University of Adelaide

Official Opening

of the

Johnson Chemical Laboratories

By

The Honourable Mr. Justice Angas Parsons

June 12th, 1933

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OFFICIAL OPENING AND INSPECTION

OF THE

JOHNSON CHEMICAL LABORATORIES

JUNE 12TH, 1933

THE ERECTION OF THE CHEMICAL LABORATORIES WAS MADE POSSIBLE THROUGH AN ENDOWMENT BY THE LATE CAPTAIN RONALD LINDSAY JOHNSON, R.F.A., IN COMMEMORATION OF WHOSE NAME THE BUILDING HAS BEEN CALLED "THE JOHNSON CHEMICAL LABORATORIES."

CAPTAIN JOHNSON WAS BORN IN ENGLAND IN 1889, AND WAS EDUCATED AT ETON AND AT CAMBRIDGE, WHERE HE TOOK AN HONOURS DEGREE IN CLASSICS. HE CAME TO AUSTRALIA IN 1912 IN CONNECTION WITH HIS FATHER'S BUSINESS, OF WHICH HE LATER BECAME MANAGING DIRECTOR IN ENGLAND. AT THE OUTBREAK OF THE WAR HE RECEIVED A COMMISSION IN THE ROYAL FIELD ARTILLERY, AND WAS KILLED ON ACTIVE SERVICE IN MAY, 1917. CAPTAIN JOHNSON WAS A GRAND-NEPHEW OF JOHN HOWARD ANGAS, WHO FOUNDED THE ANGAS CHAIR OF CHEMISTRY IN THIS UNIVERSITY.

THE LATE PROFESSOR EDWARD HENRY RENNIE, ONE OF THE PIONEERS OF CHEMISTRY IN THIS STATE, OCCUPIED THE ANGAS CHAIR OF CHEMISTRY FROM ITS INCEPTION TO THE YEAR 1927 — A PERIOD OF FORTY-TWO YEARS. IN HONOUR OF HIS MEMORY THE MAIN LECTURE THEATRE OF THE NEW LABORATORIES HAS BEEN CALLED "THE RENNIE LECTURE THEATRE," AND A BRONZE TABLET PLACED ON THE WESTERN WALL OF THE THEATRE BEARS THE FOLLOWING INSCRIPTION: "NAMED IN HONOUR OF EDWARD HENRY RENNIE, M.A., D.Sc., FIRST ANGAS PROFESSOR OF CHEMISTRY, 1885-1927."

Captain Ronald Lindsay Johnson
1889-1917

THE JOHNSON CHEMICAL LABORATORIES

For some years past, the quarters provided for Chemistry in the Prince of Wales building of the University proved to be quite inadequate for the growing needs of the Department. Realizing this, the Trustees of the Johnson estate made over the Johnson endowment as part provision towards future accommodation for Chemistry. The capital value of this endowment was set aside by the Council of the University until such time as further funds were available.

In the winter of 1932 the Commonwealth Government made a grant of £12,000 from its Unemployment Relief Funds, on condition that the money be devoted to labour employed in the erection of chemical buildings, and that the work be put in hand forthwith. Both conditions were fulfilled, and in keeping with the spirit of the latter the following dates are of interest:

The grant was made on July 13th, 1932.

Excavations and foundations were begun on August 7th, 1932.

Tenders for the main building closed on September 5th, 1932.

The building was occupied and the first lectures given on March 16th, 1933.

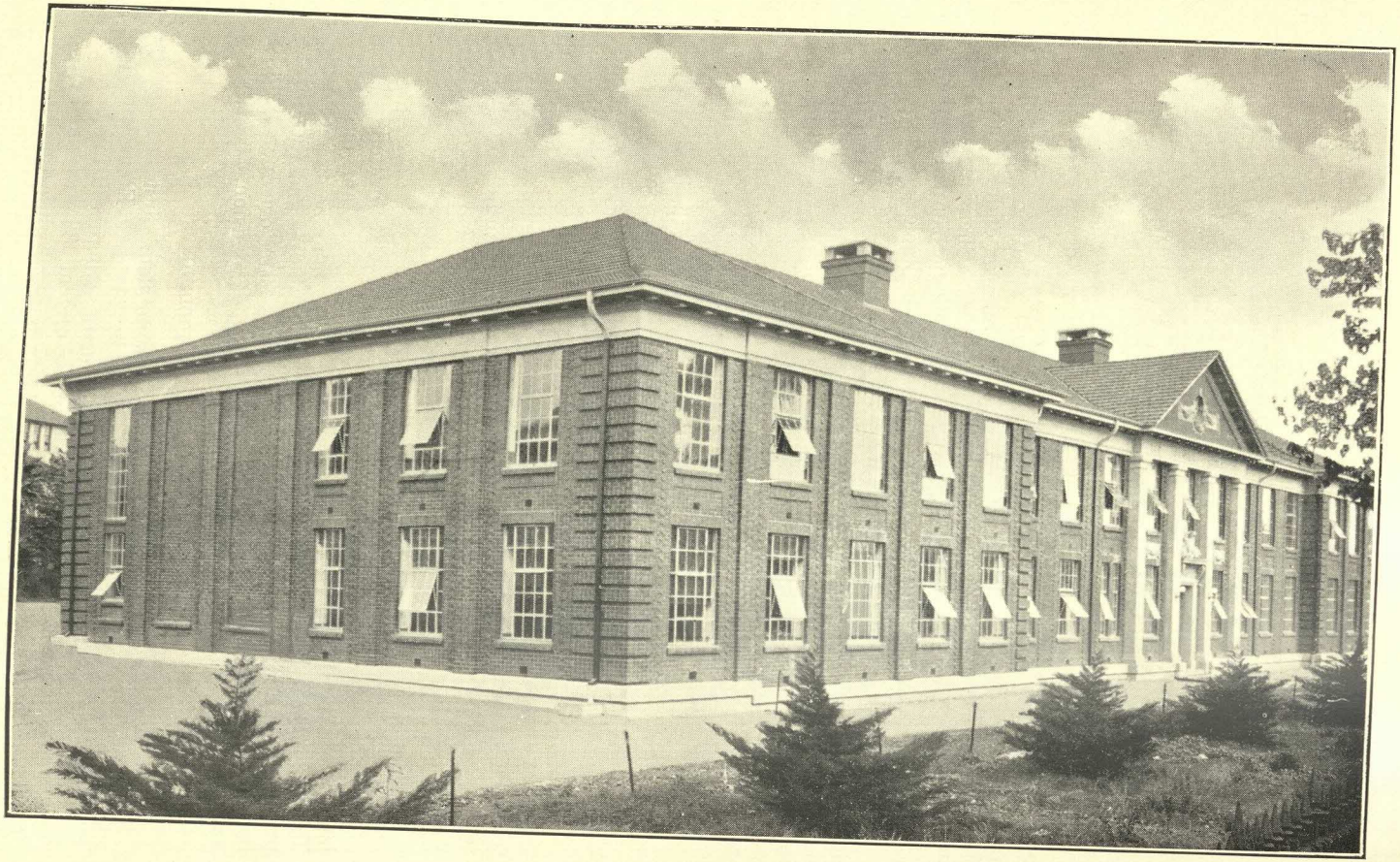
Practically the whole of the material and fittings used in the structure are of Australian manufacture, and the University wishes to acknowledge the hearty co-operation of the architects and contractors in accelerating the work.

The Site.

Situated in the north-west portion of the University grounds, the laboratores have a frontage of 200 feet to Victoria Drive, and face the Torrens River. The site is an eminently desirable one, being in close proximity to the Refectory, the Lady Symon Building, and the Barr Smith Library. The grounds offer facilities for suitable ornamentation, and are large enough to allow for future building expansion.

Dimensions and Type of Building.

The building consists of a basement, ground floor, first floor, and attic, the overall dimensions being 200 feet by 74 feet. Elevationally the architecture is simple and direct, the main structure being brick, with a central portico and entrance in white cement. The base and entablature under the eaves are also of white cement, while the roof is



THE JOHNSON CHEMICAL LABORATORIES.

covered with variegated tiles of the Marseilles pattern. The colour scheme is thus in harmony with the buildings in the vicinity stretching along the river frontage from the Nutrition Laboratory to the Barr Smith Library.

The internal walls are constructed of brick, and the floors and stairs of reinforced concrete. Full regard is paid to natural lighting, so necessary in a modern building of this type. The window space is decidedly generous, every room (except those designed to serve as dark rooms) receiving its full quota of daylight.

Leading Features of the Building.

Both in the building and in the equipment opportunity was taken to incorporate those modern features that make towards convenience and efficiency in a chemical laboratory, at the same time keeping details as simple and inexpensive as is consistent with satisfactory service.

Some of the outstanding features are summarized below:

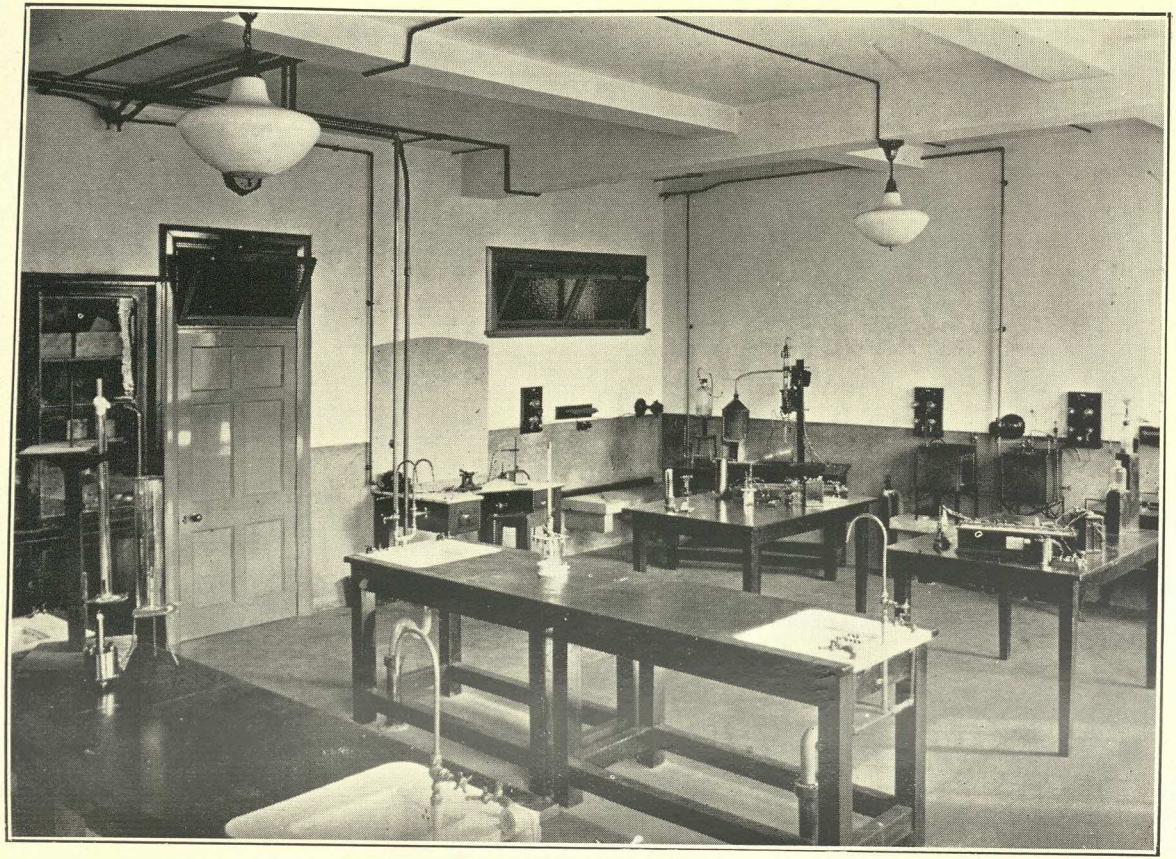
Ventilation — A double system of ventilation is installed, first to supply fresh air to those rooms which are occupied by large classes, and second to remove obnoxious and poisonous gases from the various laboratories. The motors, ducts, and exhausts for these systems are placed in the attic.

Fume hoods — The fume hoods for the collection and removal of noxious gases are of generous dimensions, and are distributed amongst the several laboratories. They are furnished with gas, water, and light, and are designed on the same pattern as those evolved and adopted in the Baker Laboratories of Chemistry at Cornell University.

Distilled water — Distilled water, of which large quantities are used, is produced in the one large plant, situated in the attic. The unit is of the latest design, being of the electrolytic type, in which impurities are removed by electrolysis. The purified water is passed into a storage tank (also in the attic), from which it is distributed, through tin pipes, right through the building.

Power points — Both direct and alternating current are available, and where confusion might possibly arise the points carry a distinguishing A.C. or D.C. label. Furthermore, all points also carry a distinguishing number corresponding to their fuse number on the switch board; fuse failures are therefore remedied with a minimum loss of time. All electric conduits are exposed and placed in easily accessible positions, the A.C. power conduit being painted red, the A.C. lighting black, while the D.C. conduits are painted brown. Breakdowns are thus readily picked out and replacements made with despatch.

Pipe lines — The gas and water pipes are also exposed and easily accessible, and likewise have their distinguishing colours, green and grey respectively. The drainage pipes which run through the floor are made of earthenware, to resist the action of chemicals, and are laid in waterproof concrete ducts.



THE PHYSICAL CHEMISTRY LABORATORY.

underground, keeping deterioration to a minimum. Moreover, it permits the segregation of chemicals of a more dangerous nature, and these are kept in a separate room, specially designed for the purpose, and situated well away from the general stocks.

A chemical stock book is kept, fitted with detachable cards, one for each particular chemical in the department. These cards are periodically checked, and the annual indent made out from them.

The Workshop.

This room is equipped with a lathe, a band saw, and the necessary tools. Like the chemical store rooms, it is provided with windows opening on to a light-well running along part of the southern wall. Here odd jobs of carpentering, fitting and turning may be done, although the workshop itself forms but an adjunct to the general workshop of the University, which is situated in the Physics Building. All glass-blowing and glass repairs are done in the general laboratories at blow-pipe tables provided for the purpose.

(B). THE GROUND FLOOR.

On the ground floor are the various private offices and laboratories of the staff, the Rennie Lecture Theatre (extending up through the first floor), an advanced lecture theatre seating about fifty students, the physical chemistry and electro-chemistry laboratories, the advanced inorganic chemistry laboratory, the general apparatus room, the departmental library, a locker room for the use of students, a gas analysis room, three dark rooms, and a small hydrogen sulphide room furnished with powerful exhaust. Some of these rooms receive further comment below.

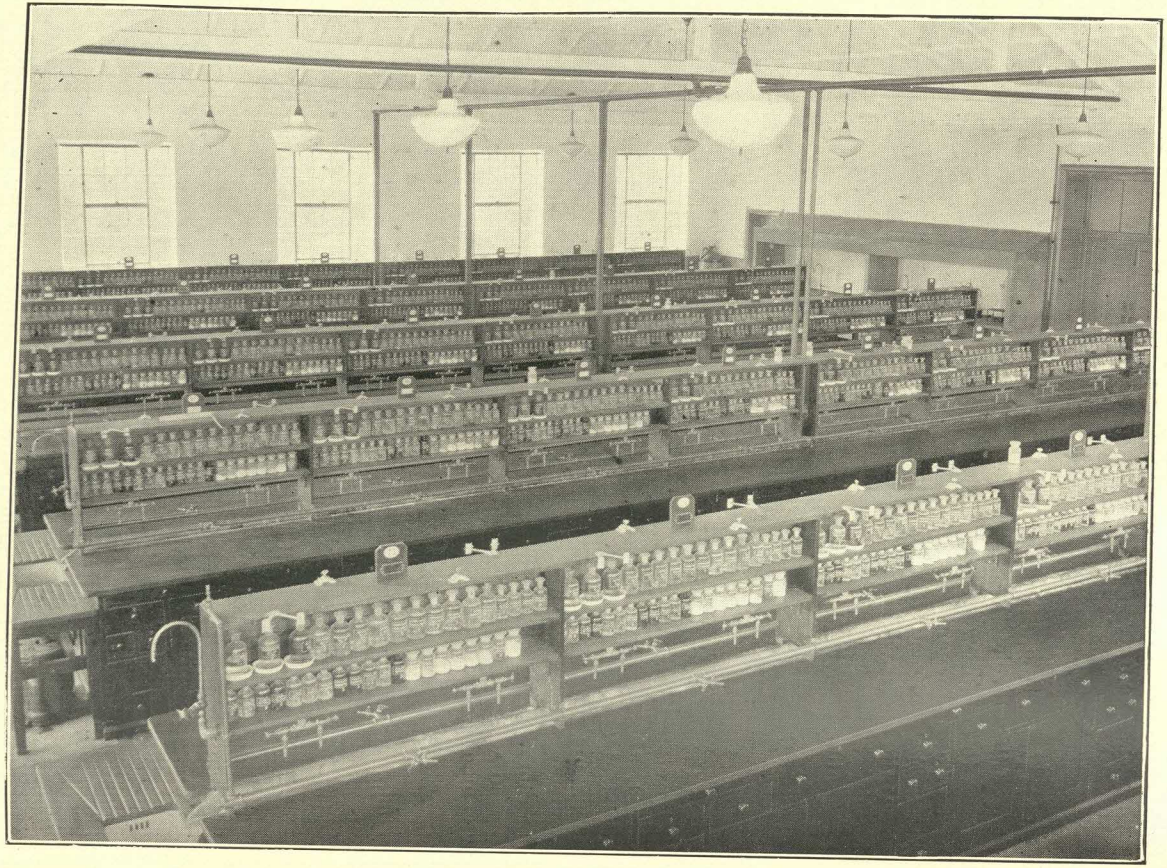
The Rennie Lecture Theatre.

The object kept in mind in the planning of this theatre was to give a maximum number of students an uninterrupted and fairly close view of the demonstration bench, at the same time making reasonable allowance for individual comfort and elbow-room. The room is 52 feet by 44 feet, and provides seating accommodation for 200 students, the nearest seats being 7 feet from the demonstration bench and the furthest only 38 feet away. The seats tip back in sets of four, allowing for the ready ingress of students. Entrance is obtained either from the ground floor or from the main entrance doors on the first floor.

Seating accommodation

Natural lighting is provided mainly by two large windows, which are placed at each end of the demonstration bench. These are furnished with dark blinds under easy control, so that the room can be darkened in a few seconds for lantern projection purposes. The main artificial illumination is a uniform reflected light from opal globes, of intensity about 3 foot-candles. Subsidiary ceiling lights of much lower intensity are also provided, so that students

Lighting



Elementary Chemistry Laboratory.

may take notes whilst lantern slides are being projected. Two floodlights in the ceiling immediately over the demonstration bench allow the bench itself to be specially illuminated. All the lights are controlled from a small switchboard placed at the lecturer's right hand. Here also is placed a buzzer for signalling to the demonstrator at the projection lantern.

The Epidiascope

A modern Liesegang Trajanus epidiascope is installed at the back of the theatre. It can be used either to project lantern slides, or to reflect upon the screen diagrams and illustrations taken directly from text-books. The high-power illumination is provided by three 500 c.p. electric lamps, this being more convenient and less distracting than the older-fashioned carbon arc.

Fresh air

Owing to the enclosed nature of the room, as well as to the purposes to which it is put, a fresh air system is desirable. Latticed vents in the ceiling are connected by ducts to an exhaust fan in the attic, and fresh air continually drawn into the theatre. The two fume hoods at the back of the demonstration bench, in which experiments of an objectionable nature are carried out, are provided with powerful exhausts to carry away noxious gases as soon as they are generated. Classes are thus able to proceed in comfort at all times.

Blackboards

The blackboards are of special flexible design, being made of heavy canvas coated with black rubber. They run round top and bottom rollers in the form of an endless sheet, 5 feet in width and 24 feet long. Twelve feet of the board is thus always exposed, the whole length being brought into use by rotating the rollers with the endless rubber rope provided for the purpose. A horizontal, hooded, illuminating tube runs across the board, so that the writing thereon may be exposed when the room is in darkness.

The Demonstration Bench

With an overall length of 38 feet, the demonstration bench allows ample space both for display and for the carrying out of experiments. The design has aimed at convenience and efficiency, modelled somewhat—like the other features of the room—on the lecture theatres of the Universities of Berlin and Leipzig. There is ample power provision, both D.C. and A.C. points, six water taps, and nine gas taps. At one end a disappearing explosion screen has been let into the bench, and this when raised serves to protect the class from scattered glass should an explosion be more vigorous than expected. At the other end of the bench an extra large pneumatic trough, 27 inches deep, has been inserted, in which under-water experiments are carried out. It is illuminated at the bottom by submerged lights, and experiments going on therein are thus rendered visible. This trough has movable side and top panels, which act as a covering when the trough is not in use.

In the ceiling immediately above the bench is a man-hole, accessible from the attic, through which connections for extra long pieces of apparatus may be lowered.

Besides the lighting controls placed at the lecturer's desk, there are also controls for starting the fresh-air fans and the fume-hood exhausts.

Corner of the Pharmacy Laboratory.

All controls are thus placed together and within easy reach of the lecturer.

The Advanced Lecture Theatre (Room 17).

This theatre has been designed to accommodate a maximum of fifty students. It is used for more advanced classes and for those in which bench experiments are not so elaborately performed. The demonstration bench is supplied with power, gas, and water, whilst a Zeiss projector is also provided. This latter instrument is of special design, known as a "Belsazar": as the lecturer writes or sketches on a cellophane plate the instrument magnifies and projects the progressive results on to the screen. By a suitable adjustment lantern slides may also be projected.

The Dark Rooms (Rooms 7, 19, 20, and 27).

There are four dark rooms in the building, the three situated on this floor being the spectrometer room, the developing room, and the optical room. The spectrometer room contains a quartz spectrograph and B.S. spectro-photometer, and is used for research purposes only. The developing room is well furnished both for convenience and rapidity of operation. Here the developing of spectrometer plates and the making of lantern slides are carried out. Both these rooms are built into the spare space under the sloping seats of the Rennie Lecture Theatre. The third dark room, the optical room, is situated close to the physical chemistry laboratory, of which it is an adjunct. It is used for instructional as well as research purposes, and carries the usual equipment—polarimeter, spectrometer, refractometer, ultra-microscope, etc.

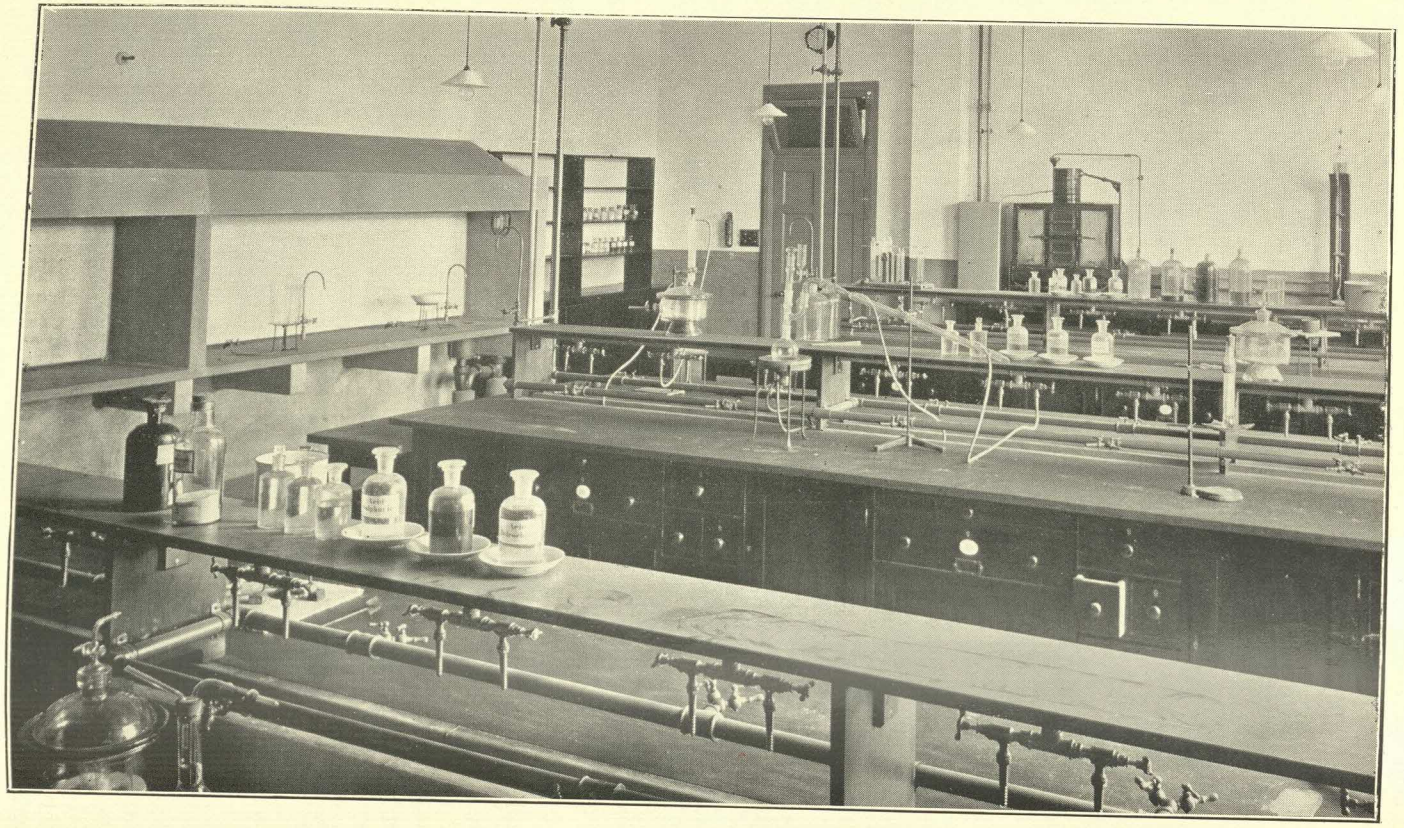
On the first floor there is a fourth dark room, the polarimeter room, which is designed for special research work on polarimetric problems, but as yet lacks the necessary equipment.

The Hydrogen Sulphide Room.

A small room for the hydrogen sulphide generators is located immediately adjacent to the advanced inorganic laboratory. The generators themselves, built of stout lead, are placed in a fume hood, furnished with powerful exhaust ventilation. A pipe line is laid to the upper floor to deliver the gas into the large elementary laboratory, where it is also collected in one of the fume hoods. With the exhaust ventilation working, the laboratories are kept quite free of this objectionable gas.

Physical Chemistry, Electro-chemistry, and Advanced Inorganic Chemistry Laboratories (Rooms 9, 15, and 13).

These three laboratories are situated in the western wing of the ground floor. They are well equipped for instructional purposes, and like all the laboratories in the building are provided with ample daylight. The thermo-regulators in the physical and electro-chemical laboratories are of a new design, which has recently been adopted throughout the department. Their chief feature is the use of a thermionic valve as a first relay, the anode current from which operates a



Organic Chemistry Laboratory.

mechanical relay which actuates the heating current in the thermostat. The regulator works in the grid circuit of the valve, and the current broken at the mercury surface is kept very small. These instruments were made in the University workshop from a model kindly presented by Imperial Chemical Industries, England, with their recommendation.

The Apparatus Store Room (Room 16).

All glassware and glass apparatus is kept in this special store room. From it supplies are withdrawn for individual use, each student being required to fill in a debit form for all apparatus issued to him. At the end of the year he is credited with all that is returned in good order, the deficiency being charged against him. An apparatus book with detachable cards, similar to that used for filing the list of chemical stores, serves to keep a check on stocks and facilitates the making out of replacement orders.

(C). THE FIRST FLOOR.

The first floor contains the large elementary chemistry laboratory (and the necessary service rooms), the organic chemistry laboratories, the laboratory devoted to pharmacy, two balance rooms, a polarimeter room, a refrigerator room, and the upper floor of the Rennie Lecture Theatre.

The Elementary Laboratory (Room 29).

This is the largest laboratory in the building, being 71 feet long by 52 feet broad, and containing 96 working units. Each unit has 4 ft. 6 in. of bench space, and is provided with a set of reagent shelves, a large apparatus cupboard, three drawers, a large sliding shelf to serve as a desk and also to hold note-books, and a rubbish receptacle with a loose hinged flap. As students share lockers in pairs, there is thus locker accommodation for 192 students, although only 96 can work in the room at a time. Each student is given a key which opens his particular set of lockers.

Working Units

The work benches are of Queensland kauri stained with aniline black and finished with wax. An open drip drain runs the full length of the bench, into which all the taps open. These taps are fed from a low-pressure system, the reservoirs for which are placed in the attic. As the water is delivered under a head of only about 12 feet, undue splashing and wastage are avoided.

Low Pressure Water

The reagent bottles are etched with a double set of numerals, one to indicate the particular shelf to which the bottle belongs, and the other its numerical position on the shelf. In this way, as in other, students are encouraged to be tidy and neat.

Reagent Bottles

Latticed vents in the ceiling are connected by ducts to the ventilation fans, and these are put in operation when large classes are at work in the room. Moreover, three commodious fume cupboards are provided, connected to the exhaust fans. In these students are required to carry out all operations that give rise to strong acid fumes. The hydrogen sulphide supply, drawn from the generators on the ground floor, is also located in one of these fume hoods.

Fresh Air

The laboratory is exceptionally well provided with natural light, there being a total of 600 square feet of window space. For night work artificial illumination is supplied by twelve opal reflecting globes, giving a uniform intensity of from 4 to 5 foot-candles.

Lighting

Balance Rooms (Rooms 12, 28, and 32).

The elementary balance room, provided with 30 balances and the necessary sets of weights, opens into the elementary laboratory. Students are taught to handle these precision instruments with due care. There are two other balance rooms in the building, one situated close to the organic laboratories, and the other next to the advanced inorganic laboratory on the ground floor. Both these rooms are reserved for the use of more advanced students.

Organic Chemistry Laboratories (Rooms 23 and 25).

The elementary organic and the advanced organic laboratories are of the same general design—fume hoods, leaded drip drains, locker units, etc.—as that of the large elementary laboratory, with the necessary modifications due to the different class of work. Opening off the advanced laboratory is the combustion room, supplied with the necessary combustion furnaces. As in the physical chemistry laboratory, a blow-pipe table is installed, at which advanced students are required to do their own blow-pipe work.

The Pharmacy Laboratory (Room 33).

The course of instruction in pharmacy has undergone complete rearrangement. In this matter the University has had the loyal co-operation of the Pharmacy Board and of the Pharmaceutical Society of South Australia, with the result that a Board of Pharmaceutical Studies has been established and a Diploma in Pharmacy instituted. The introduction of pharmacy laboratories into the Chemical Department of the University is quite a new departure, and was made possible by a gift of £300 from the Pharmaceutical Society, which body also accepted responsibility for the equipment of the pharmacy laboratory. It now forms a useful adjunct to the other teaching laboratories, and in it medical students are able to take a course of instruction in Pharmacy and Dispensing during their third year.

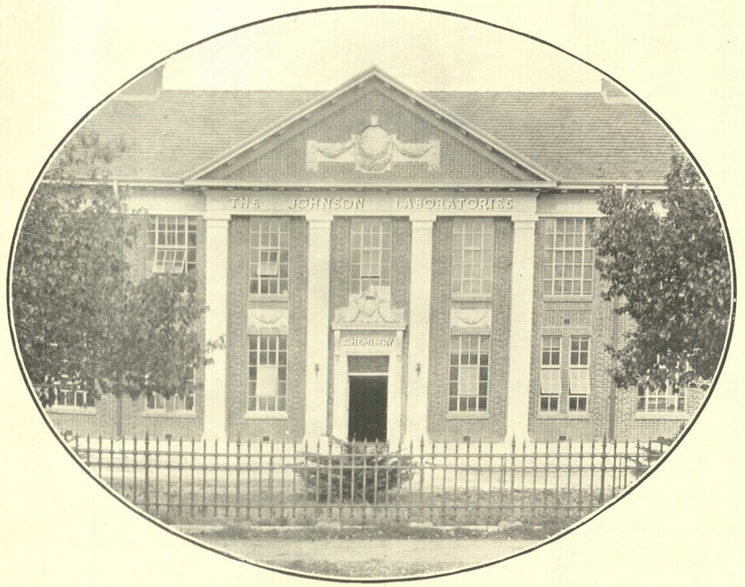
(D). THE ATTIC.

Here the fans, motors, ducts, and exhaust chimneys of the ventilating systems are installed. There are eight sets of motors in all, two to supply forced ventilation to the Rennie Lecture Theatre and to the large elementary laboratory, and six to draw gases from the various fume hoods that are distributed throughout the building. Any set of fume hoods can be operated with its particular fan without interfering with the others.

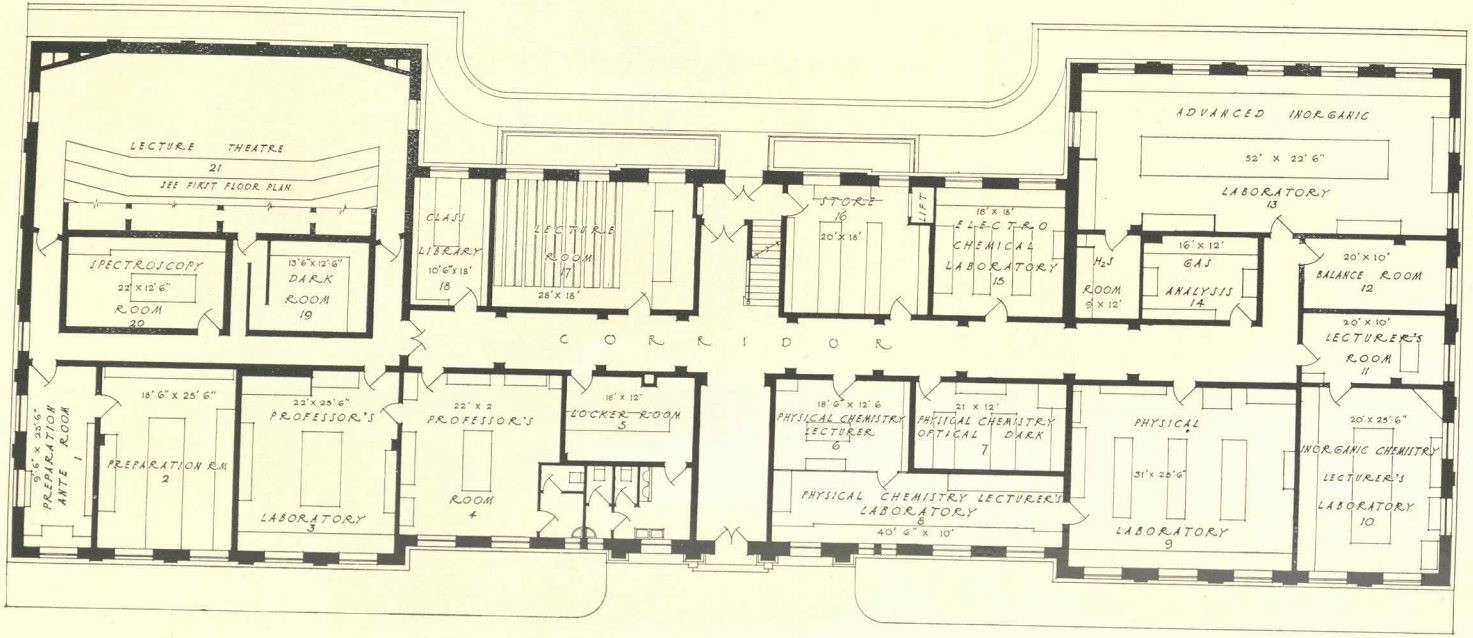
Exhaust System

Here also the electrolytic water-purifying plant is set up. To save wear and tear, which is a serious item in this type of plant, rain water is used as the raw material, and this is automatically pumped up from a 7,000 gallon tank situated underground on the southern side of the building. The still is in continuous operation, delivering the pure water into a tin-lined reservoir, of capacity 200 gallons, from which it is piped down to the laboratories below. The current consumption—working 24 hours a day—is 3 units a week, which compares very favourably with the cost of operating the older type of still.

Distilled Water Plant

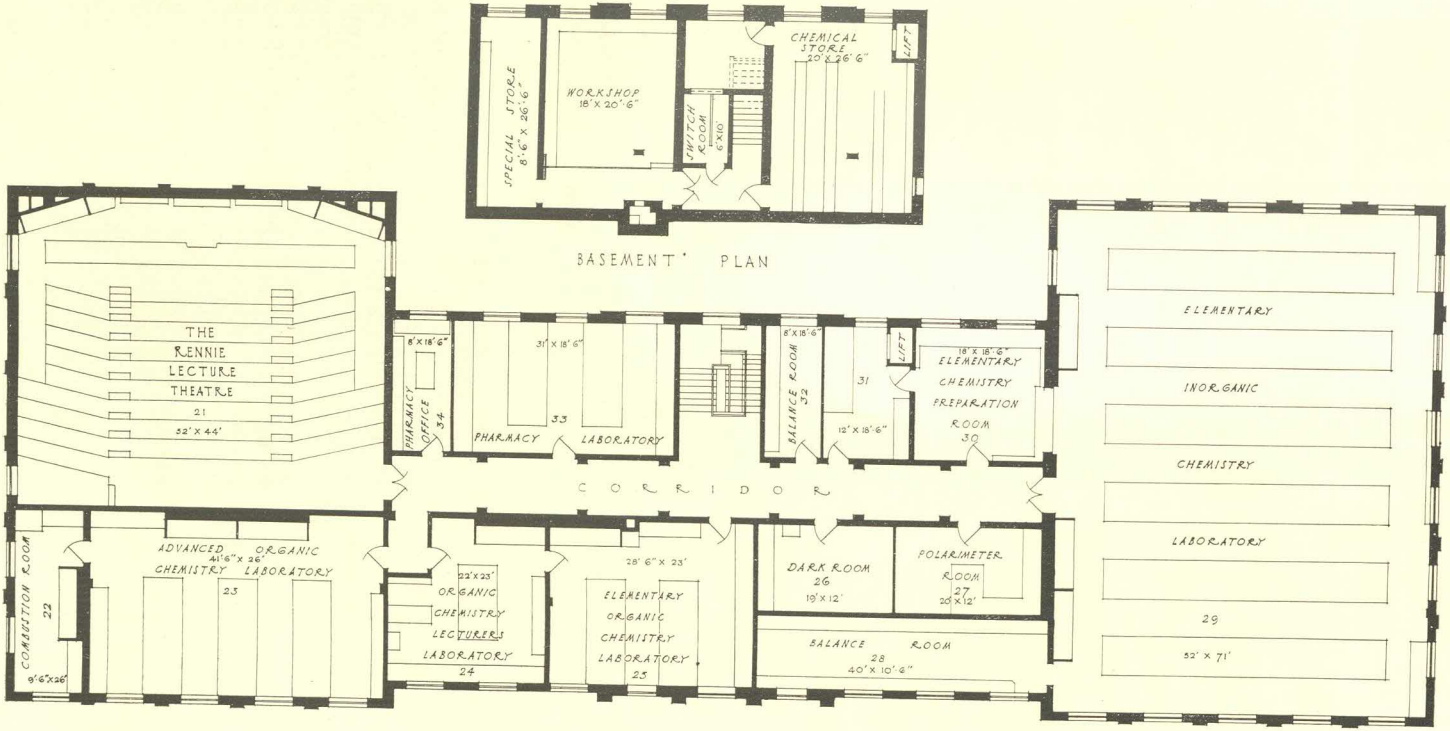


THE JOHNSON LABORATORIES



GROUND FLOOR PLAN.

THE JOHNSON LABORATORIES



FIRST FLOOR PLAN.

Woods, Bagot, Laybourne-Smith & Irwin, Architects.

ARCHITECTS AND CONTRACTORS.

The architects and contractors, through whose co-operation the building was made ready for occupation by the beginning of the first term, are as below:

Architects: Woods, Bagot, Laybourne Smith and Irwin. (Mr. Laybourne Smith in charge of the work.)

Main Building: C. & H. Martin Ltd.

Foundations: Fricker Brothers.

Plastering: J. Jenkins & Son.

Plumbing: A. Martin & Son.

Electrical Fitting: Parsons & Robertson Ltd.

Furnishing and Woodwork: Mathias & Co., Ltd.

GIFTS TO THE JOHNSON CHEMICAL LABORATORIES.

The following gifts have been made to the Johnson Chemical Laboratories:

Imperial Chemical Industries Limited: Thermo-regulator relay; cabinet of dyestuffs.

British Celanese Limited: Display of artificial silk products.

T. & H. Smith, Edinburgh: Gift of alkaloids.

RENNIE SCHOLARSHIP FOR RESEARCH IN CHEMISTRY.

The sum of £320 has been handed to the University by subscribers for the purpose of founding a Rennie Scholarship to perpetuate the memory of the late Edward Henry Rennie. With this money a Rennie Scholarship for Research has been founded, of the value of £50, awarded triennially. The Scholarship may be held in conjunction with any other scholarship or prize at the University, and the work during the tenure of the Scholarship must be carried out in the laboratories of the University.