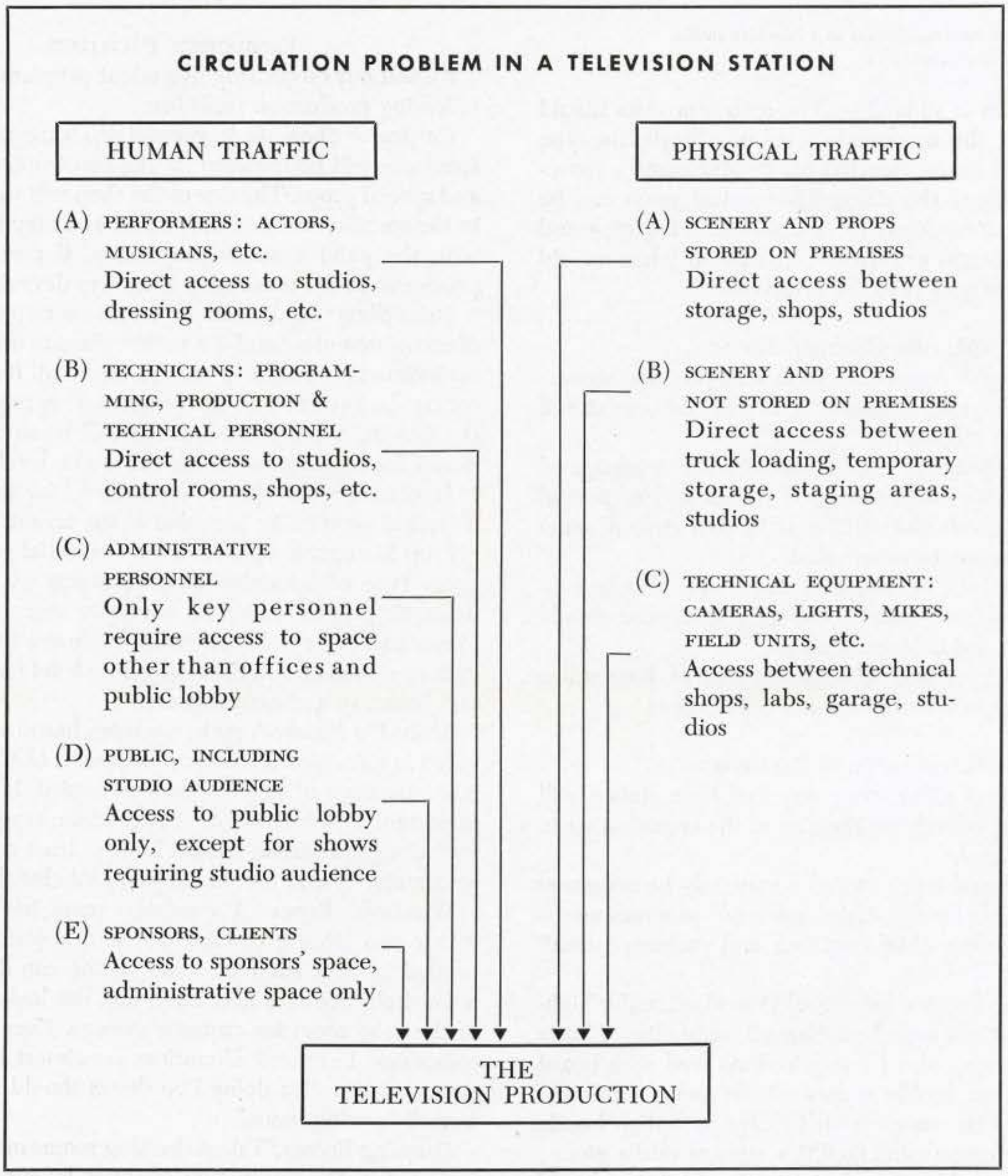
In buildings specifically designed for television an auditorium-type studio might be specified. The main studio of WABD, New York, is located in the former auditorium of the John Wanamaker department store, with balcony accommodation for some 700 guests.

Circulation

The circulation problem in a television station is a very complex one. Its solution requires properly co-ordinated facilities and an intelligently planned physical layout – one that takes into full consideration the production and operational procedures peculiar to the videographic art.

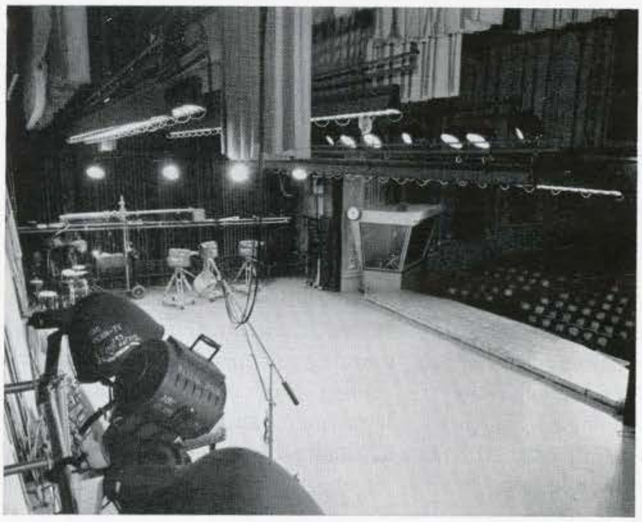
Human and physical traffic must flow easily and quickly through the plant. Split-second performances and close scheduling of programs demands that all departments, services and facilities be closely integrated with time loss kept to a minimum.

A full-service station should be designed with three separate entrances – one for administrative personnel and visitors, one for programming and production personnel, and the other for performers. Each entrance should have direct access to the department and facilities it serves. Admittedly, this is an ideal which will not always be possible.



Theatre Studios

Several legitimate theatres, (nearly fifteen in New York City alone), have been converted to television use with varying degrees of suitability. The orchestra seats should be eliminated, the floor made level or a burlesque-type runway should be constructed for greater camera movement to and from the stage. The control room can be placed under the balcony or in a side box. Lighting and acoustical problems are usually multiplied when an old legitimate theatre is used for television.



WENR-TV, CHICAGO.

A legitimate theatre converted for use as a television studio. Note location of control room.

Master Control Room

It is in the master control room that all program sources (studio, film, remote, network) terminate, are monitored and fed to the transmitter.

In many stations the master control room is separated from the studio control rooms; in others it is combined with studio control. The latter is particularly true of small stations but is not recommended.

In small stations, too, the film studio may also be controlled from master control, but this procedure should always be avoided in larger stations.

A room with at least 400 square feet of floor space should be adequate for all normal installations.

Administrative Facilities

The amount of office space required by a station will depend almost entirely on the size of the organization to be accommodated.

In a small (rural type) station it may only be necessary to provide offices for the station manager, program manager, sales manager, chief engineer, and perhaps a small general office.

Metropolitan stations require additional offices for high-ranking executives and departmental assistants. A large general office may also be required, as well as a board room (which can double as an audition room), employee lounge and lunch room, visitor's lobby, reception booth, telephone exchange, toilet facilities, storage vaults, etc.

Wherever possible, the administrative facilities should be kept separate from the programming, production and technical facilities.

Programming Facilities

Here again the size of the station and the scope of its operations will determine how extensive the programming facilities are to be. This is one department which may start very modestly and expand to great proportions. Therefore, due allowance should be made for possible expansion in the original layout.

A news room, music library, film library, film storage vault, traffic and continuity office are the basic space requirements. In the larger type of station a program manager's office and a number of smaller offices for production directors, writers and programming assistants will be required.

When space permits a talent lounge may also be included.

While programming facilities should be kept segregated from administrative and technical facilities, close proximity to the production department is desirable.

Production Facilities

All stations originating live-talent programs require the following production facilities:

Carpenter Shop: In larger stations a carpenter shop of some size will be required for the construction of scenery and special props. The size of the shop will vary according to the specific needs of the station and may be combined with the paint shop or prop room, if necessary. Close proximity to the paint shop is always desirable.

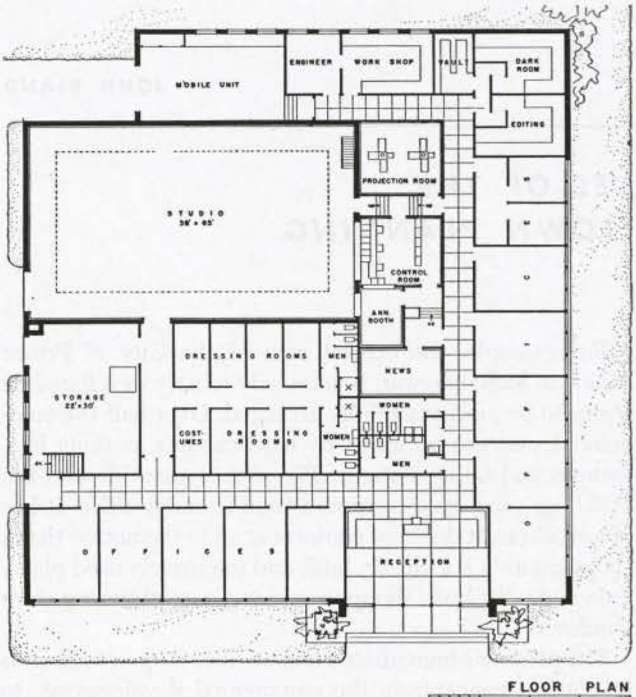
Paint Shop: All live-talent programs require some sort of scenic mounting and if a station plans to originate many such shows a paint shop will be essential. Its size will, of course, be governed by the programming requirements of the station. A basement location will be suitable if some means for hoisting scenery to the studio level is provided. It is recommended that a "scene-dock" for storing flats in a vertical position be included in the layout.

Prop Storage: Properties are an essential part of almost every type of television show. Stations which originate dramatic programs require adequate space to store furniture and other bulky items. A basement location is not as desirable as one on the studio floor level for many props will be heavy and cumbersome.

Make-Up Room: A make-up room has rarely been provided in television stations up to now. It has been omitted more because of neglect than necessity. Make-up is as important in television as it is in cinematography and a well designed station should have at least one room (approximately 8 x 12 feet in size) set aside for this purpose.

Wardrobe Room: A wardrobe room for the making, fitting and storing of costumes and accessories will be needed in large stations. Small station can dispense with a wardrobe room, if necessary, and use lockers or closets in the prop room for costume storage. Even though costumes may be rented, alterations are almost always necessary so any station doing live shows should have at least a small "sewing-room."

Dressing Rooms: Talent dressing rooms must always be included in the production facilities layout, the number and size depending upon individual requirements. Toilet rooms (preferably with showers) should be convenient to the dressing rooms.



RCA BROADCAST NEWS

Floor plan for an intermediate size television station. Note that a single control room handles all control functions. A basement under part of this building provides space for workshops, storage and heating equipment. Rene Brugnoni, Architect; Ben Adler, Facilities Consultant.

Technical Facilities

Regardless of the size of the station a technical workshop and test laboratory is required. One good size room (at least 20 x 12 feet) will effectively serve most operations. A storage room large enough to accommodate shelving and bins is also required. In the larger type of station a chief engineer's office, two or more smaller offices for technicians, a technicians' lounge and washroom (with showers) might also be specified.

Technical facilities should be kept separate from administrative and programming facilities.

In Conclusion

Television broadcasting, as an art and as a science, still has a long way to go. New production techniques are being evolved almost daily and more efficient and reliable equipment is being introduced at a rapidly increasing rate. The advent of full-color television is perhaps a great deal closer than most of us might believe. The possibility of telecasting in stereoscopic relief cannot be ignored either. Public acceptance of the medium is most assuredly keeping pace with the construction of stations. National networks will be a reality within months. International networks are not too distant, and may be practicable within the next five years. Yes, television, in spite of its many years of development is still being born!

The architect's place within the realm of television is a very real and vital one. He can contribute immeasurably to its prodigious potentialities. The architect must be given greater scope and more trusting responsibility by the television broadcaster. But he must earn that trust!

In creating an efficient and functional television station the engineer must put in his best ingredients, the production man his best ingredients, and the commercial man his best ingredients. It is up to the architect to mix the ingredients, adding his keen judgement and compromising skill, and in the end produce the best possible combination of all three.

Acknowledgement

The author wishes to thank the following individuals and organizations for their generous assistance in compiling the information contained in this paper, and for permission to reproduce drawings and photographs:

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JOHN BLAND

SOME INFLUENCES OF THE SOCIAL SCIENCES ON TOWN PLANNING

MOST PEOPLE who are concerned with the growth and development of towns agree that there are countless social and economic forces which are continually determining their pattern. However, most planners base their proposals upon the idea that an aroused public opinion alone can produce a change in the urban pattern, even in the face of the more or less automatic determinative forces such as those that establish land values or land uses. Is public opinion then, any different from other forces? Has it to be continually refueled in order to maintain its effectiveness? How much can we depend upon it to enforce a plan?

A few years ago a topic of this sort was disputed in a number of planning seminars at McGill. These discussions arose out of a review of "Land Use in Central Boston," by Walter Firey, presented by one of the planning students who happened to be a candidate for a master's degree in sociology. The discussions were mainly sociological, and I recollect that the sociologists agreed that Mr Firey was talking through his hat, and their conviction, that the forms of towns are precisely those that suit the circumstances and the selective forces that have been at play, was upheld. Zoning laws, preservation covenants even public opinion fired by the most sacred motives have fallen at the auction block to a sufficiently tempting bid. Priceless historical monuments, hallowed burying places, even temples are known to have vanished in most cities in exactly this way. Cities are dynamic. Conditions and attitudes change. Our sociologists say there is little that a planner can do, but they add, it is most important that he should do that little bit.

For those of us who are sometimes called upon to make suggestions for the improvement of a town pattern, there is some dissatisfaction in accepting the point of view that the pattern as it exists is a perfect expression of conditions. Most of us can visualize many alterations to towns that we presume would be better for specific reasons, and it is often difficult to accommodate the fact that what exists has any justification. It is hard too, to accept the idea that only a little can be done. However, believing that the practice of town planning will advance by using information that social scientists have sifted and established, it would be useful to determine some limits within which proposals can be made which are not ideological or doctrinaire and which could be adopted effectively without displacing the forces that exist.

For example, the central area of the City of Prince Albert in Saskatchewan is extremely loosely developed. It seems to be most wastefully arranged. Over half the commercial sites are occupied by used car lots, parking lots, garages and filling stations. The streets are wide and the buildings seem gaunt exposed from so many sides. It has a barrenness. It does not conform at all to the notion that a shopping area is a closely built and intensively used place, crowded with busy shoppers moving past glittering store windows.

The planner's immediate reaction, based upon feeling, is to plan to concentrate the commercial development; to forbid service stations to occupy corner sites; to group parking lots on the fringe of the commercial area; to require some urbane conformity in the height and façade treatment of buildings abutting upon the principal streets; to secure ample pavements for pedestrians; to arrange convenient loading and unloading places for public transport vehicles; to obtain brilliant illumination for the area at night; to obtain the elimination of unsightly poles and overhead wires; in other words to obtain positive civic definition for the most important functional area in town. These are laudable sentiments, but ideological, they fall into the category of ideas that would be good for the other fellow. They are also doctrinaire. What town planner has not got doctrines concerning the best manner of developing specialized areas? These suggestions follow general town planning practice but they appear to be in opposition to what our sociologists consider possible.

Can one actually forbid a corner site to one of the Canadian oil companys? Can one reject a proposal by a national chain store to establish itself three or four blocks away from the intensively used section and to surround itself with bleak yards for customer parking, on the grounds that it will inconveniently increase the spread of a commercial area? Can one refuse to tolerate a bulky federal building that squanders valuable commercial frontage on the best shopping street and pays no municipal tax? Can one deny speculators the right to hold precious central area property in a shabby or undeveloped state pending an ultimate sale at a killing price? Can one eliminate dilapidated and overcrowded rooming houses and the like? Tough business forces are involved in these which are known to have plenty of resistance to interference.

In my opinion a forthright statement of a planner's feeling upon such matters of development, and an imaginative sketch of how a town could be ideally, are useful to motivate public opinion, to influence private developers, to facilitate purposeful public expenditures and so on. In this way, some forces are set up to compete with the circumstances that have established and maintained the existing pattern. However, completely successful achievement is a lot to expect by this method. Town planners are not usually accorded the widespread sympathy and influence that planning of this sort presumes.

What more can be done? For instance how far can we get by examining the reasons behind the existing pattern of Prince Albert, which appears superficially to be so inconvenient and so uncivic? Why is it spread out? Why is so much land devoted to car lots, service stations and so on? The answers are not difficult to find. In fact, nearly every detail of the existing pattern can be described and accounted for. For instance, the city serves a wide rural area, in which the private motor car is the dominant means of communication. For most country families a good part of a day in town is spent in negotiating some auto repair or other. The garages also supply accessory articles for mechanical farming equipment. Farm appliances are sold through garages and are displayed in yards adjoining them. So, what appears to be an incredible waste of land has a purpose. Even the apparent chaotic arrangement is suited to many needs; – woman shops, while man watches car repaired; – car sits in friendly oil station yard while occupants ply to and fro with purchases. There is no doubt that the car is an extraordinarily important factor in the pattern of Prince Albert. It has not been accommodated very civicly and many inconveniences have resulted for the ordinary townsman. But the fact remains that a significant number of shoppers come into the central area of Prince Albert in motor cars. Their habit is to park their car as centrally as possible where it can be employed as the group headquarters for individual shopping or business expeditions during the time in town. Before the garage and parking lot there were numerous stables where teams could be sheltered and fed. So there is some tradition in the matter as well.

Furthermore the farm machinery which is sold during the seasons, right in the central area of the city would require acres of floor space, were it to be displayed in buildings. The techniques of sale involve a certain amount of demonstration which needs further space. It is essentially a commodity that is most suitably sold in yards. Yet the huge cost of some of the major items suggests the necessity of negotiating sales close by banks or lending companies. Tractors and combines on display in the centre of town have advantages.

These services have grown amid shops, offices, cafés, and movie theatres, apparently using any space available but at times competing successfully with the more accepted uses of the central area. Filling stations often have large corner sites and the best car lots may adjoin the most prominent stores. However the majority of the yards are a little removed from the highest value frontages, and when they do abut a main street a real estate agents sign often indicates that they are a temporary use pending the sale of land for some more intensive purpose.

Can proposals for improvement of appearance and convenience be based upon the acceptance of large open spaces in the heart of a commercial area? The spaces themselves could be gracefully shaped, planted to provide some shade trees, and verged or screened to subdue their untidy aspects and to give emphasis to their prominent commercial use. Adjoining such areas the intensively developed commercial street of normal shops could lie. In this way a plan could be drawn for Prince Albert, accepting and using circumstances which at first appear so disintegrating.

By carefully observing and using existing tendencies, perhaps plans can be made for towns which depend less upon propaganda or legal restriction, but more upon releasing the energies inherent in popular practices.

How can one release energies in planning? The following instances are suggestions of how this idea can be put into practice. By the use of natural barriers as zone boundaries, a factor in the natural patterning of urban areas is purposefully employed. Natural barriers are physical features, steep hillsides, riverbanks, etc. or railway lines, main traffic streets, large parks, religious institutions and the like. They form lines of division between areas having particular attributes. They isolate specific land uses. They interrupt the spread of change. They are boundaries for land value categories. Their use is obviously more reliable as a zone boundary than an arbitrary line drawn upon a map. With experimentation such techniques may be greatly expanded but from this point one can only suggest a few things that could be tried.

Take the example of the ubiquitous corner filling station with a couple of hundred feet of unrestricted pavement crossing, the bane of the town planner, aesthetically and from the point of view of good traffic circulation. Such stations are intended to attract the public, to serve the motorist. They often have large sites, gravelled or paved, with a small gaily painted office. If a competent traffic engineer were given the problem of designing them with the objective of improving the traffic circulation at the places where they occur and he were given a free hand to use their area for both the public and the private purposes. Would this not meet with public approval, be excellent public relations, good business, good planning and a release of an "energy"? Why should a service station not be placed on an island? They have no contact with pedestrians. In such a position they would cause the least interference with traffic and have the greatest accessibility to potential customers.

It is so obvious that the parking lot is bringing open space of a sort back into the hearts of cities, it seems unnecessary to point out that its disposition and arrangement is full of architectural potentialities. If it is well handled it can be a further example of what is intended by the idea of planning for a release of energy.

The planning of Canadian cities requires patient enquiry in order to discover actual social and economic circumstances and the relative values that people have. The planner's most important tools are methods of obtaining a knowledge of circumstances and techniques for using it.

No two of our cities are really alike, much less like any cities abroad that one may find in the planning literature. Sudbury is a town that has a reputation for stark ugliness. The smelting operations have caused fumes that have killed all vegetation over huge areas outside town. People who know it speak of its barren and desolate aspects, others imagine it to be worse than any fouled industrial town that they have experienced. For those who have an absolute standard of "the town beautiful," Sudbury must be a hopeless failure. However, if one accepts Sudbury for what it is, one finds it a fascinating place. Even the barren areas, the bald and weather beaten rocks, the scarred eroded valleys, the sterile ponds have a wonder about them, as it were illustrations of the story of the beginning of the world. The colors of the rocks are extraordinary and the sky is often richly tinted by the fumes. Someday a painter will discover the strength, boldness and warmth of color of this strange part of Canada and people will be able to enjoy it for what it is, without fear that their cherished ideals concerning what is beautiful will be undermined.

The smelting plant at Copper Cliff near Sudbury is an amazingly monumental complex of buildings. The huge stacks must be the highest brick towers in the world. At night the glow of the furnaces makes the scene positively spectacular; if it is at all cloudy the volcanic action of the tipping of slag illuminates the whole sky.

Contrary to the popular notion, the actual town of Sudbury is set in a valley which is green and fruitful. Its pattern is abruptly articulated by rocky promintories. On the south side of the town there is a fine spacious lake which is extremely well used. Many families have summer cabins along its shores and on its numerous islands, and large stretches of beach are public.

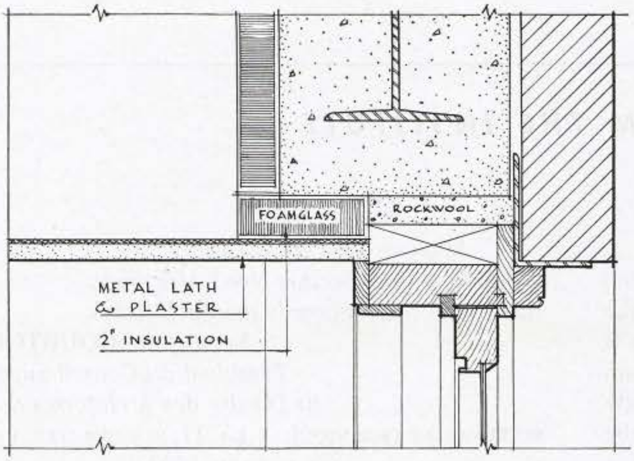
Sudbury has the highest per capita income in the country. Its people are healthy, well fed, well dressed and have many facilities for enjoyment. Those who think of Sudbury as a depressed, desolate place are wrong. It is, in fact, a lively characterful town, in part spectacular. Many thoughtful people there are concerned with its development as a good place to work and to enjoy living.

Another distinctive Canadian city is Edmonton which is fabulous. Fur, lumber, meat, and oil in turn have enriched, and vitalised it. It is a transport centre with a huge and incredibly wealthy northern hinterland. Few cities anywhere have more favoured circumstances. At the moment people in Edmonton are busy exploiting their latest treasures but at the same time, some are aware of the destiny of the City and are attempting to set a pattern for its certain growth. There is no doubt that Edmonton will rival the old established centres of power, leisure and culture. The Government of Alberta intends to see that a good share of the present harvest stays home. Oil in Alberta is not going to be exploited in the old fashioned colonial way. This means that public works on a massive scale are going to be possible. Having enough money to do things which are obviously necessary and a good deal more will have a distinct effect upon the life and manners of Edmonton.

All our towns are vigorous. They may be growing too rapidly to be fully aware of themselves, and in part somewhat clumsy and lacking in mature graces. We must try not to confuse initial development for deformities, and w should not expect growing towns to have an elegai t leisured citizenry versed in the conventional urbanities. Some of our towns are like an adolescent. They need sympathetic approval of their good qualities and freedom to be proudly aware of themselves and of their potentialities. Plans in the form of prejudiced and irrelevant images requiring disciplined conformity will produce eccentricities if there is the power of enforcement, and wasteful, abortive confusion otherwise.

This article commenced with a discussion of the idea that circumstances were the causes and the urban pattern the effects, and that planners had to find ways of working within the framework of circumstances, possibly at times deflecting them or using them as means in order to improve conditions. To compare the personality of towns with the human personality may be a useful way to illustrate that if their development is to be guided, the guiding must be performed by persons who understand and accept them and can help them to be self confident and not encourage them to have delusions or shame them into adopting pretentions patterns. The mature development of towns depends upon the elimination of absolute arbitrary principles which defy thoughtful consideration, the unprejudiced examination of circumstances, which are neither good nor evil but facts, and an awareness of the future which is forming now and can be affected.

The brief opportunities that I have had in getting to know a little of the spirit and form of our towns has made me aware of their immense variety. I am confident that when our rough little towns mellow into mature, self confident, graceful places, the townscape of Canada will rival its landscape.



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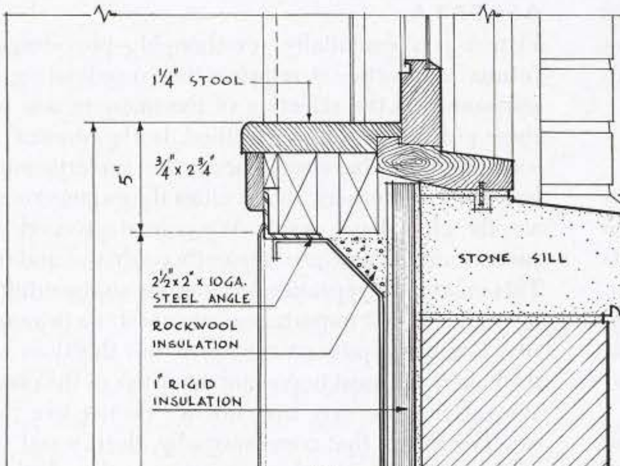
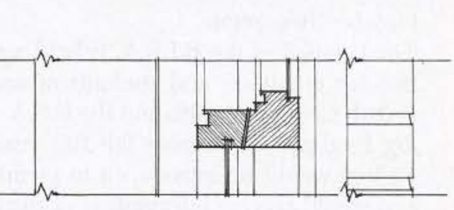
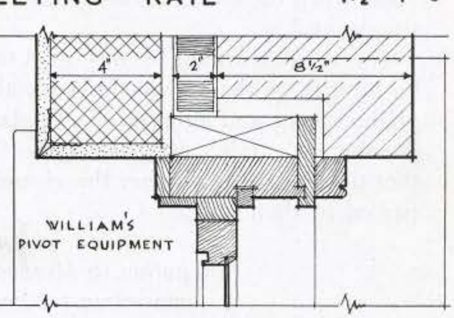


SILL AND RADIATOR RECESS



MEETING RAIL 1½" - 1'-0"



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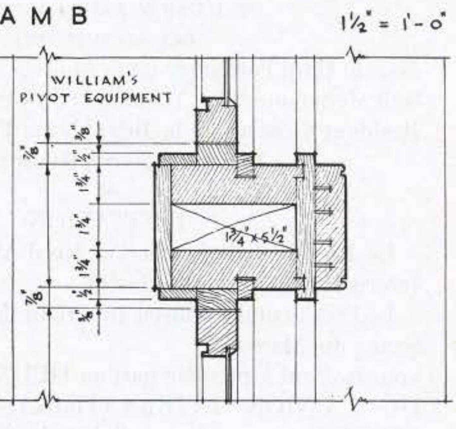

MULLION 1½" = 1'-0"

DOUBLE HUNG WINDOW

HOSPITAL FOR SICK CHILDREN TORONTO

GOVAN, FERGUSON, LINDSAY
KAMINKER, MAW, LANGLEY, KEENLEYSIDE,
ARCHITECTS TORONTO

NEWS FROM THE INSTITUTE

Netherlands Scholarship

Advice has been received from the Information Division of the Canadian Department of External Affairs that the Netherlands Ministry of Education, Arts and Sciences is offering a scholarship of fl. 2,000, with an exemption from university fee of fl. 325, to a Canadian national for study over a ten months period in the Netherlands during the academic year 1951-52.

Candidates may be university students, research workers, architects, painters, musicians, etc. Applications should be made to the Netherlands Embassy at Ottawa and supported by recommendations from scientific, cultural and educational authorities.

October Reception

The Council of the R.I.B.A. is holding an informal reception for architects and students of architecture from the British Commonwealth and the U.S.A. who might be visiting England on October 9th this year. At this reception visitors would be introduced to members of the R.I.B.A. and would receive information of the facilities and assistance which the Institute can give to visiting members of the profession.

The R.I.B.A. would be very glad to hear, through the Secretaries of the Provincial Associations of Architects, of the names and addresses in England of any R.A.I.C. members who might be planning to visit England around that time and also whether the visitors would be accompanied by their wives.

Invitation to Morocco

DEUXIÈME CONGRÈS
DE L'UNION INTERNATIONALE
DES ARCHITECTES

Sous le Haut Patronage de sa Majesté le Sultan du Maroc, Sidi Mohammed Ben Youssef, et du Général d'Armée Juin, Résident Général de la République Française au Maroc

Rabat, 23-30 Septembre 1951

*

INVITATION

Le Président de la Section Nord-Africaine de l'Union Internationale des Architectes,

Le Président du Conseil Supérieur de l'Ordre des Architectes du Maroc,

vous invitent à prendre part au DEUXIÈME CONGRÈS DE L'UNION INTERNATIONALE DES ARCHITECTES qui aura lieu à Rabat du 23 au 30 Septembre 1951.

Vous trouverez ci-joint le Programme provisoire et le Règlement du Congrès, ainsi que le programme des voyages d'études et excursions organisés à l'occasion du Congrès.

MARCEL LATHUILLIÈRE,
Président de la Section Nord-Africaine de l'Union Internationale des Architectes.

ALEXANDRE COURTOIS,
Président du Conseil Supérieur de l'Ordre des Architectes du Maroc.

SECRÉTARIAT TECHNIQUE : U.I.A. 11, RUE BERRYER, PARIS VIII^e
C.C.P. PARIS 5692-32

ALBERTA

Planning is essentially forethought,—providing for the future. In practice it requires the co-ordinating of many purposes and the selection of the many means by which these purposes are to be fulfilled. In the physical field our social purposes have some needs that underlie and are the bases of many others. In our cities the engineering utilities are the chief basic needs. We cannot proceed with any success unless these are efficiently contrived and operated. This creates a temptation to consider engineering work to be of the highest importance because it is a primary necessity. Bread is a primary necessity, but this does not make the bakers the most important members of the community. We eat that we may live, but we do not live merely to eat. The things that come secondly, thirdly and so on are of rising importance the more they approach the mathematical "n,"—our ultimate and unattainabe ideals. In comparison with the ends for which we live, the basic engineering requirements and the bread that sustains us sink into insignificance.

There are necessarily continual tensions in the minds of planners between the basic and the ultimate objectives. Engineering enterprises throw up vast heaps of refuse, slag, shale, mine derricks and heaven knows what, devastating the beauty of nature. The doers of these things, and to some extent the public generally, look upon these horrors with complacency because of the physical benefits to which they are incidental. On a minor scale, and touching architects more nearly, we have the sky over our streets webbed with power and lighting wires supported on poles often burdened with unsightly contrivances to the great detriment of the appearance of our cities. Inside our buildings, if the architect's restraining hand is not applied, heating and plumbing pipes and other gagets run rampant and to the merely mechanic mind these even appear to give much joy. The general public does not much care. But such things distress the architect's orderly mind. It is the function and duty of the architect to be distressed by them and when he succeeds in allaying these evils his clients applaud and are pleased.

To be just in this matter, engineers of all sorts do, when their attention is called to these troubles, sympathise with the effort to correct them for, after all, they also are God's creatures and wish to please their fellow men. But attention needs to be called to these things or they will not be corrected. When this is done we get our piping silvered over with aluminum paint or, much better, put into suitable place. Mechanics and manufacturers also respond nobly to the requirements of the architect. One embarrassing result of these noble efforts is that floods of trade information flow into architects' offices in such quantity as would be bewildering if paid much attention to. It is to be devoutly hoped that the two-cent postage will diminish the blizzard that has been blowing in so many one-cent fliers whose only possible destiny was quick disposal in the waste basket.

The mere selecting of the right things and the orderly arranging of a place for everything and everything in its place is the major part of the architect's daily toil. It may be asked whether this sort of work really serves the high purposes of art. It is just tidiness raised to a high plane. Tidiness is a virtue hated by men and dear to women. Yet it should be treated with sincere respect, mingled no doubt with a little superficial contempt. The multitudinous ideas that beset the minds of men if uncontrolled by art produce a crazy world. By means of his high art the architect controls these ideas, keeps the world sane, smooths the path of life and in short to use the words of the poet "his oil-can soothes the worrying cranks."

Cecil S. Burgess

SERVING SICK CHILDREN

(continued from page 158)

The foregoing are perhaps the more interesting features in the new building but, throughout the hospital, areas and departments have been set aside for special purposes. For instance, on the sixth floor there is a complete metabolic unit for the study of diabetes, nephritis, and related conditions. The dental department has been carefully planned with the faculty of dentistry, not only for the treatment of patients, but also for conducting research and teaching. Visual education has been provided for and there is a new and well-planned unit for the study of genetics. There is a complete blood bank unit on the laboratory floor and closely united to the x-ray department is a separate unit for the study and diagnosis of heart conditions.

As Part I of this article related, the Hospital for Sick Children was founded in 1875 in an ordinary dwelling house which could accommodate only six patients. Through the years it has grown in size and in service. It is sincerely hoped that this new hospital, on which members of the hospital's organization have spent so much effort, may continue to serve children in a fuller and better way than it has ever done before.

BOOK REVIEW

DESIGN FUNDAMENTALS by Carol J. Felsted, B.A.E., F.F.A., M.F.A., published by Sir Isaac Pitman & Sons (Canada) Ltd, 383 Church St, Toronto, $5.00.

With an obvious sense of organization and a thoroughness of approach, Miss Carol J. Feldsted has produced in her recently published book, a document of great value and interest to both amateur and professional students of any art or craft involving design.

Miss Feldsted, a graduate of the Art Institute of Chicago and now studying at the University of California, has during the past three years as an instructor in the School of Architecture at The University of Manitoba developed a series of lectures and practical exercises in basic design principles for first year students in architecture and in interior design. These have formed the basis for her new book which, while presented as a series of theoretical discussions and exercises to be done, is more than a mere classroom text. It is well illustrated with analytical diagrams by the author as well as by student problems which have been carefully selected to indicate the purpose and possibilities of each of the projects described. In format and layout, the book demonstrates clarity of vision and efficiency of organization, both fundamental to the understanding as well as the application of design principles.

Whether one is seeking to understand the visual elements of design seen in paintings, advertising, furniture, etc., or is training to practise as a creative designer on one of the fine or applied arts, this book provides a simple but effective approach to visual design. This approach is basic and applies equally well in the spheres of painting, sketching, illustration, advertising, or design as it affects textile, jewelry, engraving, lithography, showcard writing and other related professions.

Following the exposition of the principles of design, which, together with the lesson-demonstration outlines, comprises the first section of the book, there are sections devoted to Pattern Design, Advertising Design, and Pictorial Design, each with its analyses of design principles as applied to these specific fields. The latter section on Pictorial Design analyzes the composition and movement in twenty-four world famous paintings, both historical and contemporary. In her concise descriptions and diagramatic sketches, Miss Feldsted has provided an approach to art appreciation and analysis which is both lucid and fascinating. Thereby she explains her thesis that "art is design," – that "it is the basic orderly structure through which expression finds its forms." Some may take exception to this contention that the design pattern, whether static or dynamic, is always the principal agent in expressive art; but they will readily admit that Miss Feldsted has been consistent in her approach and has thereby accomplished her purpose.

This book has been written and published as a book for the specialist, but even the most casual reader will find its perusal both interesting and instructive. It has both visual and intellectual appeal and will serve to introduce its readers to a new understanding of the principles of design which have been basic to all art forms down through the ages and which are today responsible for our twentieth century creative arts, both fine and applied. Miss Feldsted, in creating her book DESIGN FUNDAMENTALS, has given the student a pattern for progress and has demonstrated the way in which it can be accomplished. She has also given the reading public the opportunity for a stimulating experience, at the same time removing much of the mystery from design.

John A. Russell

CONTRIBUTORS TO THIS ISSUE

Harry H. Angus graduated from Toronto University with the degree of B.A.Sc., in mechanical engineering. After graduation he spent about ten years in the United States with several engineering firms as draftsman, designer and supervising. He returned to Canada about 1913 and opened an office as Consulting Engineer on mechanical work and operated under his own name till six years ago when the firm of H. H. Angus & Associates was formed to bring members of the staff into the firm.

Mr D. L. Angus, B.A.Sc., was in charge of the electric work and Mr A. F. Edwards the other trades on the Hospital for Sick Children.

John Bland, born November 1911, Bachelor of Architecture, McGill University 1933. Later studied at the Architectural Association School in London and obtained the A.A. diploma in planning in 1937. Associate of the Royal Institute of British Architects, Town Planning Institute, and the Province of Quebec Association of Architecture. Macdonald Professor of Architecture, McGill University. 2nd Vice-President of the P.Q.A.A.

Joseph H. W. Bower, B.A.Sc., M.E.I.C., was appointed superintendent of the Hospital for Sick Children in 1928. Immediately he began studies for the new hospital, having had considerable experience in such planning. Due to the depression of the thirties and World Ward II, the project had to be abandoned until 1945.

Clare D. Carruthers was born and raised in Canada. Educated at Port Hope High School, Toronto Night Schools and University of Toronto. Graduate SPS 1927. He has worked with Toronto Harbour Commission on Sunnyside Development, with Truscon Steel Company of Canada Limited, and with Geodetic Survey of Canada. Mr Carruthers has been associated with Gordon L. Wallace in a senior capacity for years and is now a Principal in the firm of Wallace, Carruthers & Associates Limited, Registered Professional Engineers (Ontario), Structural Consultants.

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Mr Govan's hospital work dates back to the Ontario Government Mental Hospital at Whitby, started in 1912, and the firm's practice includes work in every Province in Canada except British Columbia, and consulting services on Hospital and Institutional Developments for State of New York and New York City Hospital Commission; State of New Mexico; Welfare Department, City of Cleveland, Ohio; and National Committee on Prisons and Prison Labor, New York.

Andrew N. McLellan was the Co-ordinator, First Canadian Television Clinic (1950). Member: Society of Motion Picture and Television Engineers, Television Society (British), American Television Society, British Film Institute. Graduate: Television Workshop of New York (1948). He was formerly Director of Television, Academy of Radio Arts (Toronto) and at present is Television Consultant and Program Producer.

Gordon L. Wallace, Ontario born and educated. Graduated from University of Toronto, SPS 1912. Worked with various steel companies, contractors and consulting engineers for several years. Some years on SPS staff and later as Designing Engineer for Canadian office of Thos W. Lamb, New York theatre Architect. Commenced practice as Consulting Engineer in 1921. Business name changed by incorporation in January 1950 to Wallace, Carruthers and Associates, Limited.