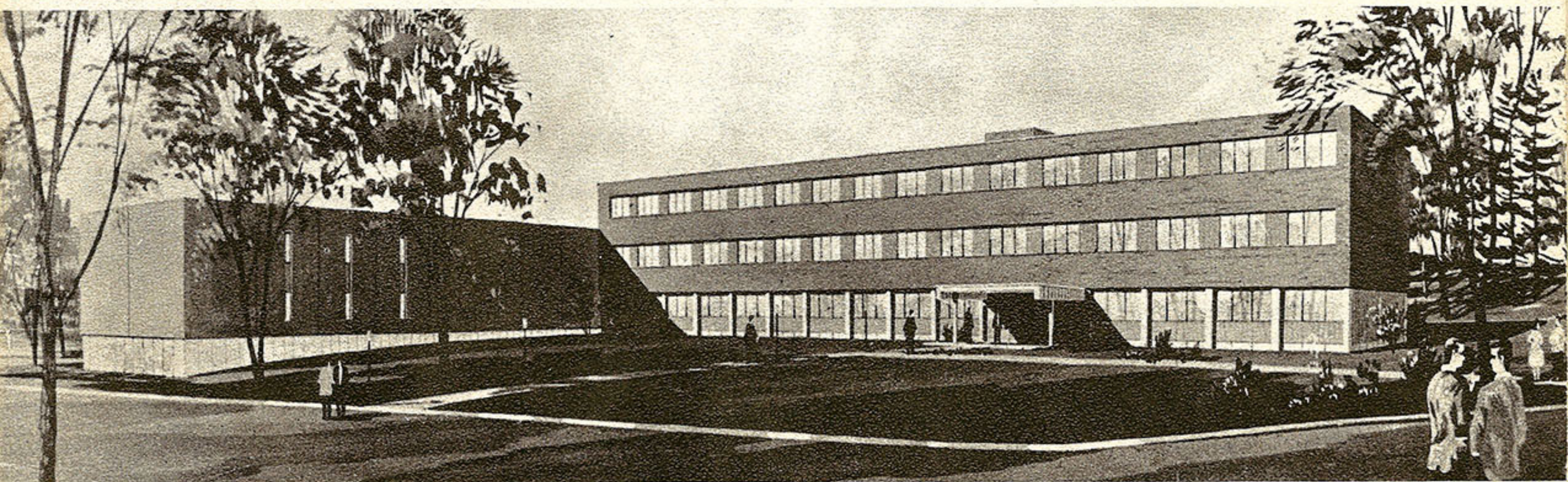




**ENGINEERING  
AND  
RESEARCH  
CENTER**





## GREAT NORTHERN

## ENGINEERING and RESEARCH CENTER



Dedicated  
in honor of  
**M. C. McDONALD**  
President of  
**Great Northern Paper Company**  
January 1, 1952  
to  
December 31, 1961

Manuel C. McDonald, President of the Great Northern Paper Company for the ten years which ended December 31, 1961, was born in Granville, in northern New York. His entire working life has been spent in the pulp and paper industry.

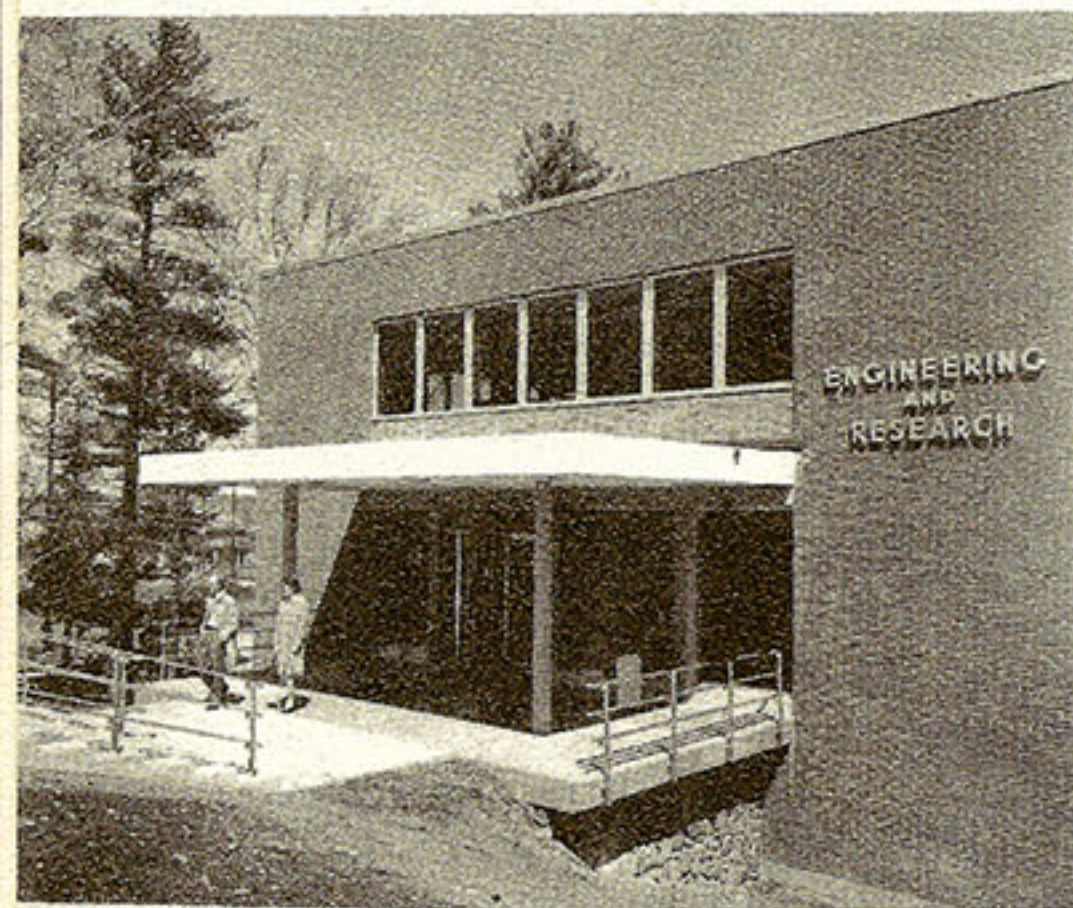
Entering the University of Michigan, Class of 1919, majoring in Mechanical Engineering, he served in the United States Navy during World War I. Upon his release from the service, he entered the employ of George F. Hardy, Paper Mill Engineer, of New York. One of his early jobs was that of Resident Engineer on construction for Brown Paper Mills Company at Monroe, Louisiana. Upon completion of this work, Mr. McDonald remained with Brown Paper Mills as Assistant General Manager, in which capacity he served from 1924 to 1932, when he became Vice-President and General Manager. In 1945, he was made President and General Manager of the Chesapeake Corporation of Virginia, at West Point, Virginia, where, under his direction, an extensive program of modernization and expansion was planned and completed.

Mr. McDonald came to the Great Northern Paper Company as President on January 1, 1952. He found the Company ready for a forward step and he gave to it direction, substance and leadership. While his previous experience had been with mills in the southern United States, he recognized the potential of Great Northern's State of Maine operations and his decisions resulted in the implementation of the Company's expansion in Maine.

He is Director of the Chesapeake Corporation of Virginia, the Maine Central Railroad Company and the Great Northern Paper Company, and a Trustee of the Eastern Trust and Banking Company. He has been associated with many activities corollary to the pulp and paper industry.

When he retired on December 31, 1961, Mr. McDonald had earned the respect and admiration of every employee of the Great Northern Paper Company for his fair-mindedness, clear thinking and decisive leadership. The Engineering and Research Center stands as a monument to his achievements in the service of the Company.





The Main Entrance, Engineering and Research Center



One of the main corridors of the Engineering and Research Center

#### IN EXPLANATION

As the dedication of the Engineering and Research Center takes place, the laboratories, executive offices and pilot plant are in process of being equipped and furnished. For this reason photographic coverage of these important areas of the Center is not complete.

The existence of the Engineering and Research Center is evidence of the increasing emphasis which the Great Northern Paper Company places on the importance of engineering, technical studies, quality control, research and experimentation in its operations.

Its design and construction have brought to reality the results of long and careful study of the requirements of the technical section, not only for present but for future programs, and it puts these facilities in one location and under one roof for the first time in the Company's history.

## ENGINEERING AND RESEARCH

The Engineering and Research Department is made up of two separate technical organizations, the Engineering Department and the Research and Development Department, serving the entire Company, and administered by one head, the Manager of Engineering and Research.

## ENGINEERING

Engineering is the senior department. Its history began in 1898, when the Northern Development Company, which was to become Great Northern Paper Company in the following year, engaged Hardy S. Ferguson, a young engineer just starting his own business, to design the Millinocket Mill. Mr. Ferguson set up an organization at Millinocket, and while retaining a private practice, held the title of Chief Engineer of Great Northern Paper Company until 1911. In that year he opened an office in New York, and his duties at Millinocket were taken over by Frank C. Bowler, a member of his original staff.

From that time until 1950, the Engineering Department remained a very small but highly versatile organization. While outside consultants were employed for some major jobs during this period, the bulk of the Company's engineering work, including the design and construction of such large projects as the North Twin and Roy V. Weldon hydro-electric stations, was carried on by the Engineering Department.

In 1950, in anticipation of the expansion program, and in recognition of the increasing importance of the technical services, the engineering and research functions of the Company were placed under one head, and the Engineering Department has since that time been built into the comprehensive and competent organization that it is today.



The Engineering Department, headed by the Chief Engineer, is responsible for the mechanical, electrical, hydraulic and process design involved in the addition of new plant and in changes to existing structures and equipment. It investigates and assists in the selection of machinery, instruments and other equipment. It makes the studies, plans and drawings which result in efficient installations with minimum interruption of production. It keeps informed on new engineering and construction techniques and materials. It does the surveying and other field work for new projects; prepares specifications; makes estimates of the cost of work to be done; administers construction work done by the Company's own organization and supervises the work done by contractors. It is in charge of the distribution of power generated by the Company's steam and hydro-electric plants; controls water storage; maintains meteorological, power plant and technical records and lends general engineering assistance to the operating departments.

To carry out these activities, the Engineering Department is organized into four functional divisions, headed respectively by the Chief Design Engineer, the Electrical Engineer, the Power System Engineer and the Construction Engineer, each with a specialized staff, the whole coordinated by the Chief Engineer.

## RESEARCH AND DEVELOPMENT

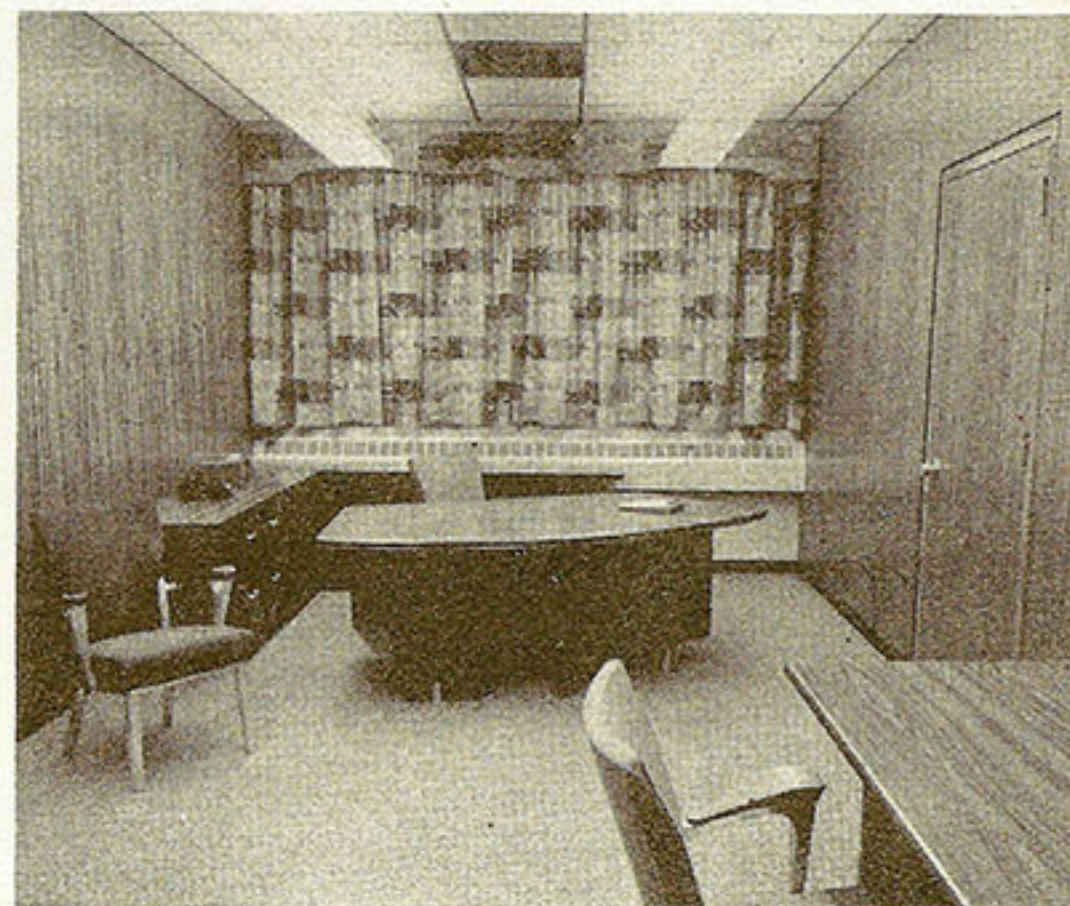
The Research and Development Department was first organized in 1911 as the Bureau of Economy, headed by Garret Schenck, Jr., son of the Company's first President. Its duties were to study manufacturing processes for waste and inefficiency, conduct investigations of new developments in the industry, perform routine testing operations, assist in quality control and give general technical assistance, particularly in the chemical field, to the operating departments. It also recruited and trained qualified young men for supervisory positions in the manufacturing organization.

About 1940, the name of the Bureau of Economy was changed to Bureau of Tests, to more realistically designate its function at that time. In 1950, it was placed under one administrative head with the Engineering Department. Following this, in line with the Company's policy, a true research organization was assembled and an efficient quality control organization was trained and turned over to the mills. The name of the department was changed first to Research and Control, and then to its present designation of Research and Development.

The duties of the Research and Development Department, administered by the Technical Director, are many and varied. The department is organized in three divisions; Research, Product Development and Administrative, each headed by a Director.



The Mechanical Drafting Room

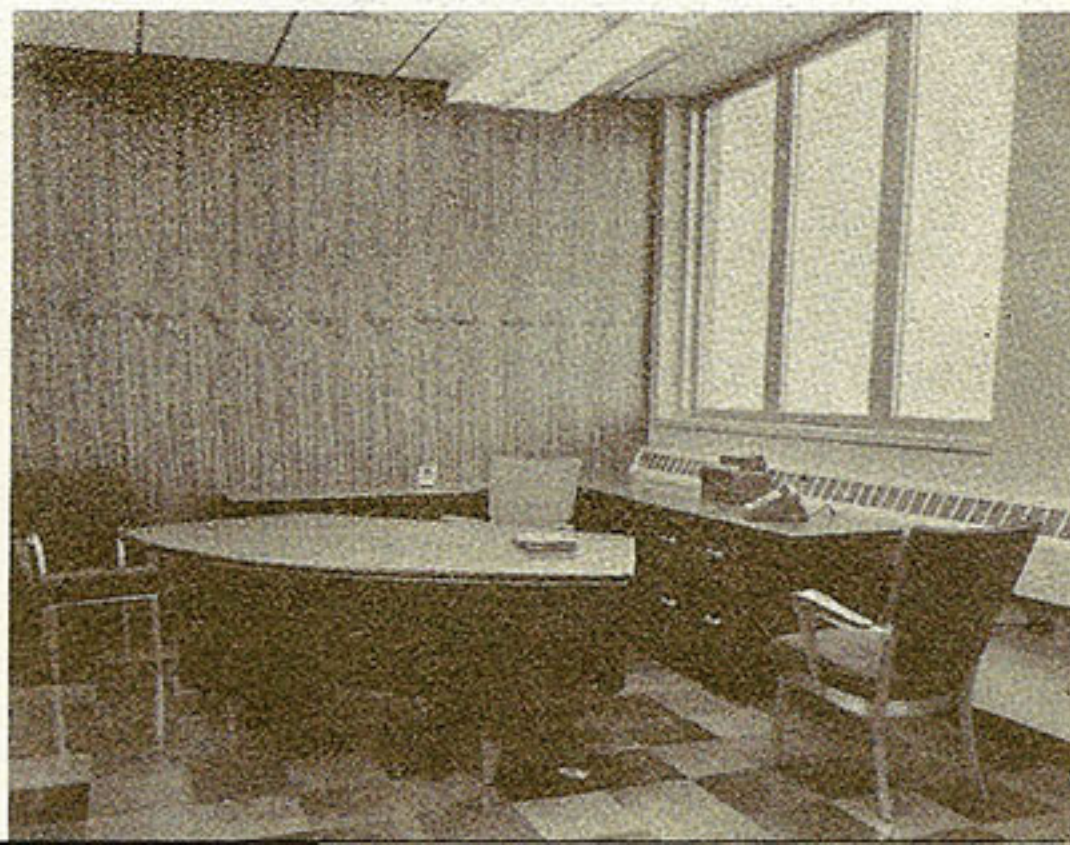


The Manager of Manufacture's Office



The Nerve Center of the Mechanical Drafting Room

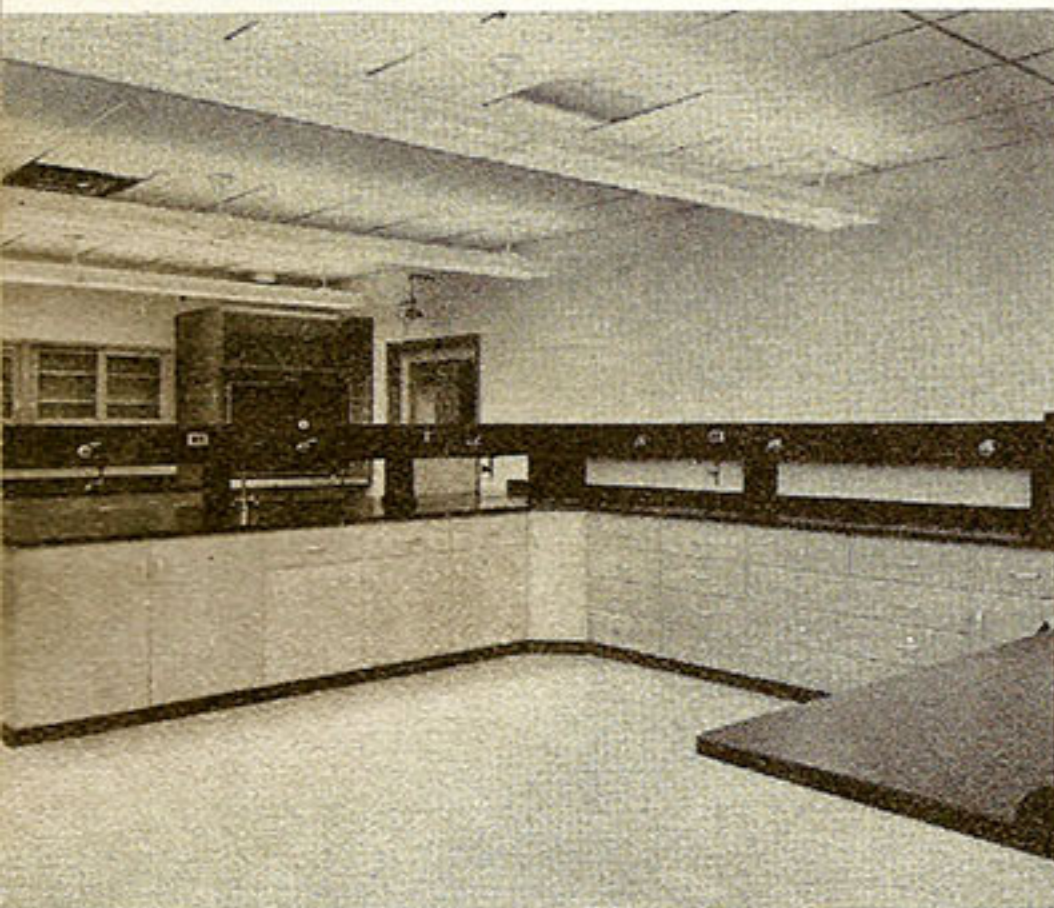
Another Executive Office







The Research and Development  
Department Clerical Office



Analytical Laboratory



The Central Printing Room

THE RESEARCH DIVISION investigates and studies established and projected methods of producing and processing pulp, to improve quality, reduce cost of pulping and widen the uses and usefulness of the various pulps. It similarly studies the operations and problems of the paper-making processes, the development of new grades of paper and the improvement of techniques and equipment for quality testing and control. It renders specialized services, particularly those involving chemical analyses and investigations, to all departments of the Company; tests materials for quality and works on such problems as slime control, stream pollution and troubles encountered in the various manufacturing processes. A special section busies itself with the problems which will be encountered in the production of the Company's new lines of coated papers — the study of various types of coating and their performance — adhesion, dusting, finish and printing qualities. Finally it studies the long range aspects of improvements in pulp and paper-making processes, investigating and experimenting with innovations and looking into such matters as the possible uses of computers in manufacturing operations. This division is organized in five groups, the names of which — Pulp Research, Paper Research, Analytical, Coating and Pioneer Research — are descriptive of their functions.

THE PRODUCT DEVELOPMENT DIVISION works with the mills and the Sales Department on the development of new products. It furnishes advisory supervision in the trial manufacture of new grades of paper, and assists in establishing specifications for the products made by the mills. It furnishes the manufacturing organization and the Company's customers with technical services on a day-to-day basis, and conducts special tests and investigations as required. It exercises an auditing function with respect to the mill control organization in checking for conformance with quality standards and the procedures for testing, and it keeps constant check on the characteristics and quality of competitive products. This division is set up in three groups under the Mill Trial Coordinator, the Technical Service Group Leader and the Quality Control Group Leader respectively.

THE ADMINISTRATIVE DIVISION is responsible for the recruiting of new personnel for the Research and Development Department. It administers and supervises the technical library and maintains records and files. It operates the photographic laboratory and is responsible for documentary photography and the files thereof. A special section, the Wood Survey Group, attached to this division, serves both the Woodlands Department and the mills in an advisory and auditing capacity in connection with the measurement and turnover of pulpwood inventories.



## THE CENTER

The Engineering and Research Center is the new home of the Engineering Department and the Research and Development Department, and the headquarters of the local Manufacturing Department Executive Staff and its organization.

In the design of the Center, the Architects, Anderson-Nichols Company, of Boston, Mass., have succeeded in combining efficiency and good taste. While there are no unnecessary embellishments in style or decor, nothing has been neglected which will add to the usefulness of the building and the effectiveness of the organization which will work within it.

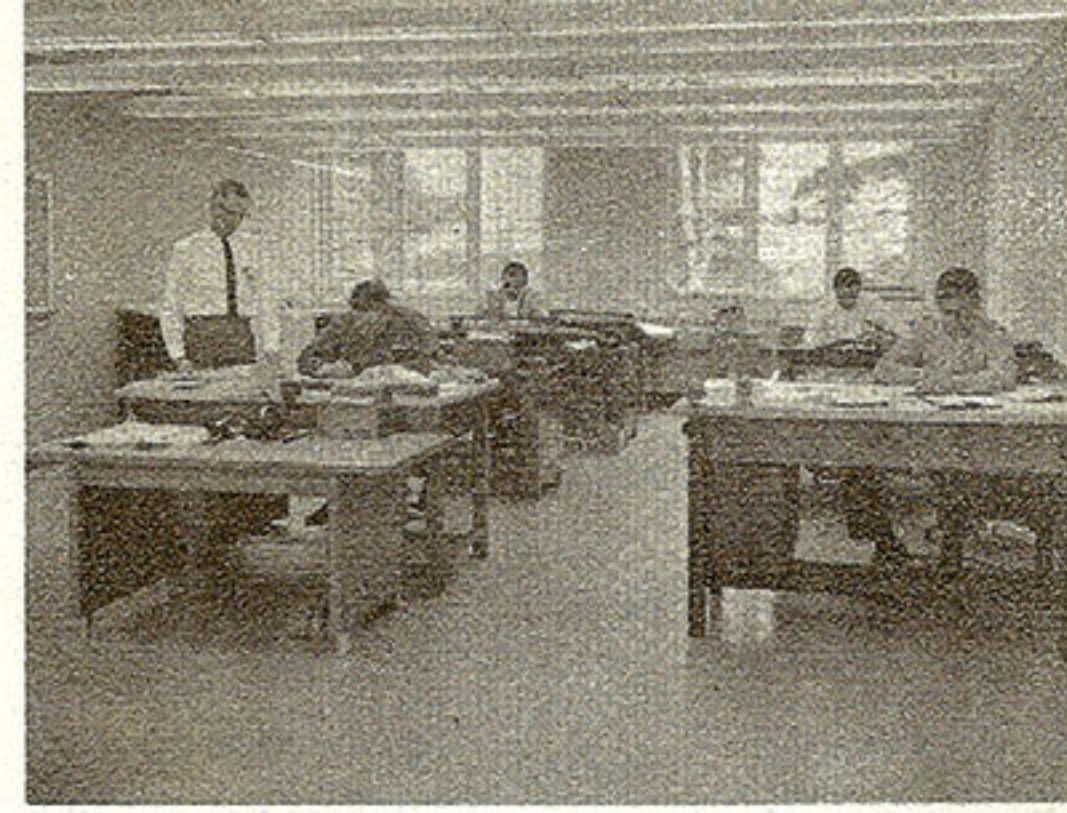
The building was erected by Consolidated Constructors, of Portland, Maine. Each of the three floors of the main structure provides 14,000 square feet of floor space, a total of 42,000 square feet. The pilot plant wing provides another 12,500 square feet in a basement, main floor and mezzanine.

The main floor of the Engineering and Research Center is the second floor. On this floor, in addition to an attractive lobby and waiting room, decorated with scenes portraying Company activities, are the offices of the Manager of Manufacture and his staff, including the Statistical and Order Scheduling departments; the Manager of Engineering and Research; the Technical Director; the heads of Research and Development divisions; the analytical and instrument laboratories and the library and reading room.

The third floor contains the offices of the Chief Engineer; the heads of Engineering Department divisions; the mechanical and electrical drafting rooms; the pulp and paper process laboratories and the pioneering laboratory.

On the first floor are the paper testing and graphics laboratories; the photographic laboratory; central printing; storage rooms and vaults; the Construction Division offices; the Water Dispatcher's offices and a multi-purpose room.

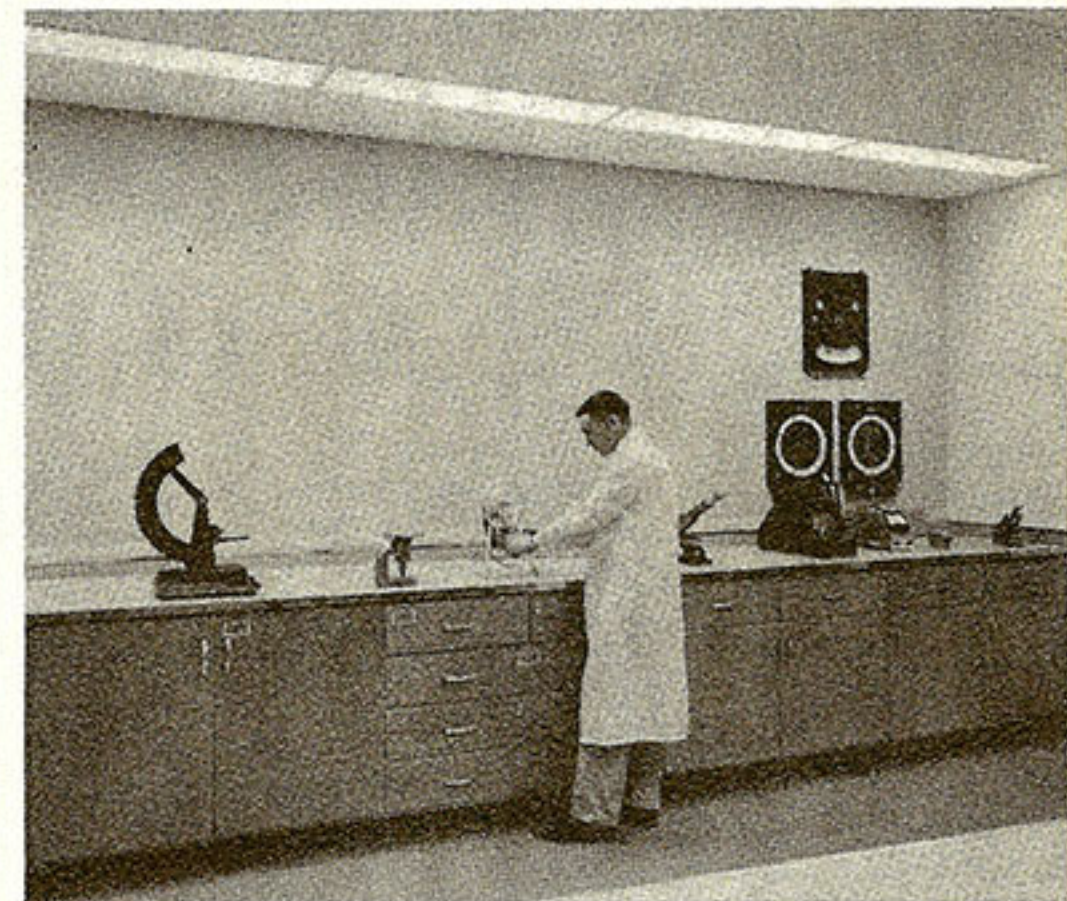
On each floor there are offices for secretaries and for staff members not specifically mentioned. The second and third floors will each have conveniently located conference rooms.



The Electrical Drafting Room

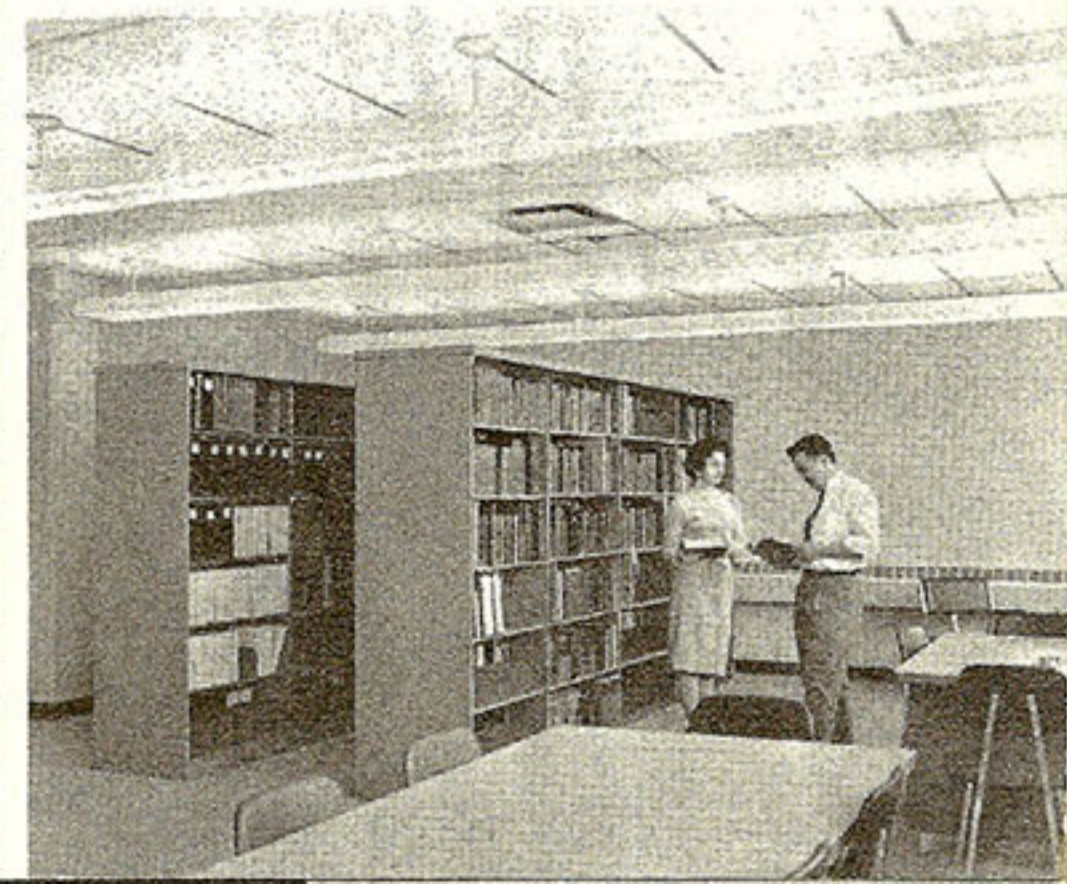


The Manufacturing Department Conference Room



Part of the Paper Testing Laboratory

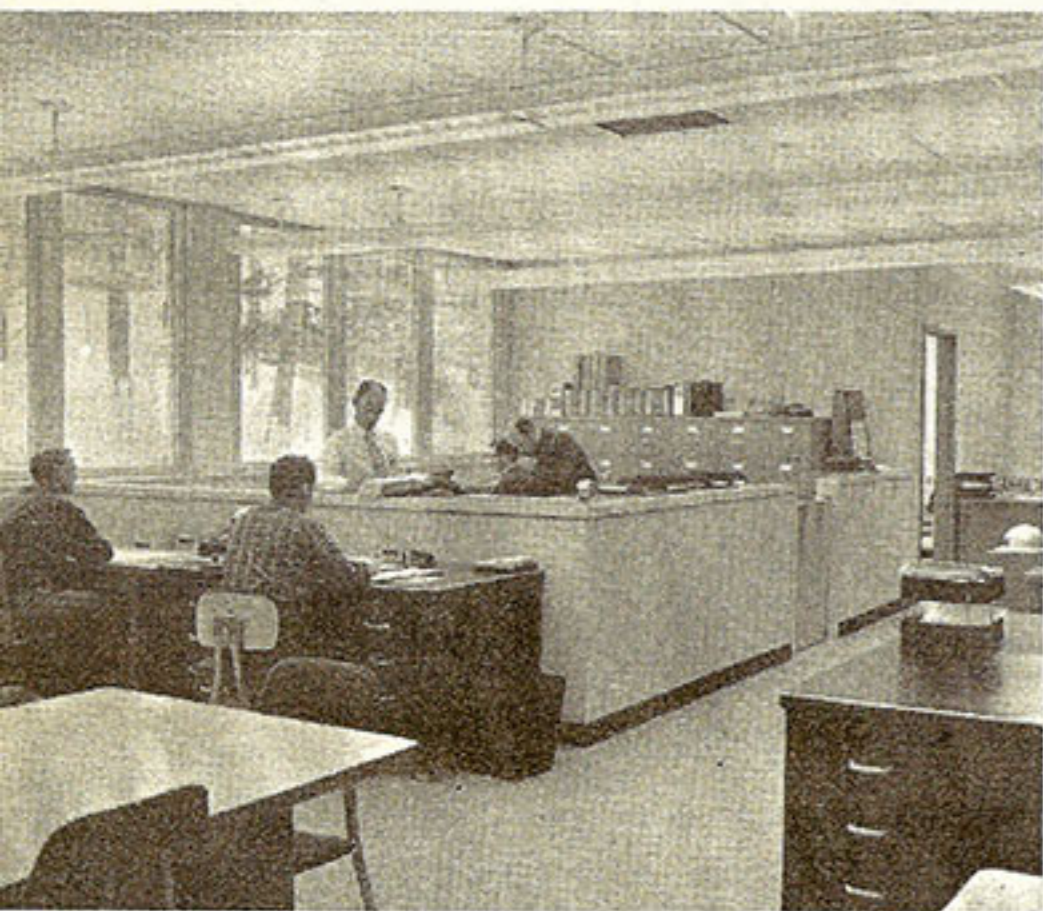
A corner of the Technical Library







The Engineering Department  
Clerical Office



The Construction Division Office



The Center Kitchenette

The pilot plant, when the building is opened, will not be equipped, although many of the facilities are presently available and will be moved from other locations. On the main floor, the pilot plant building is open through to the roof, and is provided with cranes for handling heavy equipment. On this floor will eventually be located the experimental paper machine; pilot digesters for various chemical pulping processes and a small pulp grinder. Here also will be pilot-scale pulp processing and treating equipment for various types of pulp, a pilot paper coating machine, supercalenders and testing equipment. The basement will contain auxiliaries such as pumps and compressors, the stock chests and the electrical control room. On the mezzanine floor will be the lockers and showers for the pilot plant.

The structural design of the Engineering and Research Center is based upon providing maximum fireproofing consistent with reasonable cost. Column foundations are concrete spread footings. The first and second stories are of poured concrete joist construction, supported on poured columns and beams. The third story is steel frame and the roof structure of bar joists, with long spans over the drafting rooms to provide column-free space. The pilot plant is of steel frame construction, with the main floor and mezzanine supported on steel beams.

Exterior walls are of cement block, brick veneered, with one-inch air space. First floor walls in those portions below grade are of reinforced concrete. Floors are reinforced concrete slab. The roof is of pre-cast lightweight concrete plank, insulated and waterproofed with fibreglass. Except in the pilot plant wing, the windows are double glazed, in aluminum sash and frames.

Interior partitions are of steel stud and laminated gypsum board construction, with isolation clips where sound-proofing is required. Interior door and window frames are of steel. The ceilings, which are 9'4" high in the offices, 8'0" in the corridors, are of fire-resistant acoustical board, in removable panels. Ample space is provided over ceilings and under floors for service piping, ducts and wiring.

The building is provided with 200-lb. process steam and 40-lb. steam for the zoned warm-air heating system, from the mill boiler house. Supplementary hot-water perimeter heating is provided under the windows. A central chilled water unit supplies the air conditioning system, which is zoned for each floor.



The Engineering and Research Center has its own 750 KVA substation, connected to the Company's 40 cycle power system. A 250 KW rotary frequency converter supplies 60 cycle current to a separate distribution system for lighting and small motors. Fluorescent lighting, with diffusion-type fixtures, provides artificial light intensity of 200 foot-candles in the drafting rooms and other work-spaces.

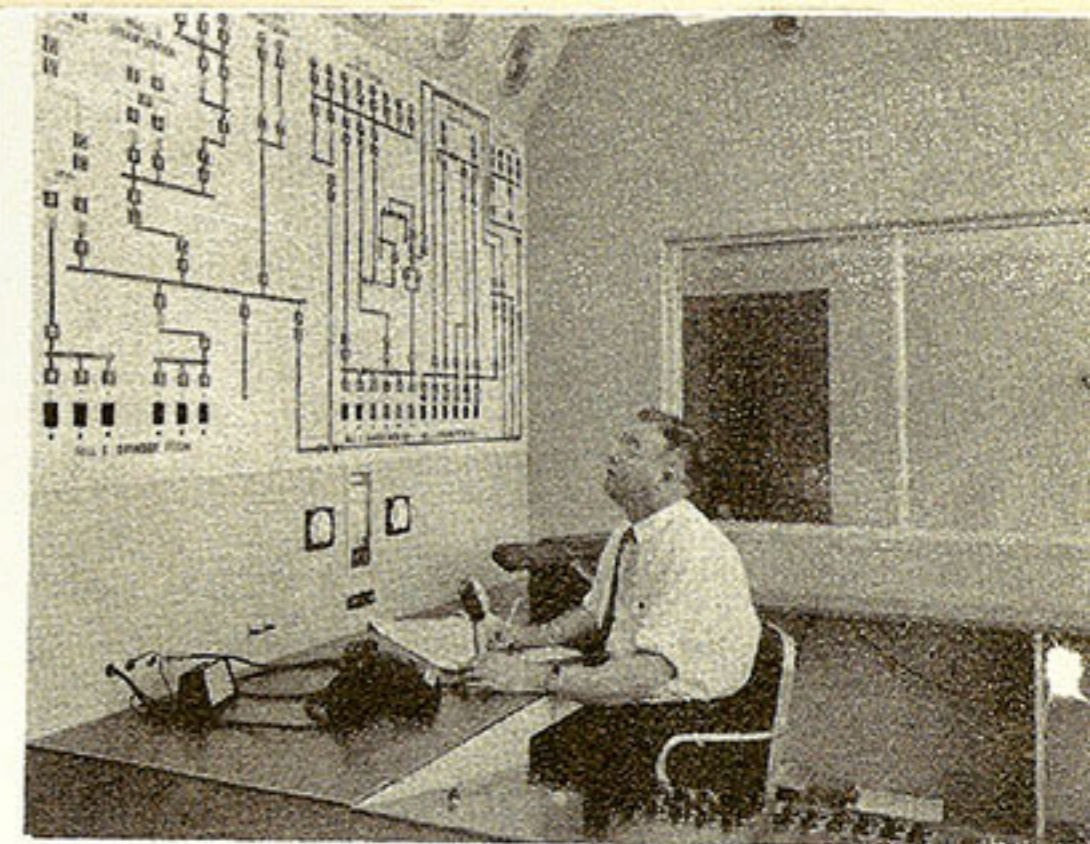
There are many interesting features about the building. A hydraulic elevator serves all floors, and in addition a small power-operated "dumb waiter" is available for the transmission of papers and small objects between floors. The laboratories on the different levels are located one over the other, with common services passing through chases in the interior walls. Laboratories where chemicals are to be used are equipped with heavy-duty decontamination showers located over the exits. Drains from the laboratories are of pyrex glass to ground level, below which duriron piping leads to a neutralizing tank before discharge from the building. An automatic fire detection and alarm system is installed. Steps and walks around the building are electrically heated to prevent snow accumulation.

The new telephone switchboard, which serves the entire Millinocket operation, is of ultra-modern design, the only one of its kind in New England. In addition to telephone communication, the Center is provided with a 40-station intercom system and a P.A. system.

Another very interesting feature is the complex array of instruments and recorders which monitor the entire steam and hydro-electric power system, indicating the units which are generating, the large motors which are in operation, water levels at various points in the storage, frequency in the electrical system and other data important to the control of power distribution.

The interior of the Center is tastefully decorated and finished. Floors in the lobby are terrazzo; other floors are cork, asphalt or vinyl tile. The executive offices are beautifully paneled in paldao wood. Other offices and working areas are painted in attractive neutral colors and trim color throughout is a pleasing blue-gray.

The construction of this building is another milestone in the history of the Great Northern Paper Company, and its very name—"Engineering and Research Center"—indicates its importance as the point from which will come many of the developments which will in the future make Great Northern greater.



Dispatcher's Console and System Map



The Central Scheduling Office



A corner of the Millinocket Purchasing Office

The Manufacturing Department Statistical Office





FLOOR PLANS

ENGINEERING and RESEARCH

CENTER

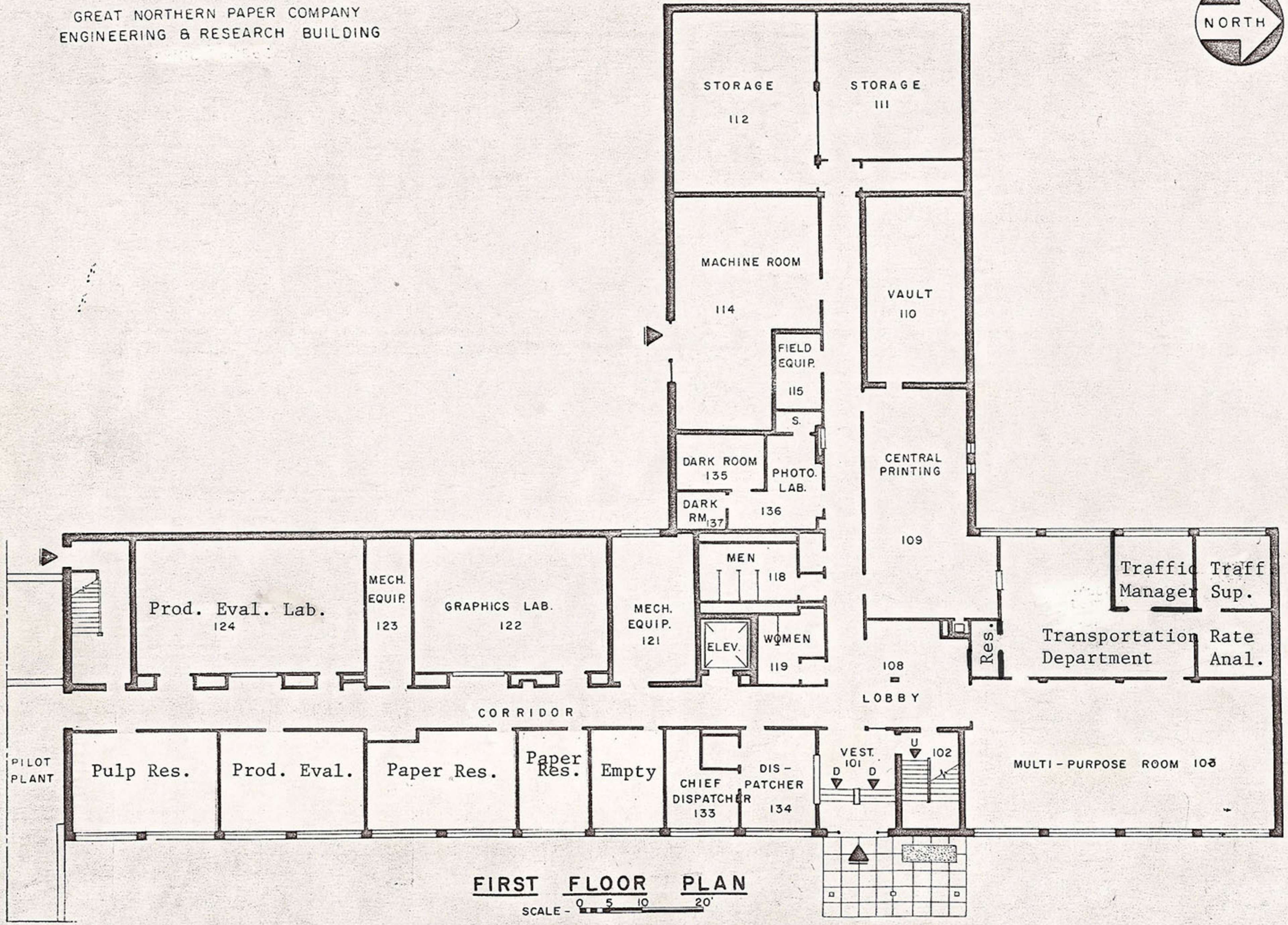






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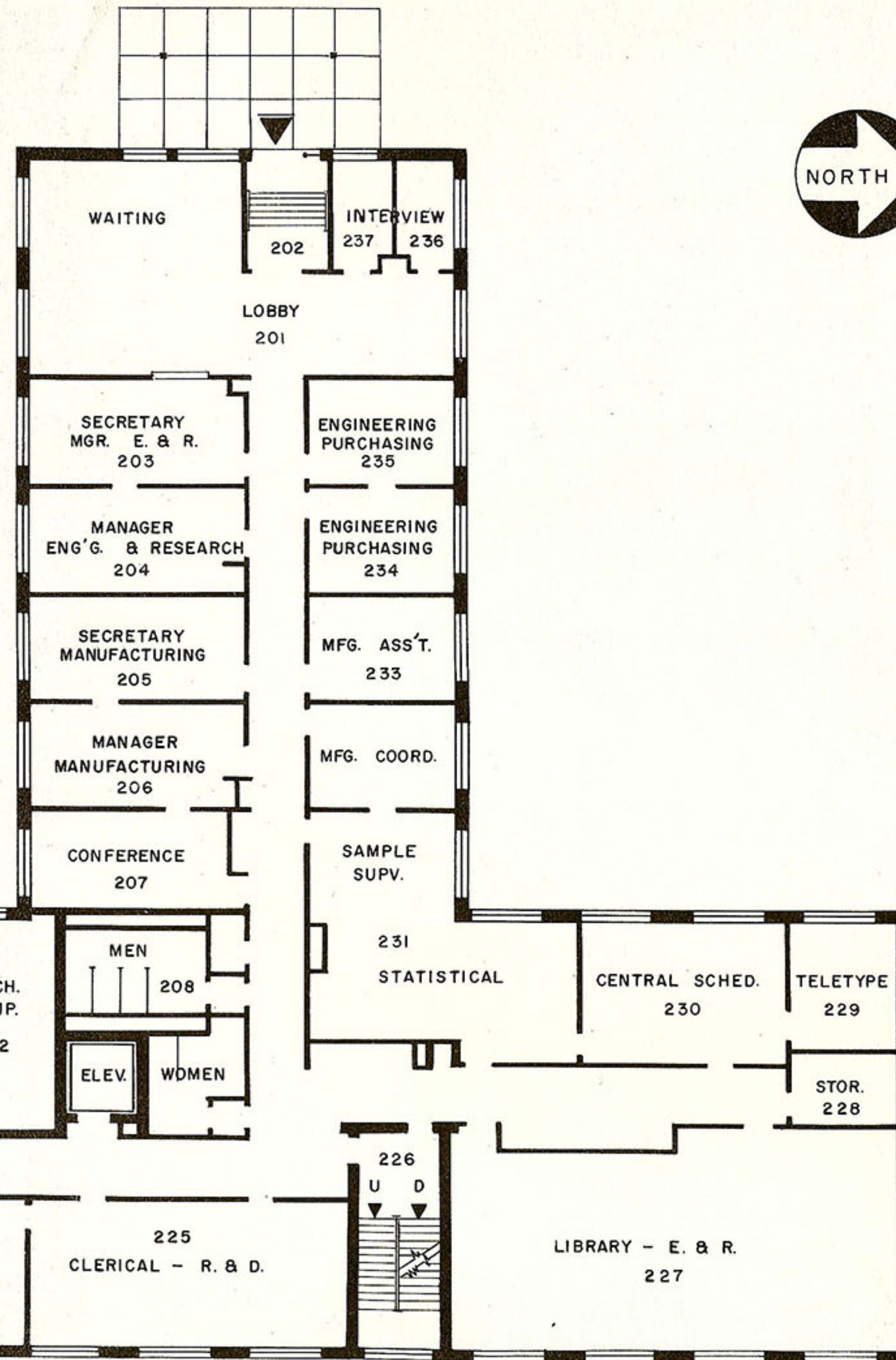
GREAT NORTHERN PAPER COMPANY  
ENGINEERING & RESEARCH BUILDING



**FIRST FLOOR PLAN**  
SCALE - 0 5 10 20'



GREAT NORTHERN PAPER COMPANY  
 ENGINEERING & RESEARCH BUILDING  
 APRIL 28, 1962



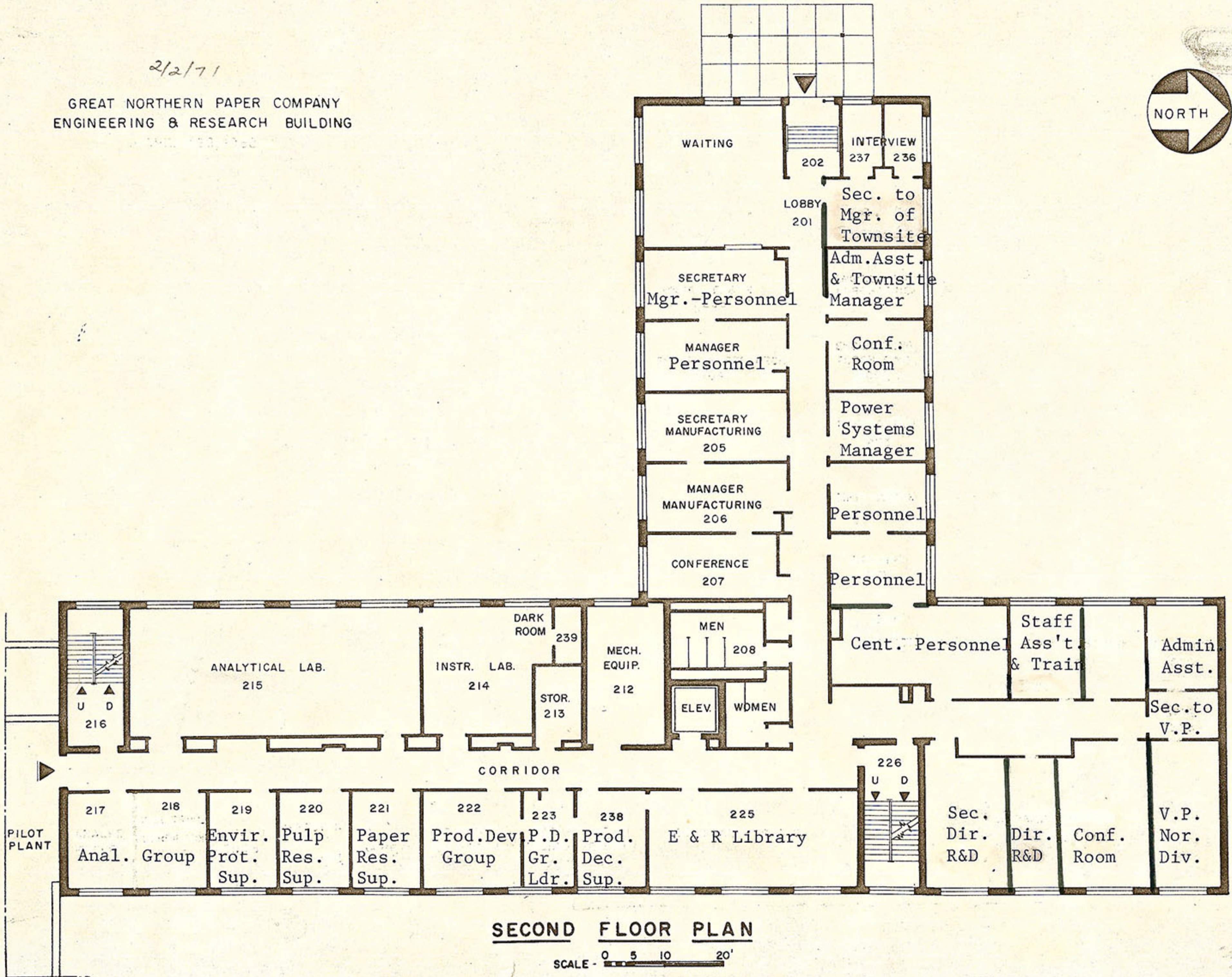
**SECOND FLOOR PLAN**

SCALE - 0 5 10 20'



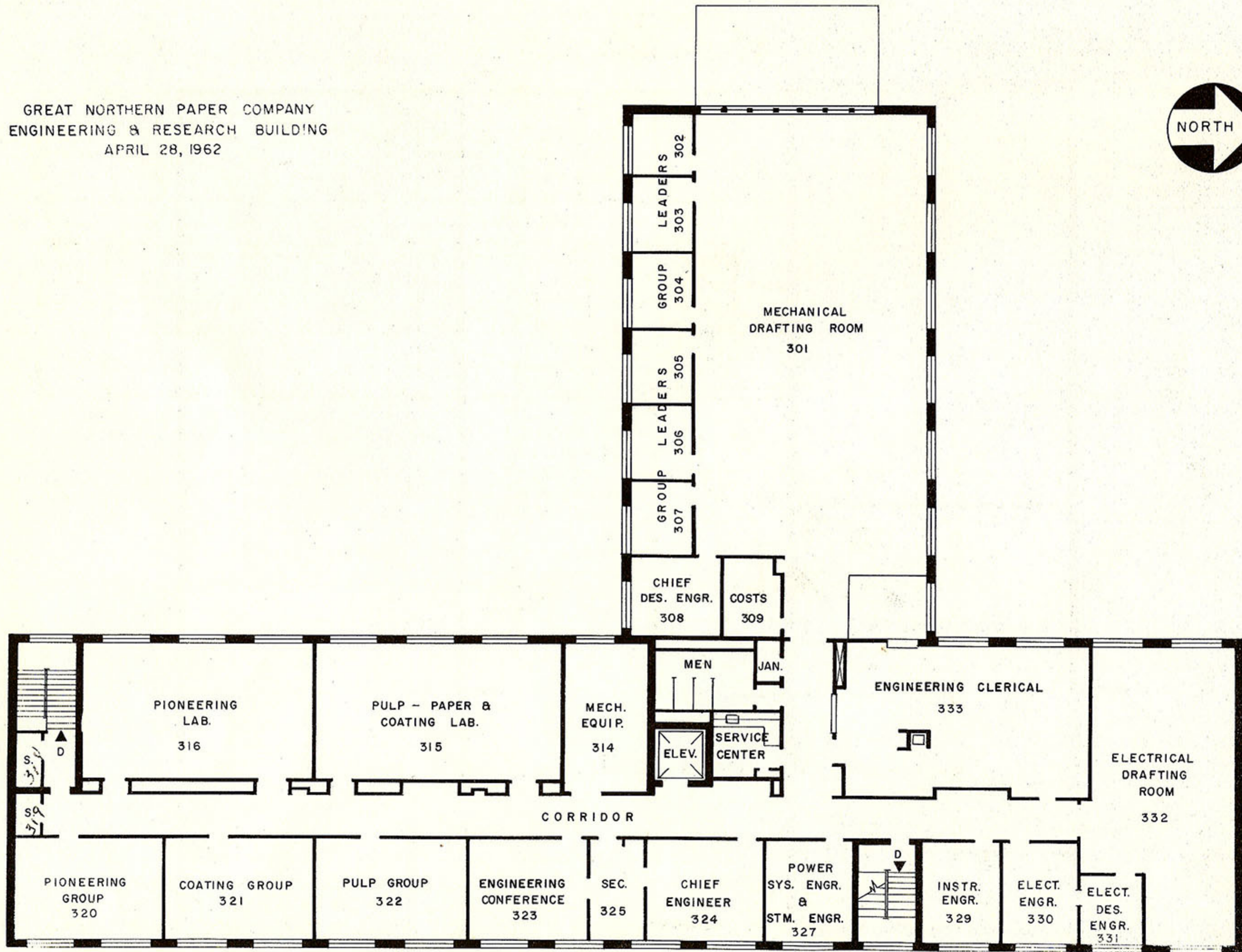
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GREAT NORTHERN PAPER COMPANY  
ENGINEERING & RESEARCH BUILDING





GREAT NORTHERN PAPER COMPANY  
 ENGINEERING & RESEARCH BUILDING  
 APRIL 28, 1962



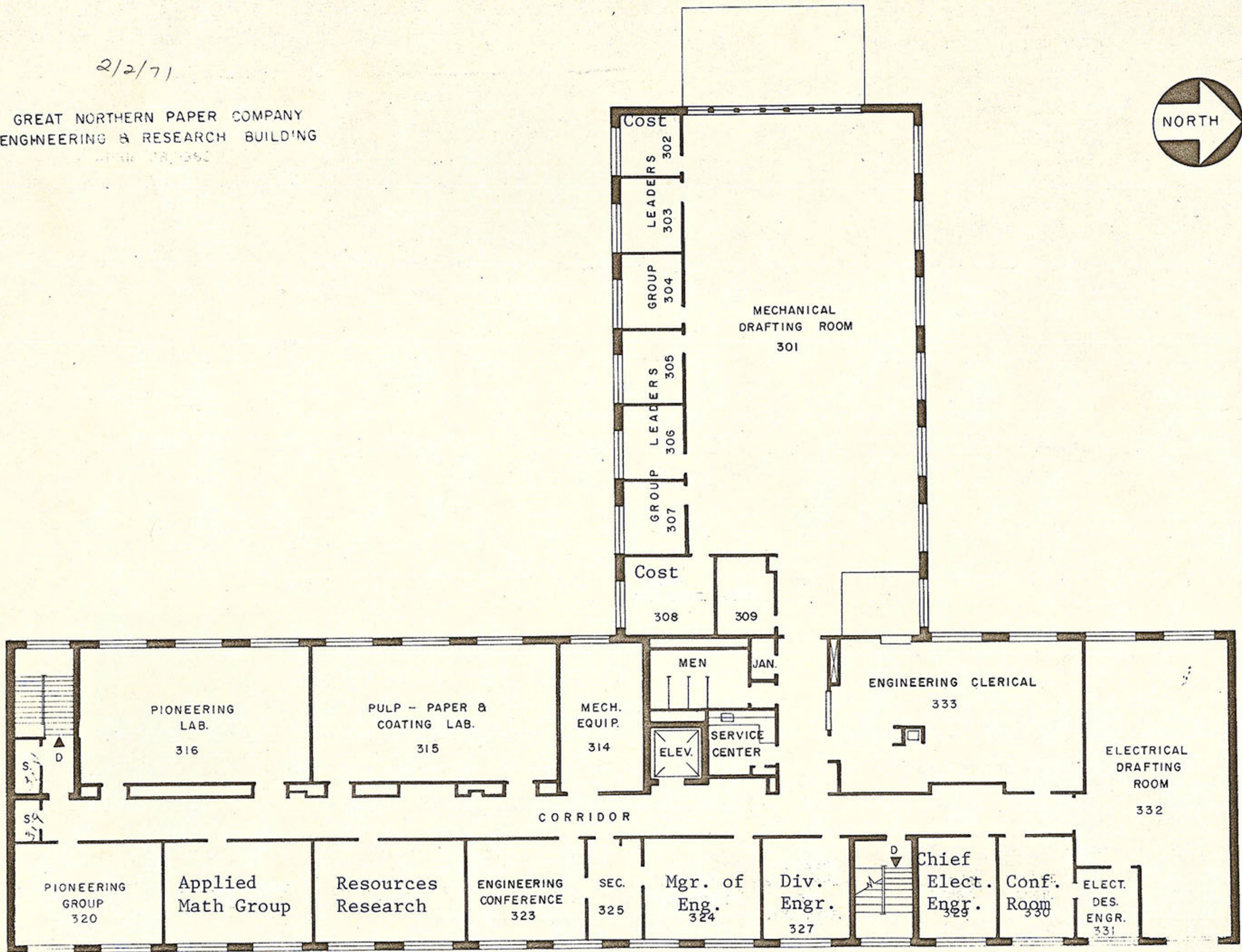
**THIRD FLOOR PLAN**

SCALE - 0 5 10 20'



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GREAT NORTHERN PAPER COMPANY  
ENGINEERING & RESEARCH BUILDING

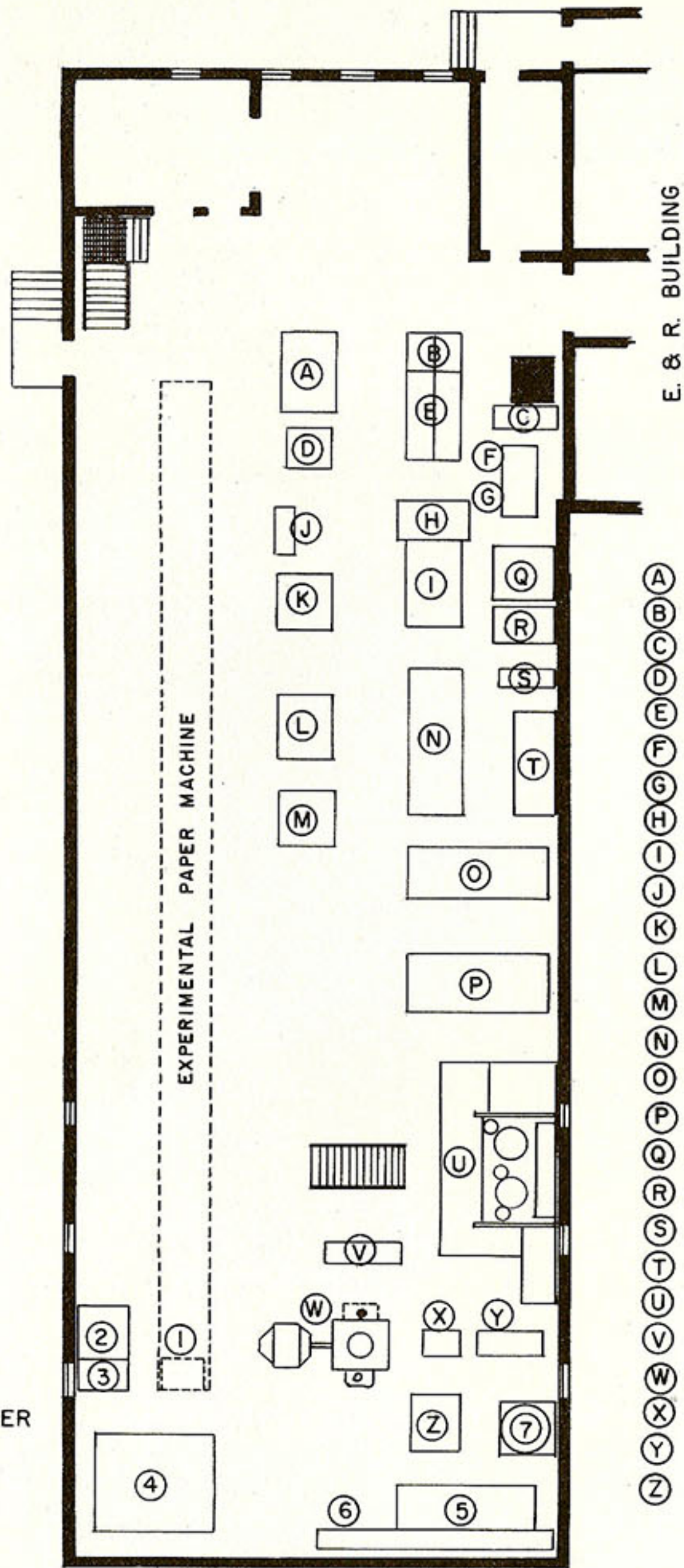


THIRD FLOOR PLAN

SCALE - 0 5 10 20'



- ① HEAD BOX
- ② SCREEN
- ③ VORTRAP
- ④ PULPER
- ⑤ CHEMI. G.W. DIGESTER
- ⑥ HEAT EXCHANGER
- ⑦ LIQUOR TANK

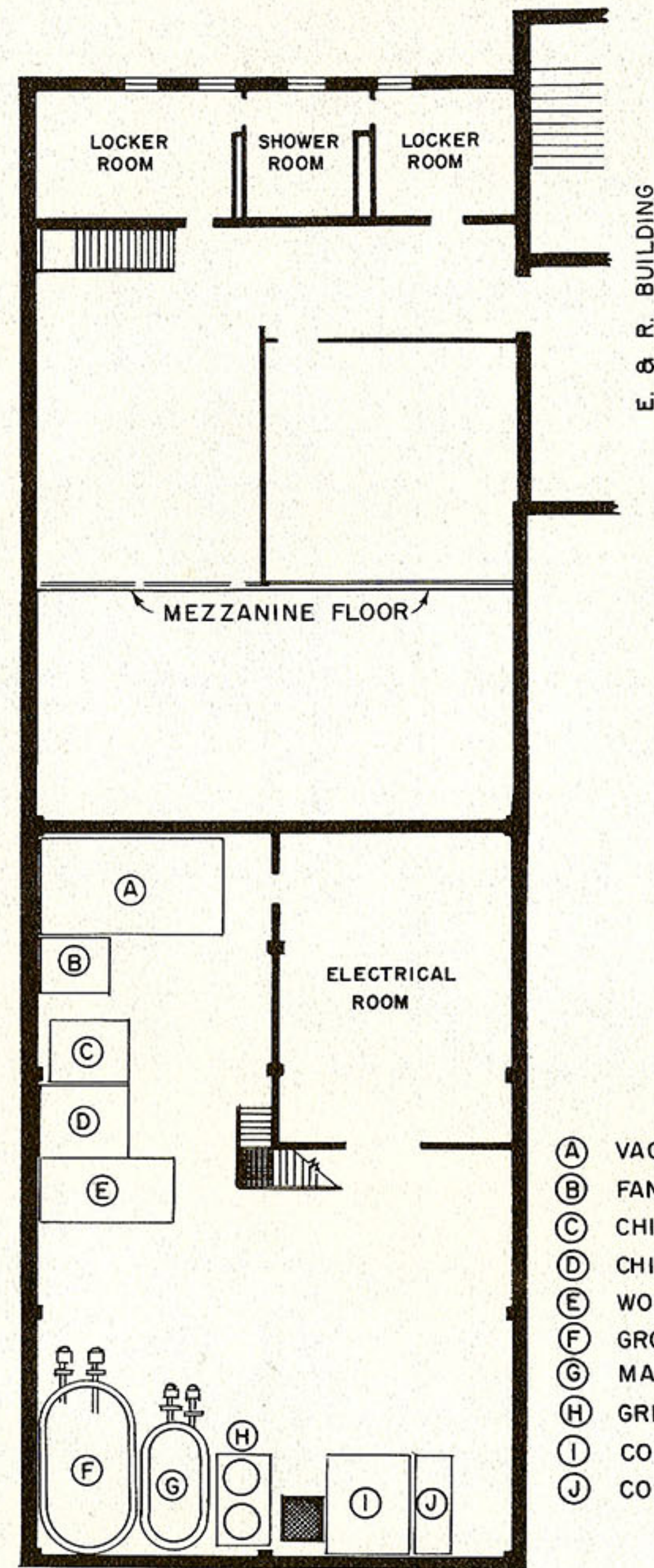


FIRST FLOOR PLAN

- (A) GLOSS CALENDER
- (B) PAPER SCALES
- (C) 1" BEATER
- (D) HUMIDIFIER
- (E) STEAM DRYERS
- (F) DISINTEGRATOR
- (G) TAPPI PRESS
- (H) NW PRESS
- (I) WORK SINK & NW MOLD
- (J) DRAINAGE TESTER
- (K) STARCH COOKER
- (L) BENCH COATER
- (M) SUPER CALENDER
- (N) BENCH, OVEN, SINK.
- (O) BENCH, 2 SINKS.
- (P) LAB BENCH
- (Q) FIBER CLASSIFIER
- (R) STEAM OVEN & SINK
- (S) 1" BEATER
- (T) FURNACE BALANCE & OVEN
- (U) SULFITE DIGESTERS ETC.
- (V) REFINER
- (W) GRINDER
- (X) PLATFORM SCALE
- (Y) KNOTTER
- (Z) CUT-OFF SAW



PILOT PLANT



BASEMENT AND MEZZANINE FLOOR PLAN

- (A) VACUUM PUMPS
- (B) FAN PUMP
- (C) CHIP SCREEN
- (D) CHIPPER
- (E) WOOD STORAGE
- (F) GROUNDWOOD CHEST
- (G) MACHINE CHEST
- (H) GRINDER TANK
- (I) COLD STORAGE
- (J) COMPRESSOR





ENGINEERING and RESEARCH CENTER  
MILLINOCKET, MAINE