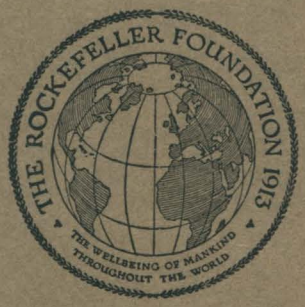
METHODS AND PROBLEMS

OF

MEDICAL EDUCATION

(SEVENTH SERIES)



DIVISION OF MEDICAL EDUCATION

THE ROCKEFELLER FOUNDATION

61 Broadway, New York, N. Y., U. S. A.

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THE SCHOOL OF MEDICINE AND DENTISTRY

OF

THE UNIVERSITY OF ROCHESTER

AT

ROCHESTER, NEW YORK

PREFATORY NOTE TO FIRST SERIES

In the present period of unprecedented progress and readjustment in medicine, the problem of the dissemination of information is becoming increasingly difficult and perplexing. In the field of research, productive effort is so abundant that it is quite impossible for an investigator to keep in touch with general literature except through abstracts or reviews. Moreover, lengthy papers, and especially those dealing with problems of administration, equipment, methods, and maintenance of laboratories and clinics, are year by year more difficult of publication. This is especially true of contributions in the field of medical education, which, in that they are fundamental to all progress, are in the long run of prime importance. Plans of new buildings, methods of instruction, and experiments in teaching are usually published in local journals or for distribution as commemorative volumes in connection with a dedication or inauguration of new facilities. Such material, naturally, is not widely disseminated. Likewise, the traveler to other countries, interested though he may be in fundamental problems of medical education and returning with first-hand information of new buildings and new methods, can reach only a few associates or perhaps the staff of a single institution.

To avoid some of these difficulties, it has seemed advisable to the officers of the Division of Medical Education of the Rockefeller Foundation to collect and publish from time to time brief descriptions of clinics, laboratories, and methods of teaching in different parts of the world in order that the information in convenient form may be brought to the attention of those most interested. It is hoped that the material may be of assistance to those planning improvements in buildings and methods.

The collection of articles here presented constitutes the initial effort in this venture. Other collections will appear from time to time. The recipients of these volumes are invited and urged to make suggestions concerning other material which might be published to advantage in the same form, to comment concerning improvements, and also to offer the names of those who might be interested either in these collections as a whole or in the "separates" representing special fields. These articles are not copyrighted and permission to reprint or utilize in other ways is not necessary.

RICHARD M. PEARCE, *Director*
Division of Medical Education
The Rockefeller Foundation

New York
September 10, 1924

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UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

SCHOOL AND HOSPITAL PLANS

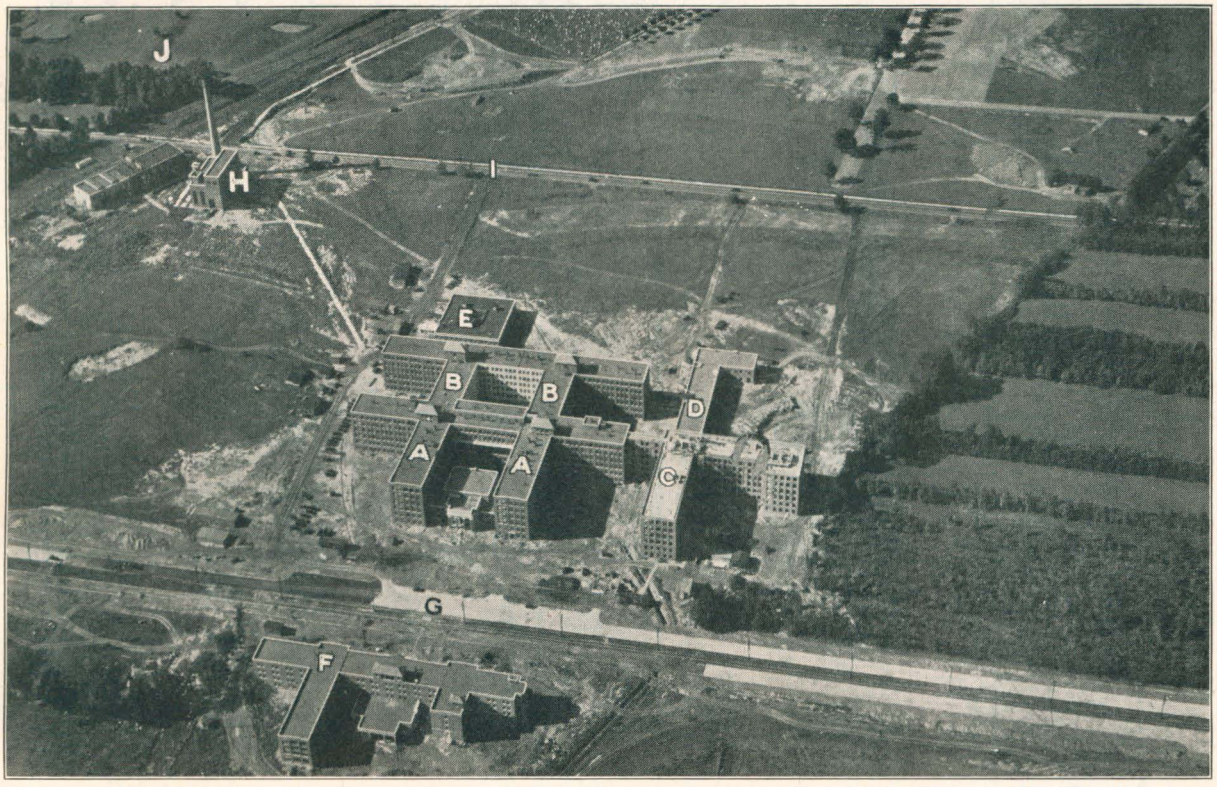
BY

GEORGE HOYT WHIPPLE, M.D.

PROFESSOR OF PATHOLOGY AND DEAN OF SCHOOL OF MEDICINE AND DENTISTRY

PLAN

Two main principles were kept constantly in mind during the planning of the School of Medicine and Dentistry and the Strong Memorial Hospital at the University of Rochester, Rochester, New York: first, the necessity for the closest physical contact between the clinics and the laboratories for the basic sciences; and second, the urgent need for the construction of a plant of the highest efficiency employing a simplicity of structure and the strictest economy. It was believed



Photograph by Air Service of U. S. War Department

FIG. 1.—AIRPLANE VIEW OF BUILDINGS OF THE SCHOOL OF MEDICINE AND DENTISTRY, UNIVERSITY OF ROCHESTER

A—STRONG MEMORIAL HOSPITAL
B—SCHOOL OF MEDICINE AND DENTISTRY
C—MUNICIPAL HOSPITAL
D—STAFF HOUSE
E—LABORATORY ACCESSORY BUILDING
F—NURSES' DORMITORY
G—CRITTENDEN BOULEVARD
H—POWER PLANT
I—ELMWOOD AVENUE
J—OAK HILL SITE

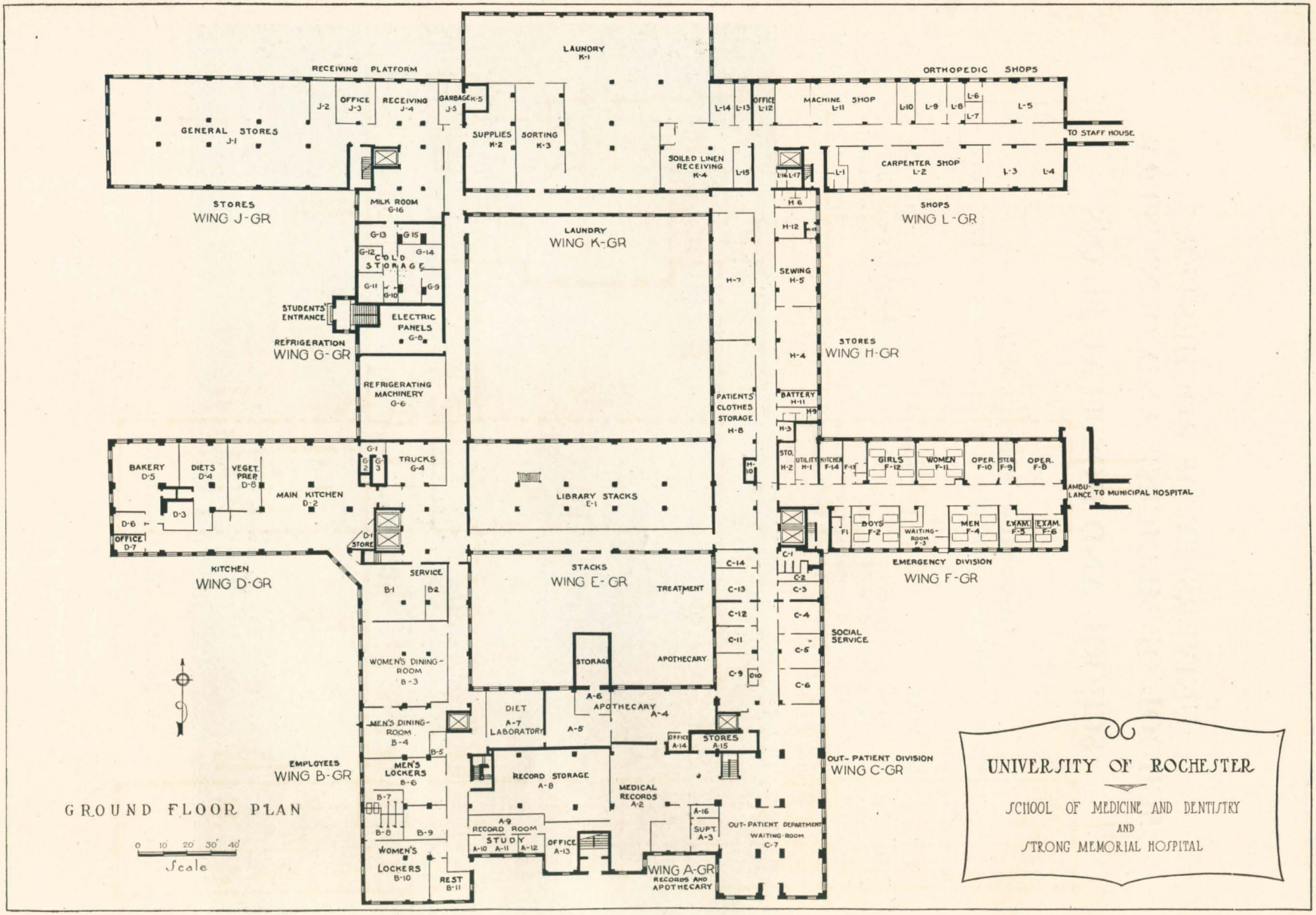


FIG. 2.—GROUND FLOOR

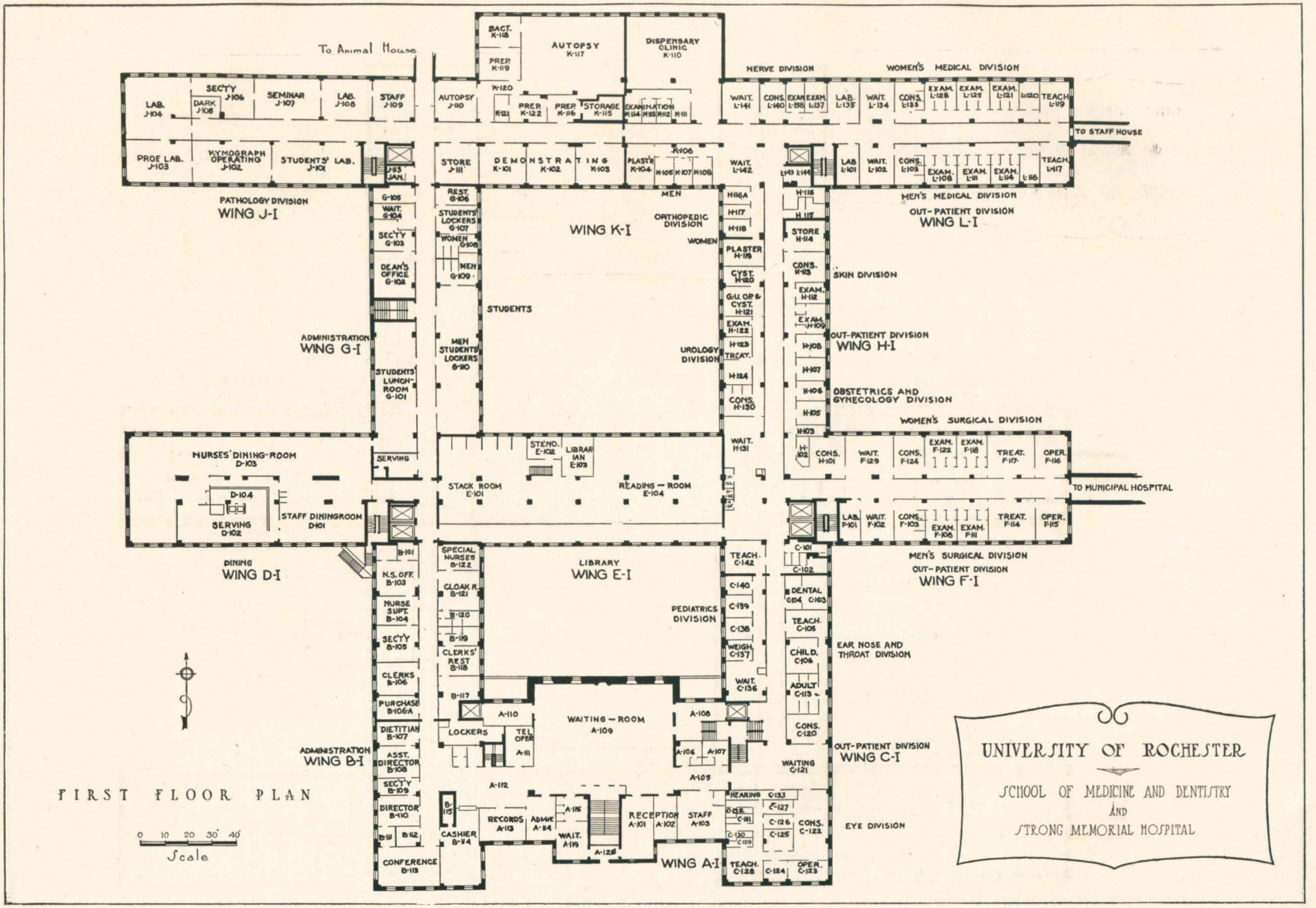


FIG. 3.—FIRST FLOOR

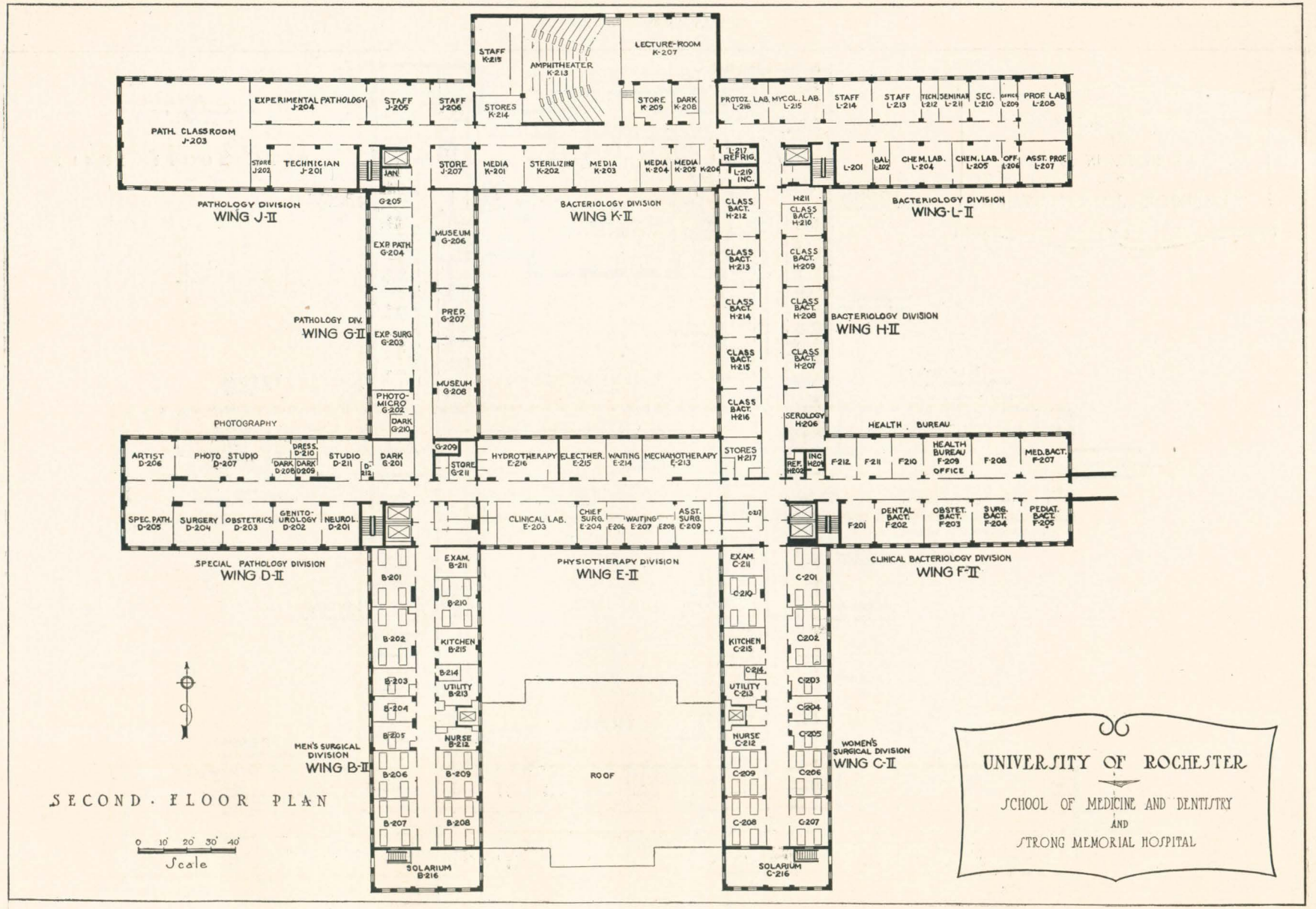


FIG. 4.—SECOND FLOOR

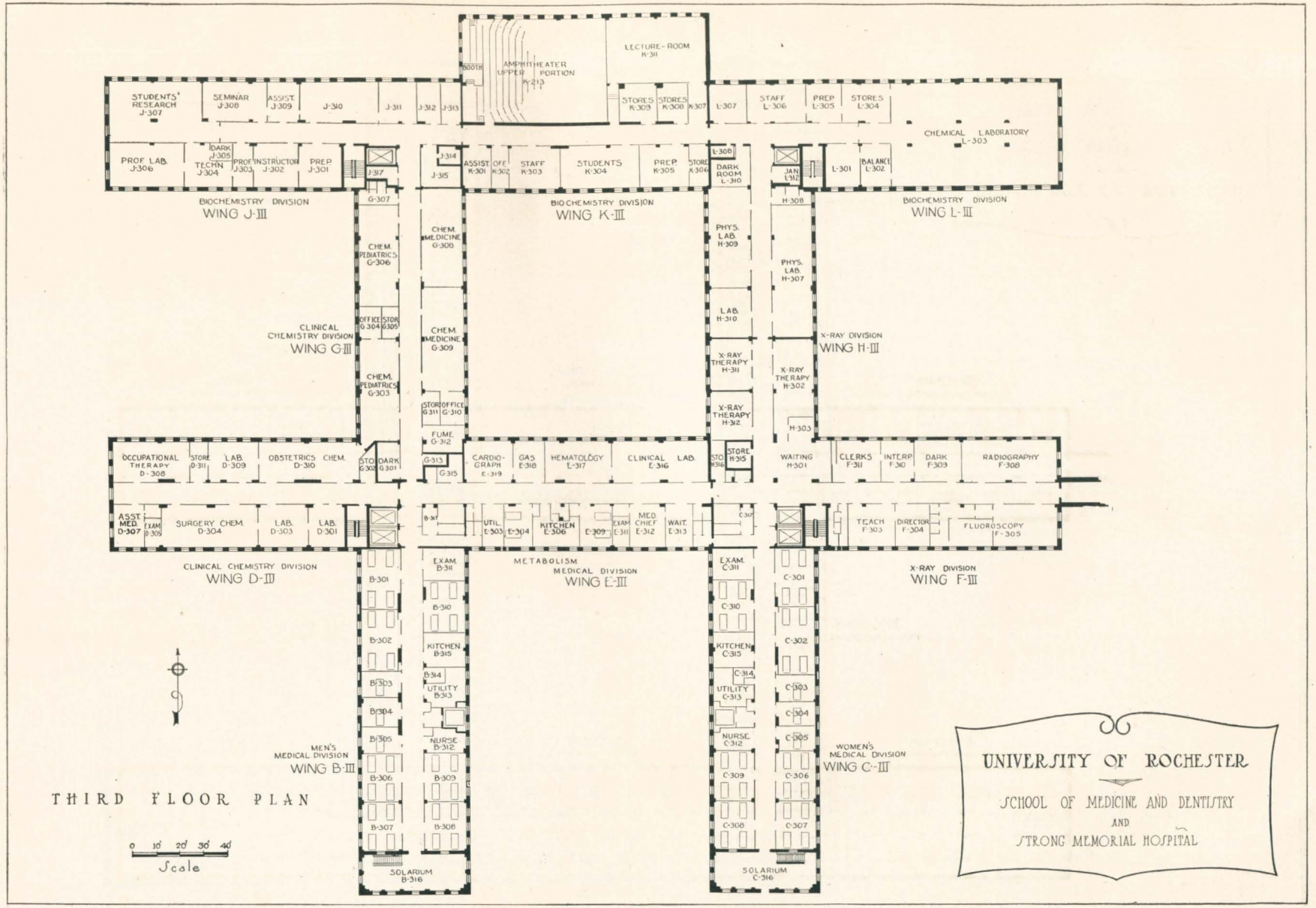


FIG. 5.—THIRD FLOOR

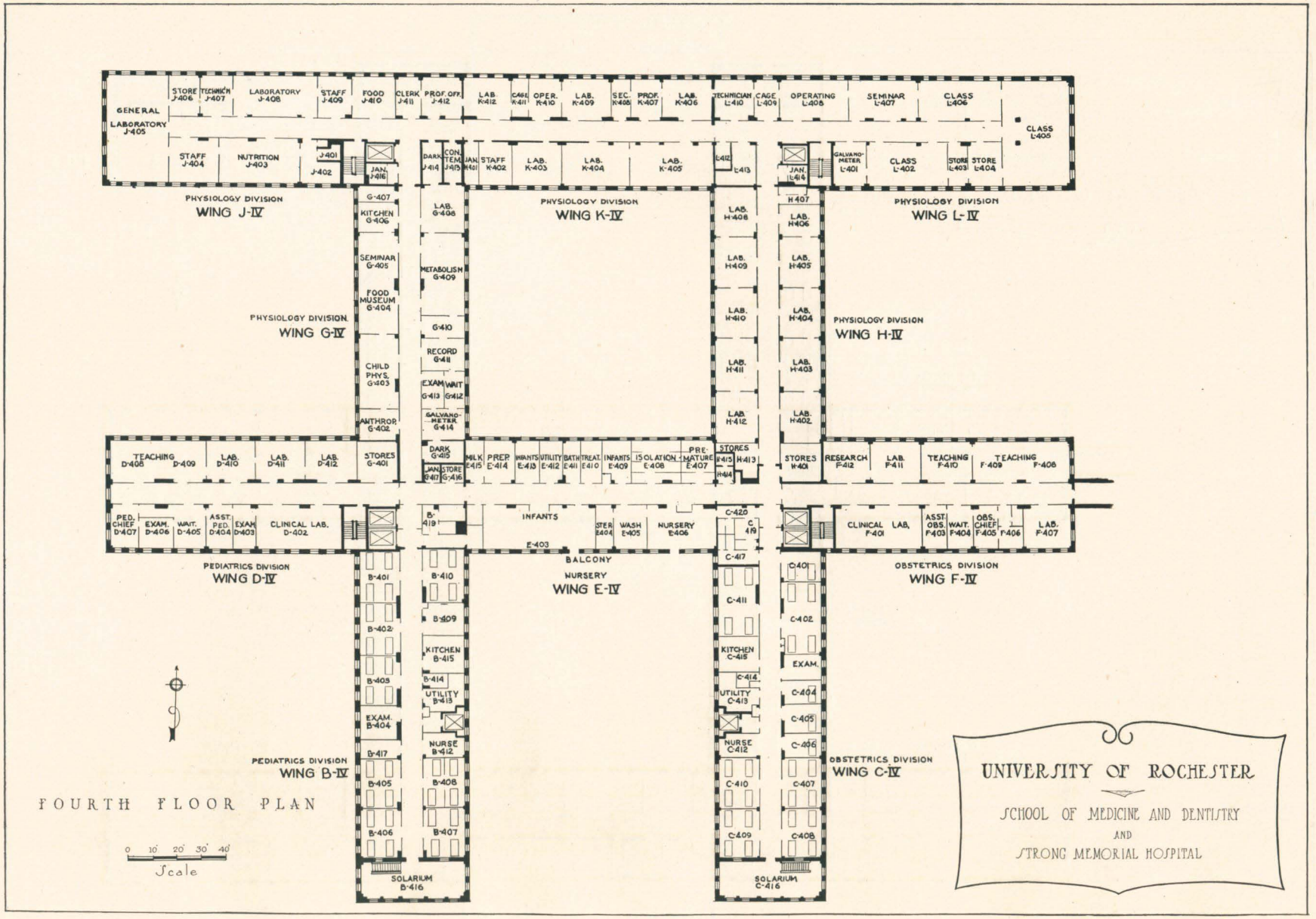


FIG. 6.—FOURTH FLOOR

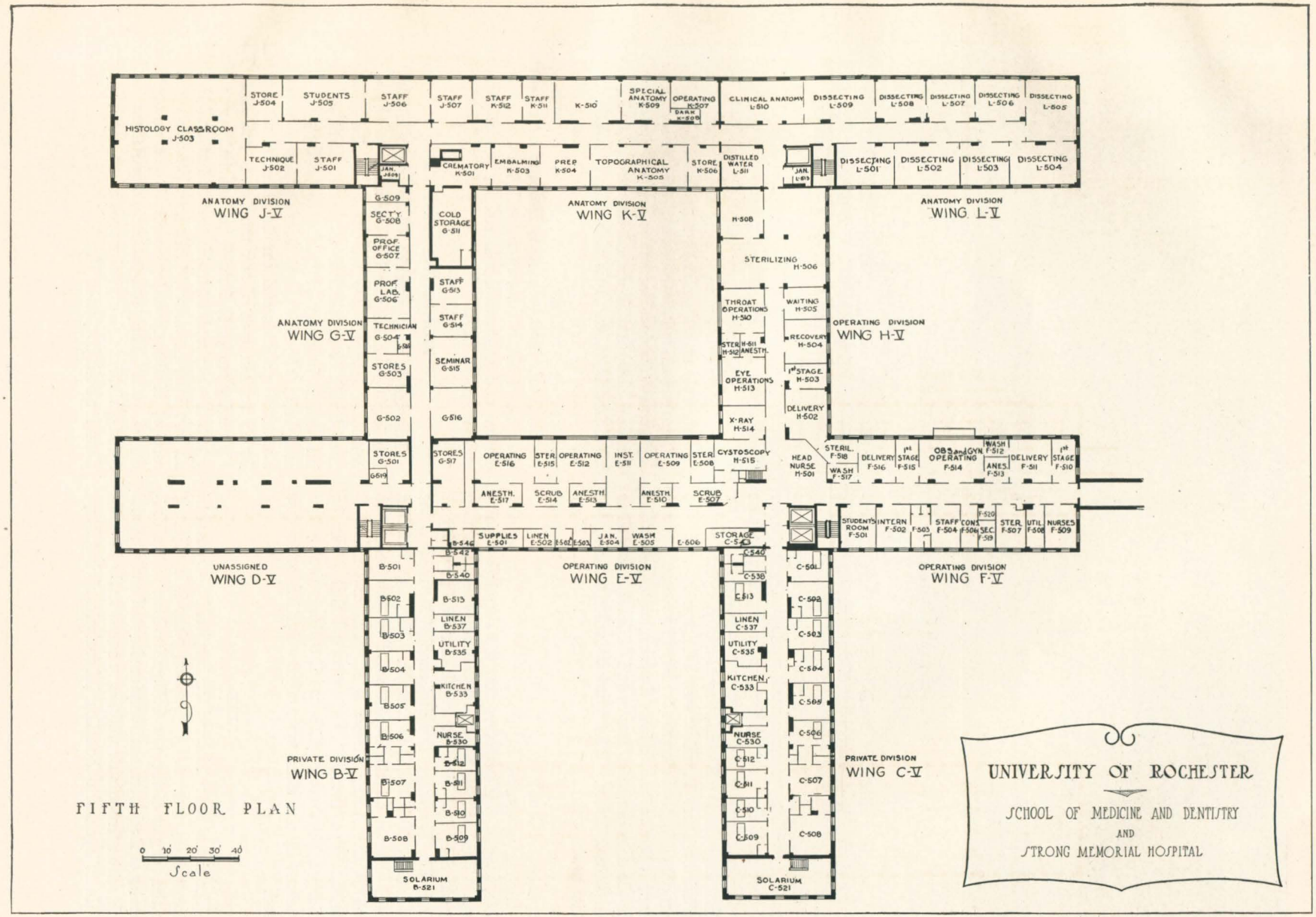


FIG. 7.—FIFTH FLOOR

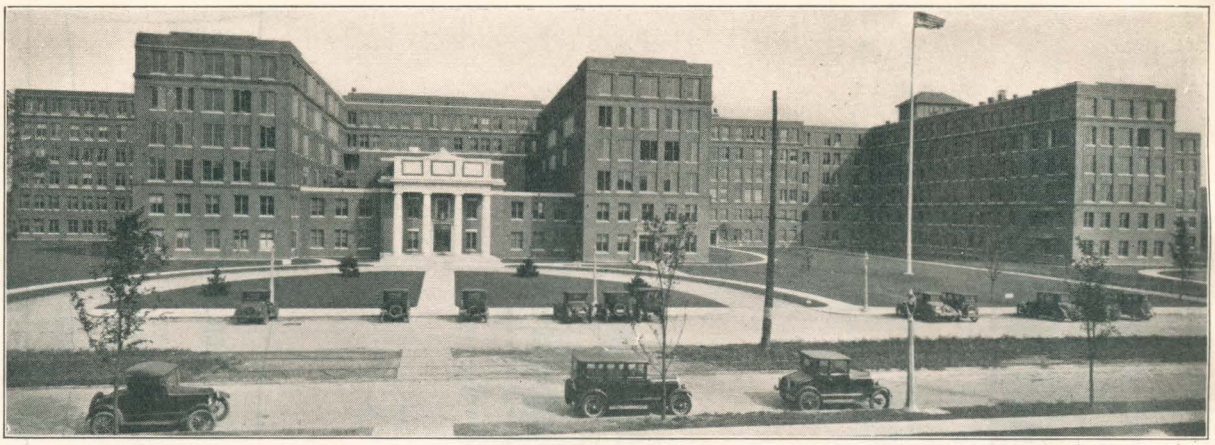


FIG. 8.—SOUTH ELEVATION AND ENTRANCE OF STRONG MEMORIAL AND MUNICIPAL HOSPITALS

that an effort should be made to demonstrate that extreme simplicity and economy of construction could be combined with a maximum efficiency of function.

The older type of hospital construction, in which the familiar pavilion system is used, permits of great waste of time and effort among the groups of persons whose duties take them to widely scattered units. In the new plant we endeavored to do away almost completely with naked corridors. It will be seen that practically all the corridors in the building are bordered by rooms. It was thought best to exclude from the complex central building the dormitories for nurses and for interns as well as the animal house. These various units are situated close to the central plant but separate from it. They are connected by short corridors and so built as to be capable of indefinite expansion.

Having determined to build as compactly as possible, a series of intersecting axes was the obvious solution. This plan was adopted practically simultaneously by the School of Medicine of Vanderbilt University at Nashville, Tennessee, and the School of Medicine of the University of Colorado at Denver. The main building which houses all the departments of the school as well as the Strong Memorial Hospital and the Out-patient Department is so constructed that it can be enlarged indefinitely, without disturbing the central nucleus, by the same type of construction as is now used.

SITE

The site of the school and the hospital is fortunate in almost every respect. In the first place it is adjacent to the campus of the new College for Men of the University of Rochester, and therefore its staff and students will, with a five-minute walk, have access to the libraries of the college and to the college laboratories of chemistry, physics, and biology. On the other hand it is not within the college campus, which might be disturbed by the presence of the many hospital, dispensary, and emergency patients. A central heating plant, constructed to serve both the College for Men, the School of Medicine and Dentistry, and the Strong Memorial Hospital, is situated adjacent to the Lehigh Railroad and midway between the college and the school, which is manifestly an economical arrangement (Fig. 1).

The tract of land controlled by the School of Medicine is adequate for development to any size in the distant future. The plant is served by surface trolleys and rapid transit trains. It is within ten or fifteen minutes walk of the following institutions: the County Hospital and the Almshouse, the County Jail, the State Hospital for the Insane, and the County Hospital for Tuberculosis. All of these institutions will eventually furnish clinical and anatomical material for student training and for special work.

MUNICIPAL HOSPITAL

Through an arrangement with the city of Rochester a Municipal Hospital was built adjacent to the Strong Memorial Hospital (the University hospital) and connected with it on all floors by short corridors. This hospital is in every way like the Strong Memorial Hospital. The Municipal Hospital has a capacity of about 210 patients and can be enlarged without difficulty to take care of any number of patients. The University agrees to furnish professional care without cost to the city and to furnish to the Municipal Hospital at cost interns, nurses, food, heat, laundry, and the services of the operating rooms, laboratories, special clinics, etc. The Out-patient Department of the Strong Memorial Hospital serves as an admitting medium for both hospitals (Fig. 8).

FIG. 9.—MEMORIAL WAITING-ROOM, STRONG MEMORIAL HOSPITAL

CONSTRUCTION

Considerable attention was given to details of construction and the administrative officers bent their energies toward efficient and economical construction of the hospital and of the various school laboratories. For this reason the width of the wings and the concrete skeleton throughout were kept practically uniform. Any deviations from this standard were subjected to the most careful scrutiny and wherever possible avoided. All the amphitheaters and lecture-rooms were placed in one section. This arrangement did away with much disturbance of the framework which is entailed by the distribution of these assembly rooms through various separate wings in the plant. This plan also effects economy in special ventilation and facilitates the adjustment of schedules for the use of the various assembly rooms. The width of all the wings was decreased from the usual 50 feet to 45 feet as it was believed that the extra space on the corridor side of the rooms was of relatively little value and that this economy in construction was legitimate. Experience with these rooms has convinced us that this was sound judgment. The corridors throughout were kept at the width of eight feet. The ceiling height was kept as low as possible; it was determined by the minimum height considered safe for the patients' divisions. The distance from floor to floor was fixed at 11 feet, 2 inches, which is considerably below the average. This could have been decreased slightly in the laboratories on some floors but changing the floor levels would have introduced difficulties and increased the costs.

Throughout all parts of the school the inner surface of the building walls was faced with an inexpensive light gray "sand-lime" brick which reflects the proper amount of light for general laboratory work. The corridor walls and partition walls throughout the school, with the exception of the fire partitions, were of "sand-lime" brick of single thickness built on top of the monolithic slab floor. These brick partitions were strengthened by steel door-frames anchored to the floor and to the ceiling. Experience has shown that these walls are in every

respect satisfactory; they can be taken down and rebuilt with a minimum of effort and expenditure. All of the walls, concrete columns, and ceilings were left untouched by paint. No plaster was used in any part of the school except in the toilet-rooms. All the pipes are exposed. On all of the partition walls the first three courses of brick are of a hard-burned, "iron-spot," yellow brick which serve as a mopboard and have proved to be perfectly satisfactory for this purpose.

FLOOR PLANS

Careful study of the location of the various departments of the school and hospital was made with the idea of placing each department closest to the other departments with which it naturally would have the most intimate relationship.

Sub-Basement

In the sub-basement are placed all the various pipes, conduits, water-heaters, transformers, etc., arranged so that they are easily accessible.

Ground Floor

The ground floor (Fig. 2) contains mainly the utilities including the general storerooms and the receiving rooms, the laundry, and the general shops, including machine shops, orthopedic shops, and instrument and carpenter shops. The emergency division for accident work and the waiting-room for the out-patient clinic are on this level. The apothecary and general record room are situated on this floor and are served by a Lamson carrier system connecting them with all the divisions and the various stations in the Out-patient Department and the Municipal Hospital. The kitchens, the general refrigeration plant, and the rooms for the general help are situated here.

First Floor

The first floor (Fig. 3) contains most of the Out-patient Department, the autopsy suite, and the remaining laboratories for the Department of Pathology. The library is placed in the very center of the whole plant, a

Fig. 10.—Main Library Reading-Room

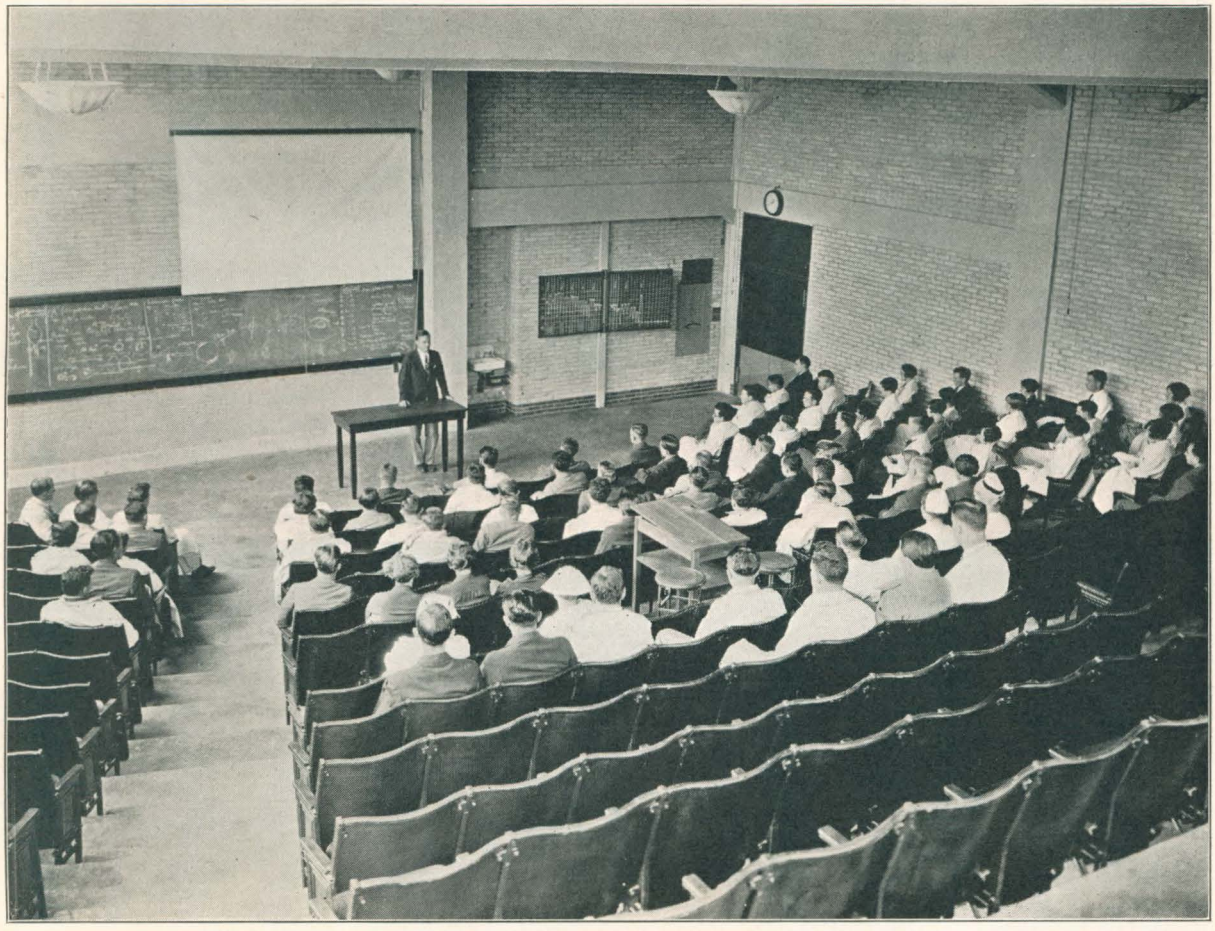


FIG. 11.—LARGE AMPHITHEATER CLASS

large reading-room (Fig. 10) being on the first floor with two stack levels below, giving a capacity for 100,000 volumes.

The students' entrance to the building is on the first level and beside it are the students' locker- and lunch-rooms. The main dining-room for the nurses and the staff is on this floor, as well as the Strong Memorial Hospital waiting-room (Fig. 9) and the offices of the administration.

SECOND FLOOR

On the second floor (Fig. 4) is found the entire Department of Bacteriology combined with the Health Bureau of the city. This fortunate arrangement makes available for teaching a very large amount of field material which comes into the Health Bureau. A media kitchen is a part of this department, and all media for the entire school, the hospital, and the Health Bureau is prepared here economically under the direction of the head of the department. Classrooms for experimental pathology and histopathology are on this floor, and also the museum space which is set aside for general and special pathology. Rooms for the teaching and study of special pathology and experimental surgery are located here. There is also a large area for special work in photography including microphotography, motion pictures, and color photography, and an artists' studio. On this floor are the two divisions for surgical patients together with the related clinical laboratories and offices. There are two surgical divisions on the second floor level of the Municipal Hospital. Hydro-, electro-, and mechano-therapeutics are housed on this floor where these facilities will be readily accessible to the medical and surgical patients. The amphitheater (Fig. 11) and the lecture-rooms appear in the north axis of this floor level and on the floors above and below.

THIRD FLOOR

The third floor (Fig. 5) gives laboratory and teaching facilities to the departments of biochemistry and

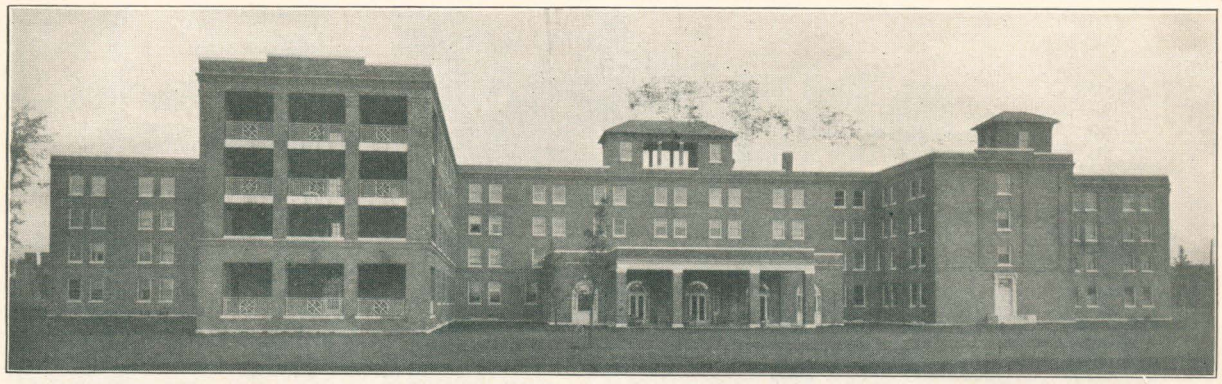


FIG. 12.—SOUTH ELEVATION OF NURSES' DORMITORY

FIG. 13.—NURSES' DIETARY KITCHEN

pharmacology. The chemical laboratories of the various clinics are situated adjacent to the laboratories of biochemistry so that the closest cooperation obtains. The X-ray Department is likewise on this floor and adjacent to it is set aside floor space which will eventually be used for a Department of Physics. On the hospital side this floor shows two divisions of the medical clinic as well as a special metabolism unit and medical laboratories. There are two medical divisions on the same floor level of the Municipal Hospital.

Fourth Floor

The fourth floor (Fig. 6) contains, on the school side, the University Department of Physiology (Vital Economics) and the medical Department of Physiology, while the offices and divisions of the Pediatrics Department and Women's Clinic are on the hospital side. The University Department of Physiology has definite duties toward the undergraduate and graduate students of the Arts and Science College. It also takes part in the instruction in nutrition given to the students of medicine and dentistry. The Department of Physiology of the School of Medicine and Dentistry is particularly responsible for the teaching of medical and dental students as well as for the carrying on of investigations in the field of general physiology. The Pediatrics Department has, besides the two divisions in the Strong Memorial Hospital, two units in the Municipal Hospital on the same floor, accessible through a short passageway between the two hospitals. In the Municipal Hospital are treated the cases of infectious diseases which develop within the city limits, so that this important part of medicine is represented in the school facilities. The Department of Obstetrics and Gynecology (Women's Clinic) is housed on this floor where its offices, laboratories, teaching rooms, and hospital patients are conveniently placed. Its two divisions in the Municipal Hospital are located on the fifth floor adjacent to the operating and delivery suites.

Fifth Floor

On the top or fifth floor (Fig. 7) of the main building, the entire Department of Anatomy is housed. Everything relating to this department except special animal

Fig. 14.—Demonstration and Practise Laboratory for Nurses

quarters is found here; the cadavers for dissection are stored here by refrigeration, and there is a crematory unit by which all dissection material or other cadavers may be cremated according to improved modern methods. The ashes of all of these bodies are kept in separate containers in case these shall ever be claimed by relatives.

In the south half of this top floor are found the two private divisions containing twenty-six beds as well as the general and special surgical operating suites.

SIZE AND COST OF BUILDING

The main building has a cubature of 4,589,954 cubic feet, divided roughly into 2,455,264 cubic feet for the school and 2,134,690 for the hospital. The cost per cubic foot including plumbing, heating, electric wiring, and everything but equipment is thirty-nine cents for the school and sixty-two cents for the hospital. The cost of equipment for the school amounts to approximately four cents per cubic foot and more than six cents per cubic foot for the hospital.

LABORATORIES

It may be pointed out, in addition, that the various clinical departments have ample chemical laboratories, but these laboratories are placed adjacent to the rooms for general chemistry where consultation with the science groups will do away with the necessity of an independent senior chemical appointee on each of the clinical staffs. In like fashion each clinical department has space for bacteriological work in the area devoted to public health work and general bacteriology. This space belongs to the clinic and is occupied by a member of its staff but there is easy accessibility to the experts in the Department of Bacteriology and in the Health Bureau. This arrangement makes a very considerable saving in the clinical budget. In the same way special space for pathology is assigned to each of the departments of surgery and obstetrics, genito-urinary surgery, and neurology. These rooms will be occupied by members of the various clinics designated, but they are so closely related to the Department of Pathology as to form an integral part in that organization. Some departments such as those for photography, X-ray, media kitchen, etc., serve all departments of the school and hospital. The same plan applies to the preparation of histological material for the various departments, including that for special and general pathology. This work is all carried on in one department, the cost being allocated on the basis of work done for each department.

VENTILATION

The ventilation is natural, in general, but is greatly aided by the universal use of the Browne steel-frame windows. Exhaust fans are used only in the kitchen, the toilets, the operating rooms, and the autopsy rooms. Vent ducts were carried straight up to the roof from the patients' divisions, from the assembly rooms, and from certain special rooms. Chemical hoods were vented straight up to the roof by individual flues. Individual "univent" ventilating unit fans were installed in the amphitheater and in the large assembly rooms.

FLOORS

It was determined to use concrete floors in all the school rooms, laboratories, and corridors. After a good deal of experimentation with hardening compounds, fillers, floor paints, etc., we came to a uniform procedure for finishing the floor surface which appears to be quite satisfactory. All cement floors are given a treatment with one of the many commercial hardening compounds. After a suitable interval the dry floor is mopped over once or twice with a liberal coat of boiled linseed oil which is rubbed in thoroughly. After some weeks the floor is given a liberal coat of wax and polished thoroughly with a machine. This gives a floor surface which is impervious to stains, and which is agreeable in appearance and is easily cleaned. A suction cleaning system is installed throughout the plant and this facilitates the routine cleaning.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

ANIMAL HOUSE

BY

GEORGE HOYT WHIPPLE, M.D.

PROFESSOR OF PATHOLOGY AND DEAN

The general floor plans of the animal house (Figs. 2 and 3) at the School of Medicine and Dentistry of the University of Rochester show that the upper floors are designed for the smaller animals which in general are bedded with sawdust, shavings, paper, etc., and therefore are cleaned dry. On the lower floors are the larger animals and particularly the dogs. These animals require a great deal of cleaning with the use of large

FIG. 1.—STANDARD STOCK CAGES FOR RABBITS AND GUINEA-PIGS

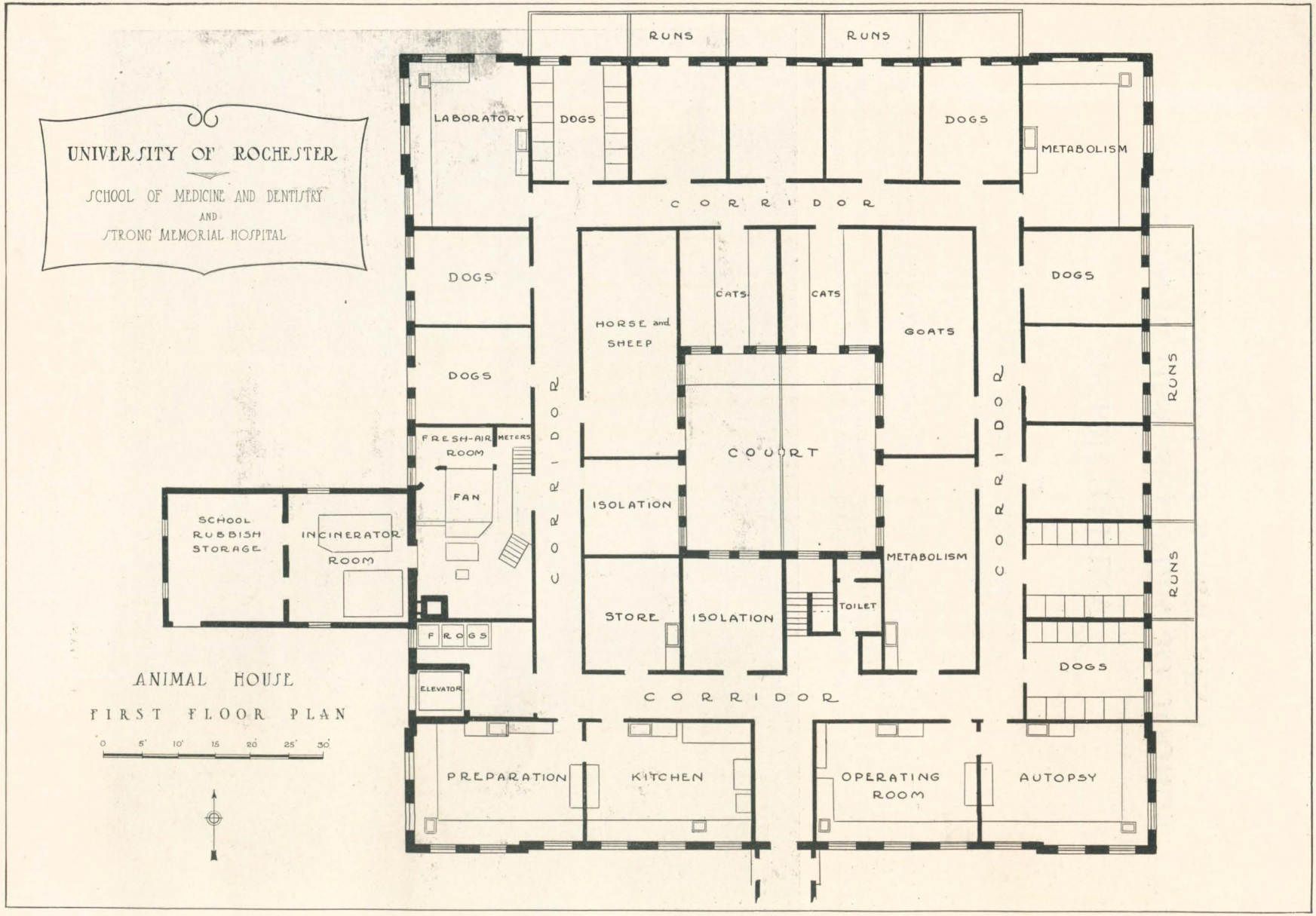

UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY
AND
STRONG MEMORIAL HOSPITAL
ANIMAL HOUSE
FIRST FLOOR PLAN
0 5' 10' 15' 20' 25' 30'
RUNS
RUNS
LABORATORY
DOGS
DOGS
METABOLISM
CORRIDOR
DOGS
DOGS
HORSE and SHEEP
CATS
CATS
GOATS
DOGS
RUNS
FRESH-AIR ROOM
METERS
FAN
COURT
CORRIDOR
CORRIDOR
SCHOOL RUBBISH STORAGE
INCINERATOR ROOM
ISOLATION
METABOLISM
STORE
ISOLATION
TOILET
RUNS
FROGS
DOGS
ELEVATOR
CORRIDOR
PREPARATION
KITCHEN
OPERATING ROOM
AUTOPSY

FIG. 2

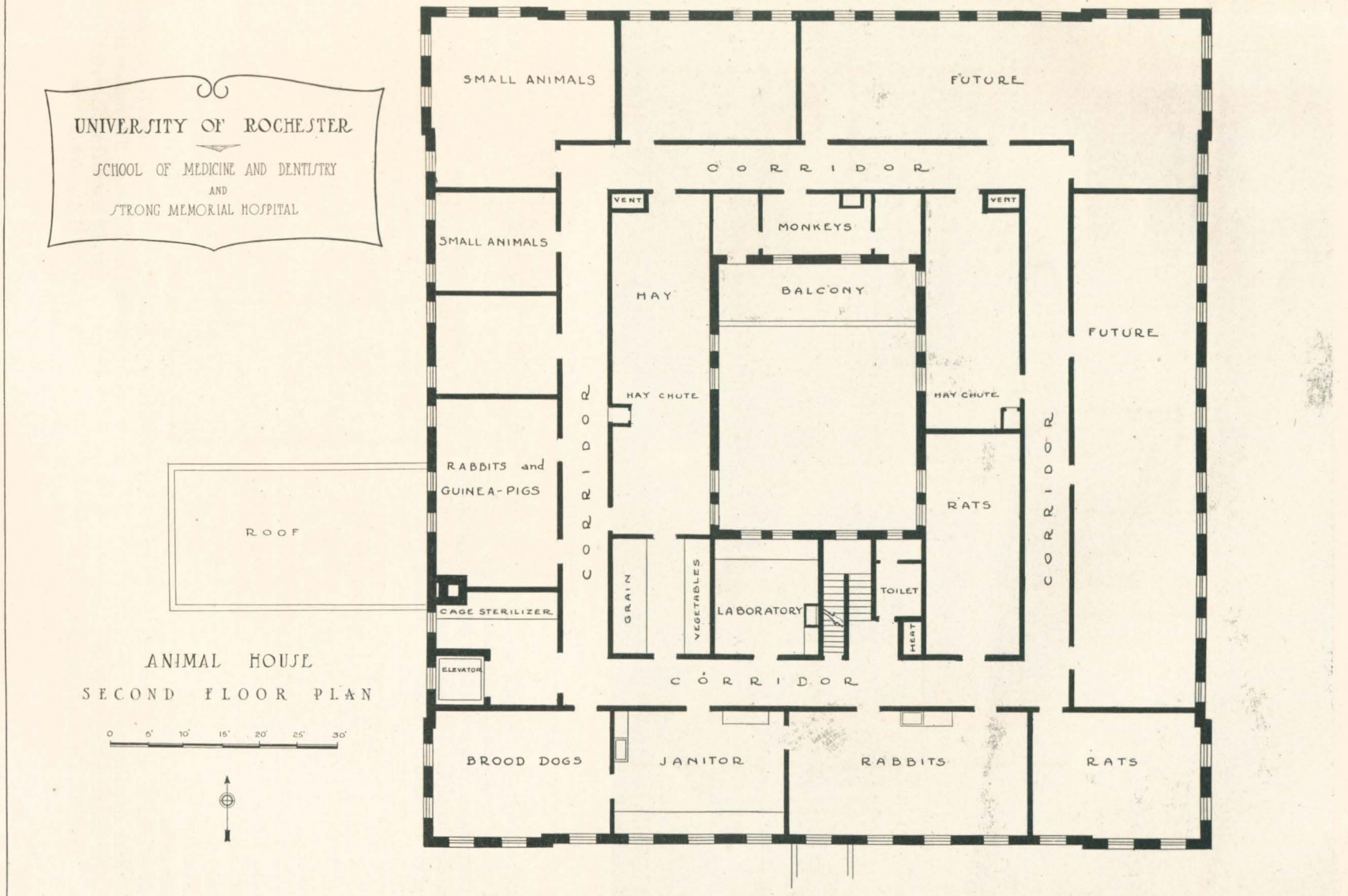

UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY
AND
STRONG MEMORIAL HOSPITAL
ANIMAL HOUSE
SECOND FLOOR PLAN
0 5' 10' 15' 20' 25' 30'
SMALL ANIMALS
FUTURE
CORRIDOR
VENT
VENT
MONKEYS
SMALL ANIMALS
HAY
BALCONY
FUTURE
HAY CHUTE
HAY CHUTE
RABBITS and GUINEA-PIGS
ROOF
RATS
CORRIDOR
CORRIDOR
GRAIN
VEGETABLES
LABORATORY
TOILET
HEAT
CAGE STERILIZER
ELEVATOR
CORRIDOR
BROOD DOGS
JANITOR
RABBITS
RATS

FIG. 3

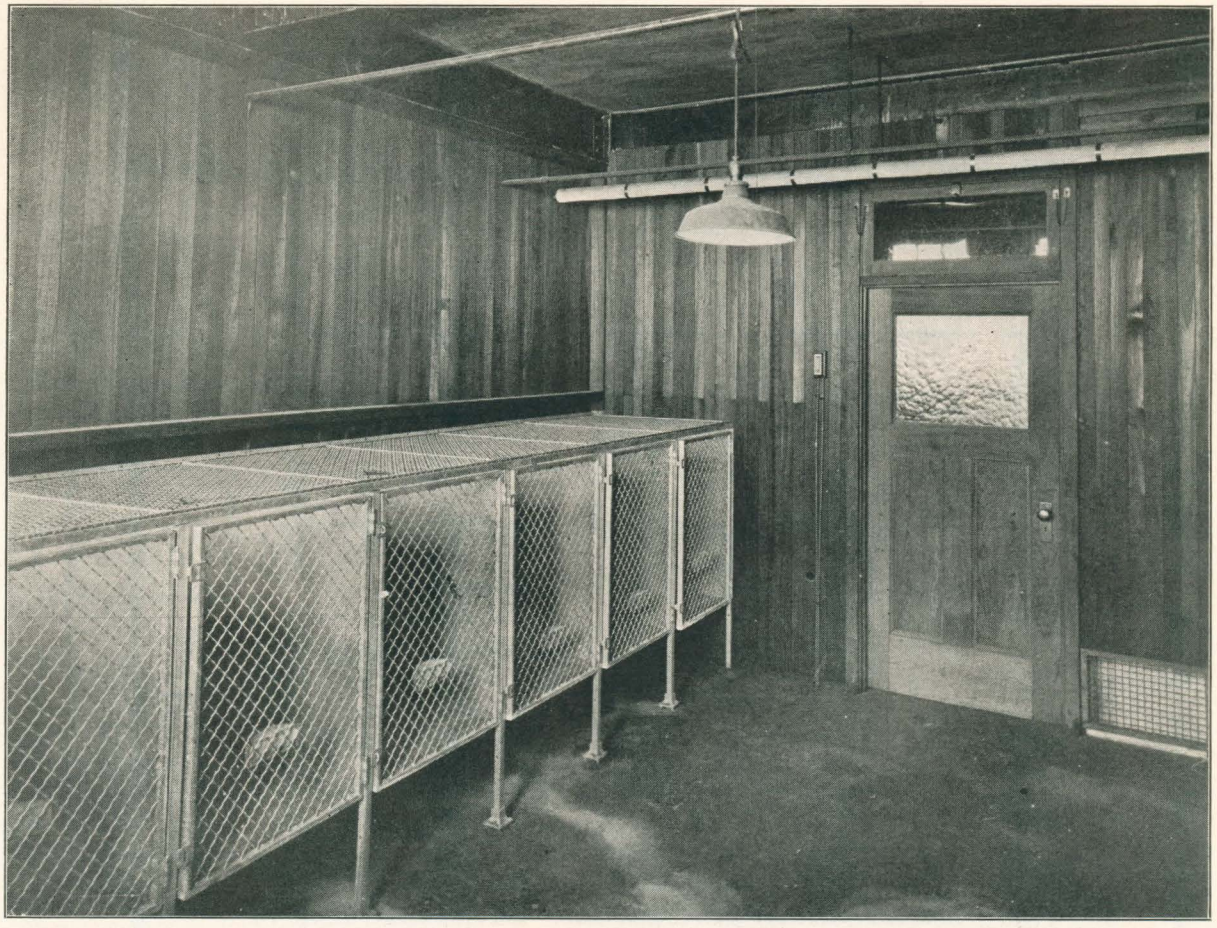


FIG. 4.—STANDARD STOCK CAGES FOR DOGS

amounts of water. In planning this house the object in mind was to provide quarters for animals which would be in every way comparable to those supplied to patients in a modern hospital. For this reason special attention was given to heating, ventilation, cleaning, and the preparation of food. The house is so well ventilated that although hundreds of animals live there constantly, unpleasant odors are almost completely removed. This is effected by two large fans on the roof exhausting the air from every animal room in the building through large conduits. There is also a large positive-blast fan delivering warm air through conduits to all rooms on the lower floor. It is only occasionally necessary to use this latter fan as the exhaust ventilation takes care of practically all conditions. Each room has one or more radiators controlled by a thermostat and therefore held at the predetermined temperature which varies according to the individual group of animals. For instance, the rooms for dogs are kept between 66° and 70°, the rooms for sheep and horses are kept at about 50°. Some of the rabbit rooms are set for 55° to 60° and the rooms for rats are maintained at about 70°.

All the downstairs rooms have a central drain in the cement floor and hot and cold water spiggots so that cages and floors can be cleaned readily and thoroughly. They are so cleaned daily. All dog cages (Fig. 4) are built completely of metal and constructed so that parts are interchangeable. All these parts are heavily galvanized and after four years use, show practically no deterioration.

Large dog cages give ample room for exercise, and under these conditions animals can be kept to a normal life cycle from birth to old age and maintained in a perfectly healthy condition. Each room has a runway, and in good weather each animal gets some exercise outdoors. Two large rooms give facilities for the preparation of routine and special diets. The routine kennel diet is made up of carefully selected table scraps from the hospital and a standard dog-biscuit. Special diets

of all kinds are used for the various animals. Special rooms for minor operations, autopsies, and experiments in metabolism are included in this floor. Special cages for cats with outside runways are also located here.

On the upper floor of the animal house are special outside cages for monkeys and even in this rigorous climate Rhesus monkeys maintain perfect health when kept in an outside veranda throughout the winter. Special cages have been designed for the use of special animals. These need not be described in detail but such detailed descriptions can be obtained by any interested person who may wish to write for this information. Most of the cages for stock rabbits and guinea-pigs are of wood with metal floor covering, and are built in three tiers. This makes an inexpensive cage in which animals get considerable space for exercise. The construction of cages so that they can be cleaned with a minimum amount of time and effort is important, as is the construction which provides for the rapid sterilization of the separate cages. A large sterilizer for the disinfection of metal cages is located on the upper floor. A room for new-born puppies was placed on this floor to isolate mothers and puppies from larger dog colonies downstairs. By this arrangement it is possible to raise litters of puppies without infection with distemper.

It is well known that large colonies of dogs, although they may appear to be free from distemper, do actually include carriers of the virus so that a non-immune animal placed in this environment will contract the disease within a relatively short period of time. Our attempts to control distemper at first included vaccination, but this has been gradually abandoned as the protection is very slight if actually demonstrable. Our entire dog colony is kept in individual cages. Such isolation of the animal is most important; it prevents the rapid spread of the infection and therefore militates against the most virulent type of distemper. Upon recognition of the early signs of clinical distemper the dog is placed immediately in an isolation room and not removed from that room until recovery ensues. The man who cleans the distemper room is not permitted to enter nor to care for the rooms for animals with anemia nor for other experimental animals. The present régime so far has prevented any epidemic of virulent distemper. We feel that accurate regulation of temperature and ventilation and careful feeding to maintain the general bodily condition of the animal as closely to normal as possible is always important in the general control of a large animal colony.

The animal house was the first one of the entire school and hospital group to be constructed, and for good reasons it was built with considerable rapidity to give laboratory and office facilities to the few persons who were then present in Rochester. Largely for this reason the partitions are built of cypress and there is a good deal of inflammable material throughout the house. This would be corrected if the structure were to be built under ordinary conditions.

To protect the animals and the plant itself, the entire area is supplied by automatic sprinkler heads so that a dangerous fire could scarcely get started. A modern incinerator for school and hospital trash as well as animal waste was installed as a part of the animal house unit.

The animal house serves all the departments of the school and the hospital and carries the necessary stock to safeguard as much work as possible. It was decided that all animals should be kept in this building at all times with a few obvious exceptions. Special metabolism experiments may necessitate continuous observation in some room in the main building. In such instances the individual staff member in charge of the experiment is responsible for the feeding and care of the animal until its return to the animal house. In the animal house are rooms and necessary facilities for much of the routine work done with animals under experimental observation, so that weighing, catheterization, bleeding, blood sampling, and stomach tube administration, etc., can all be readily done without removal of the animal from the animal house. Major operations are done in the main building and autopsies are done either in the school departments or in the animal house.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF ANATOMY

BY

GEORGE W. CORNER, M.D.

PROFESSOR OF ANATOMY

The Department of Anatomy has been organized and its laboratory planned in accordance with the idea that a scientific laboratory in a professional school for graduate students is a place where the staff and students co-operate as fully as possible in the study of their subject by working together over preparations and experiments.

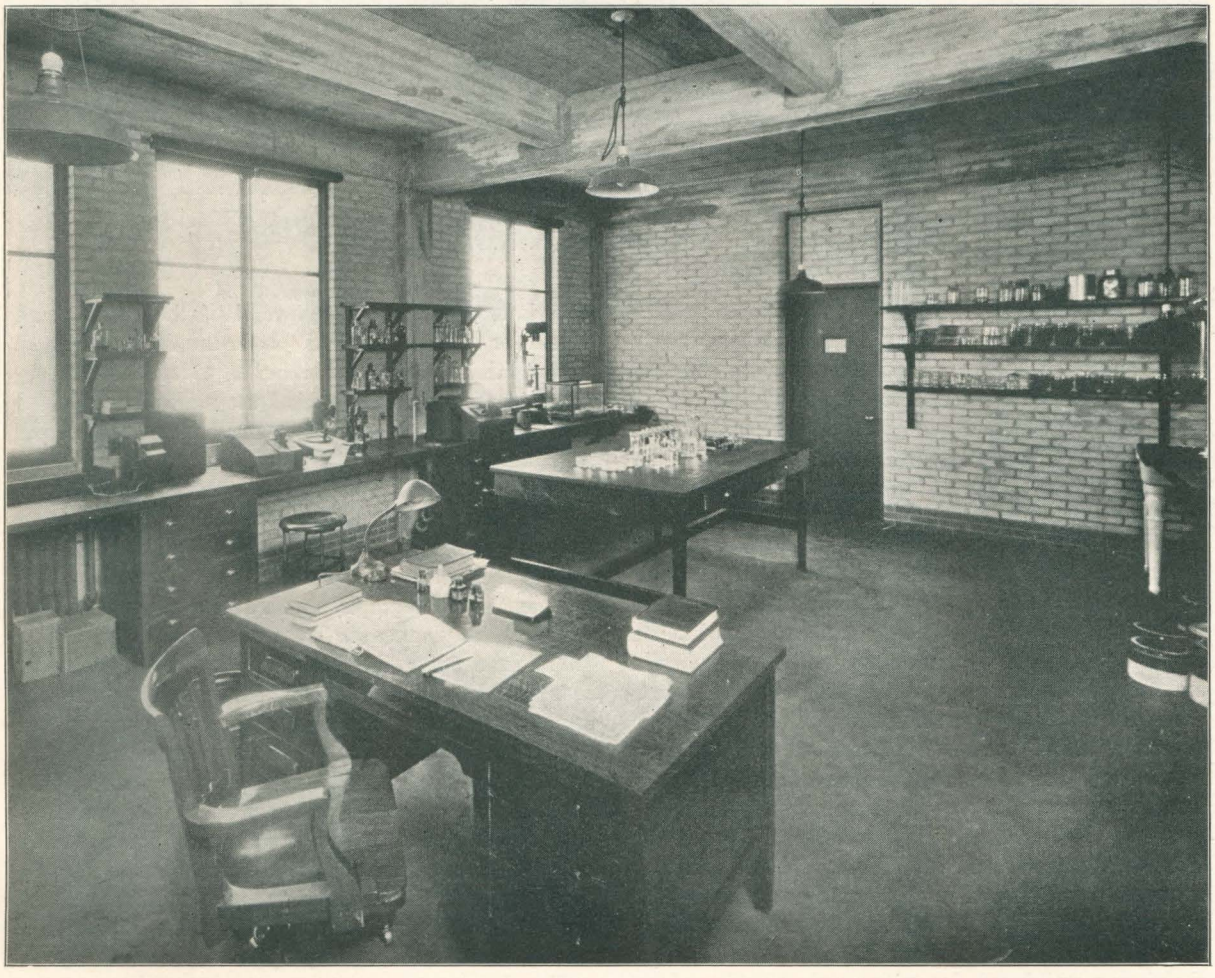


FIG. 1.—ONE OF THE LARGER STAFF ROOMS

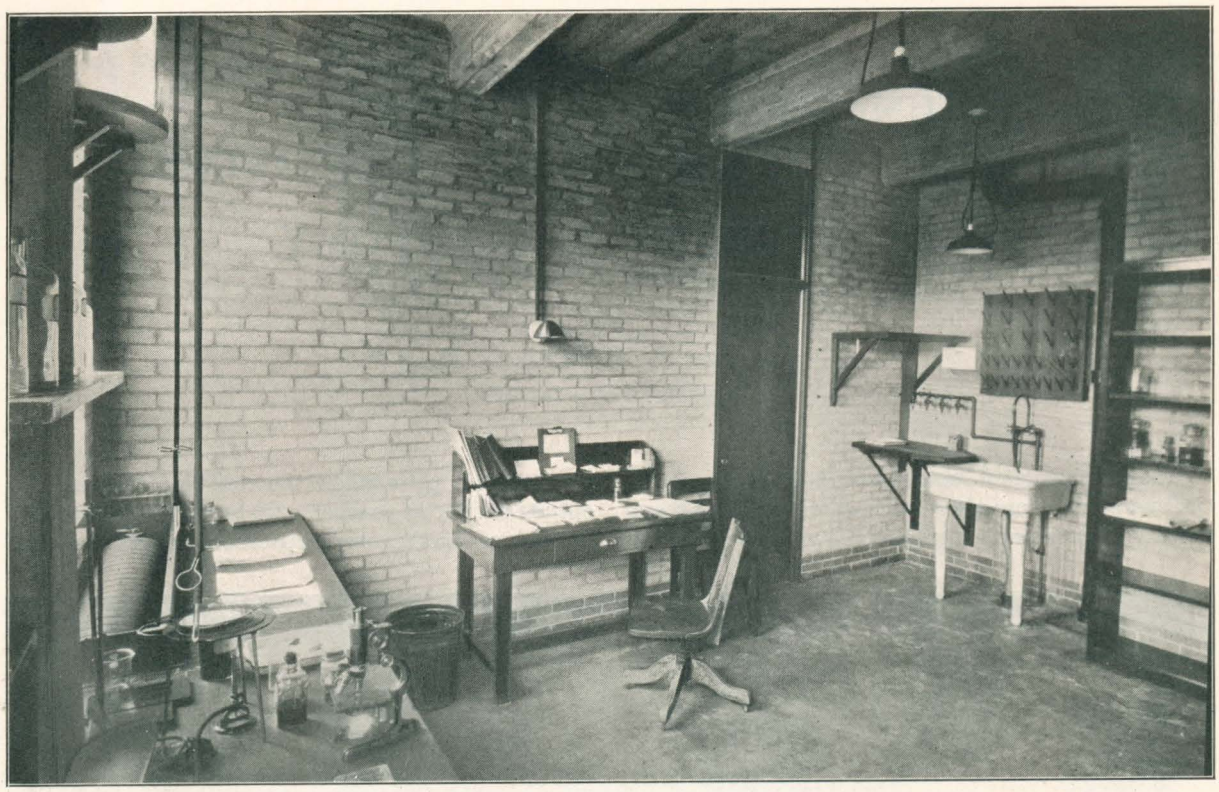


FIG. 2.—ONE OF THE SMALLER STAFF ROOMS

For this reason the department is quite willing to use a lecture-room on another floor, to abandon a departmental museum in favor of a central museum managed by another department, and to convert all its available space as far as possible into actual workrooms, of plain but convenient character.

The laboratory occupies 22,500 square feet, including all of wings G, J, K, and L on the upper (fifth) floor (Fig. 7, page 7). Wing G contains a set of rooms for the professor of anatomy, including the secretary's office, the professor's office, a private laboratory (19 by 20 feet) with a technician's room and a small dark room adjoining, and a room for the storage of the collection of embryological material. On the other side of the corridor in the same wing is a cold storage room for cadavers (opening behind locked doors in wing K), two small rooms for junior members of the staff or for visitors, a seminar room, and two rooms as yet unassigned.

Other private laboratories for members of the staff are located in wings J and K. Three of these are large enough to accommodate a private technician or a student or two (Fig. 1); the others are small units about 19 by 14 feet (Fig. 2). Each is provided with ample shelving, a wall-bench for microscopical work, a large sink, gas, electricity, compressed-air, a steel cabinet, and a desk or writing-table. Several of these rooms are wired for telephones and power-driven centrifuges. There is thus a sufficient number of private rooms to accommodate seven members of the staff (the expected number when the student body reaches seventy-five per year) and three visitors.

One of the staff rooms has been provided with a photographic dark room in case radiographic or other elaborate photographic technique should become necessary in the future. At present a very cooperative Department of Radiography meets all our needs for X-ray work. It is planned to have a central photographic establishment for the entire school. The operating room (K-507) for experimental surgical procedures has been planned to accommodate a few onlookers; it has the form of an "L" so that the workers are not subject to scrutiny or interruption when the corridor door is open. In case a need for wax-modelling or other heavy technical work of some unforeseen character develops, it can be accommodated in the two unassigned rooms in wing G.

Throughout the laboratory, built-in furniture has been kept at a minimum and almost all the rooms can readily be turned to other purposes when necessary.

The department occupies a generous share of the animal house (pages 15–19) including a small room for

rats and guinea-pigs, a large room (about 15 by 30 feet) for rabbits, and a suite of three rooms with two outdoor runs for the colony of monkeys under observation by Dr. Corner.

HISTOLOGY AND NEUROLOGY

Wing J contains at its western end the classroom for histology, room 503 (45 by 54 feet). This room (Fig. 3) will seat ultimately about eighty students. The tables, which stand at right angles to the walls, as shown in Figure 4, are wired to provide for electric microscope lamps and contain very small individual lockers, one at each student's place. Most of the students' equipment (staining jars, etc.) is kept on the table top; the locker serves to contain personal equipment, notes, etc. Two central tables, provided with two sinks, and with gas, electricity, and compressed-air, serve for the performance of experiments and the dissection of animals. These tables are covered with sheet lead. Behind the blackboard (immediately in front of the main door) is a demonstration table wired for six microscope lamps; the lecture-table in front of the blackboard is also wired for a number of lamps and serves for various demonstrations.

The teaching in histology, under the direction of Dr. Franklin F. Snyder, is based very largely on the study of fresh tissues and experimental methods. As far as possible, the functional states of the tissues are studied, rather than the purely static aspects. By way of example, the blood cells are studied on four consecutive days, during which time each student has the opportunity to make preparations of living blood cells with and without vital dyes, to observe phagocytosis in vitro, and finally, to prepare and stain smears by routine methods. The salivary glands are examined before and after stimulation with pilocarpin, the kidney is studied with the aid of vital stains and the latest maceration methods. Each student is given about seventy-five sections of carefully fixed material, which he stains himself for permanent use, but the time spent

FIG. 3.—CLASSROOM FOR HISTOLOGY AND NEUROLOGY

in the classroom is largely devoted to fresh tissues. Each week, two or three students are assigned to join a member of the staff in performing and demonstrating some experiment which is unsuited for performance in the classroom; for instance, the staining of bone by madder feeding, the mechanism of ovulation in the rabbit, etc. These semi-private experiments have proven of the greatest benefit to all concerned. We also ask each member of the class to prepare during the first year a paper on some subject of his own choosing, in any branch of anatomy, to be illustrated by his own preparations; and to make it approach, as nearly as he can in the time available, to the standard of a research paper or a good text-book chapter. The result of this requirement has varied all the way from a negligible *réchauffé* to a promising beginning at research.

For this work students are given free access to the resources of the department, being made as much at home in the laboratory as the facilities and time of the staff permit. To what extent we shall be able to continue this freedom when the school grows larger is, of course, problematic.

Lectures are given sparingly, about once a week. Attendance is of course voluntary. All members of the department undertake them, including those who do not otherwise participate in the course. No effort is made to cover the entire field of histology in the lectures; the intention is to illustrate how a more mature student assembles the results of his study in a few subjects of particular interest and importance. No quizzes nor examinations have been held, up to the present, except for the dealing out of an occasional unknown specimen to be examined and described.

The course in neurology, under the direction of Dr. W. M. Copenhaver, is taught by dissection of the brains of the dogfish, sheep, and man, followed by study of

FIG. 4.—ONE OF THE TABLES IN CLASSROOM FOR HISTOLOGY, SHOWING MICROSCOPE LAMPS AND SEATING ARRANGEMENT

FIG. 5.—TECHNICIAN'S ROOM AND SUPPLY ROOM FOR HISTOLOGY COURSE

serial sections of the human brain-stem. Experimental demonstrations and material prepared by experimental methods (tract degeneration, etc.) are introduced as often as possible; and it is planned to demonstrate from time to time a few very carefully chosen clinical cases.

The histological laboratory is open daily until 10 P.M.; instruction in histology and neurology occupies three afternoons a week, from September until February 28th.

For the work of these courses, the students' histological laboratory is provided with apparatus for direct and opaque projection, a freezing microtome, a set of simple boxes for studying living blood cells, an ample supply of demonstration microscopes, and a special apparatus for microscopic drawing, intended to accommodate large slides of the human brain-stem drawn by students in the neurology course. This apparatus consists of a small projection lantern, with a 4-inch lens and special carriers for 3 by 2 inch slides, fixed to the wall so that it projects the image downward onto a drawing-board adjustable to two positions giving magnifications of three and seven.

Adjacent to the students' histological laboratory are the technician's room and a small room intended for storage of histological demonstration specimens and also for the general storage of microscopical materials and laboratory supplies (Fig. 5). The technician's room is provided with a center table covered with sheet lead, containing a sink which is equipped with a series of taps to provide for washing of histological specimens. There is an electrically heated paraffin oven and a drying oven. This room serves also, by means of a window with a counter opening into the corridor, as a supply room for the students in histology and neurology.

Room J–505, intended for advanced students, contains a set of large individual lockers, shelves for chemical supplies, a fume-hood, and two fixed lead-covered tables equipped with gas, compressed-air, and electricity. It serves primarily to provide locker space and laboratory room for students who are accepted as research workers in the department. In most cases such students are taken into the private rooms of the instructors, but it is desired to give them at least a small place which they may call their own. At present this room is also used for special researches on smooth muscle of the re-

productive tract, in which several workers take part, and it is, therefore, fitted with a Brodie-Starling clock and a large water-bath specially constructed by the Wilmot Castle Company.

One member of the staff, in charge of histology, has his private laboratory in wing J.

GROSS HUMAN ANATOMY

The course in gross human anatomy is given from September until February 28th. The dissecting rooms are open daily until 10 P.M. and the instructors are present during five forenoons of each week. Instruction is given by means of dissection, under supervision which is deliberately made as light as possible. The use of dissecting manuals is discouraged, the plan of dissection being indicated verbally by the instructors, with frequent alteration to fit special needs. There is constant discussion and informal questioning over the work, but no formal quizzes nor examinations have as yet been held. In the time available (which is apparently shorter than in other medical schools), it is hardly possible to dissect the entire body with the great perfection which can be obtained where dissection is done throughout two years. Moreover, it is obvious that no student can be expected, without detriment to his other work, to become proficient in the entire field of gross human anatomy. It is our chief effort, therefore, to teach the principles of organization of the body, a good technique of dissection, and the use of reference books and of other means of study, so that the student may be prepared to continue educating himself in anatomy according to the needs of his future years. We do not give formal lectures in gross anatomy, but now and then, when questions of general interest arise, members of the staff assemble the class and speak informally. Such a procedure seems to be necessary when dealing with complicated matters like the arrangement of the peritoneum, the cerebro-spinal spaces, etc.

The dissecting rooms (Fig. 6) are nine in number and comprise four units and one extra room. Each of the

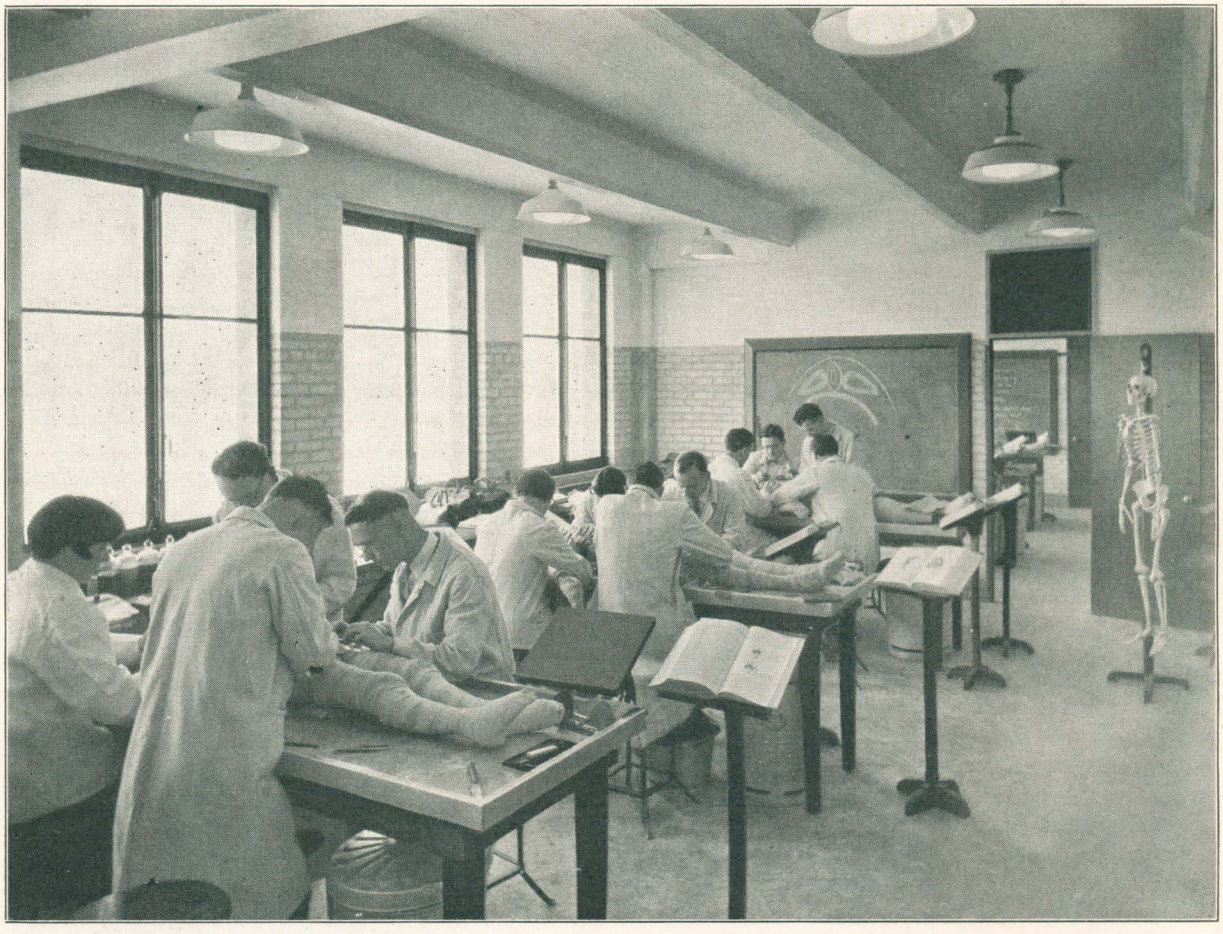


FIG. 6.—ONE OF THE DISSECTING ROOMS

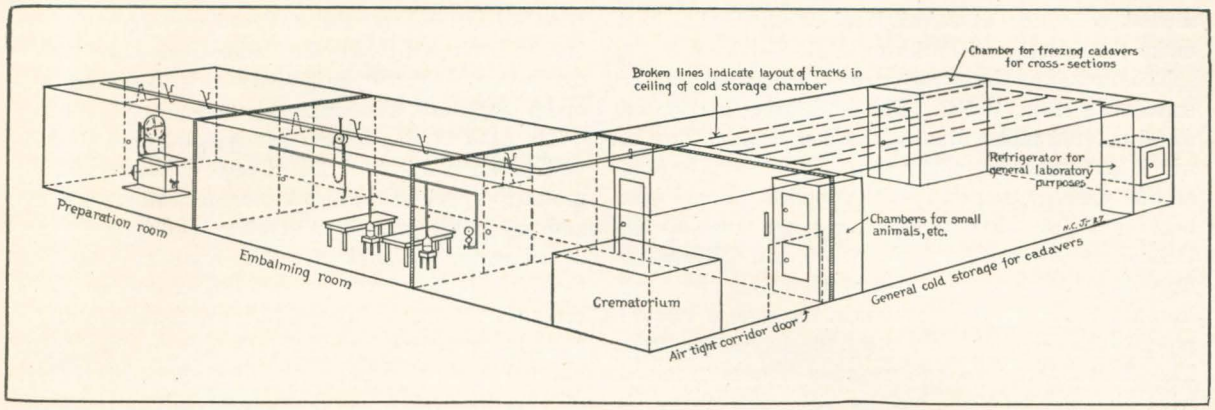


FIG. 7.—SCHEMATIC PERSPECTIVE DRAWING OF THE SUITE OF ROOMS USED FOR PREPARATION AND STORAGE OF CADAVERS

four units consists of two rooms, one containing two tables, the other containing three, making one instructor's section of twenty students. The total capacity thus amounts to eighty in the four units, and eight places in the extra room which is intended to serve in the future for students of art and other persons who wish to dissect. We are entirely convinced of the advantages of small dissecting rooms, which are quieter and easier to keep clean than larger units. They tend also to do away with mass methods of instruction; but they cannot be handled without a sufficient staff. These dissecting rooms are each provided with a sink, a wall-bench, metal covered dissecting tables of the simplest design, a blackboard, and an articulated skeleton on a stand. X-ray viewing boxes are to be provided. Owing to the northern climate of Rochester, skylights were opposed by the architects and the rooms have been lighted with fair success by the installation of 200-watt ceiling lights in diffusing units, so arranged that each table receives the light from four such lamps. This installation was designed by the General Electric Company.

It is planned that applied anatomy will be taught during that part of the medical course in which the students are first admitted to the surgical clinic and operating rooms. The study room, K-505, will be supplied with special dissections and teaching preparations as fast as they can be accumulated. This room and its material will be open at all hours, and a representative of the Department of Anatomy, working in conjunction with the surgical clinic and the Department of Medicine, will conduct demonstrations and special dissections. A dissecting room of four tables is also provided for the use of this course, and room K-504, next to the study room, will be provided with a band-saw and other apparatus for the preparation of cross sections and the bulkier kind of topographic specimens.

As will be seen from the plan and from Figure 7, three rooms are devoted to the care of material for gross anatomy. These rooms form an independent unit and can be shut off from the rest of the building by closing two doors. Material brought up on elevator No. 1 need only be transported across the corridor and through the air-tight door of room K-501. Into this room open both the storage room and the embalming room. K-501 contains a cremation oven constructed by the Morse-Boulger Destructor Company. It is heated by city gas raised to a higher pressure by a compressor. The oven is so designed that the heated gases pass under its floor twice before entering the flue; owing to the presence of a burner in this tortuous smoke chamber, the smoke is almost entirely consumed. The temperature of the oven is recorded by an ordinary pyrometer made by the Taylor Instrument Companies.

The cadaver storage room measures 19 by 28 feet. The brine coils are connected with the central cooling system of the institution and the temperature is maintained fairly evenly at 30° F. without requiring any attention from the Department of Anatomy except an occasional check of the thermometer. The room is insulated in the usual way and bears on its ceiling six overhead tracks of the type used in packing houses, so connected that four of the tracks are in communication at both ends of the room and two of them at the front end only. Preserved cadavers are suspended on hooks shaped like blunted ice-tongs which are caught in the external auditory meatus; the hooks in turn are attached to rollers running on the tracks. The space is sufficient to store about 150 bodies. An inner chamber with extra brine coils provides for temperatures low enough to freeze a cadaver hard for cross-sections; this room is just large enough to hold a body in either horizontal or vertical position. There are also two small spaces at the front, with separate doors, for the temporary storage of dead animals, parts from the dissecting room, etc. It should be added that the design of this storage space is adapted, with improvements, from that constructed

several years ago at Johns Hopkins Medical School under the direction of Professor L. H. Weed.

The track from the storage room is continued into the embalming room, K-503. The embalming is done on metal covered tables fitted with roller casters, three of which (or four in emergency) can be placed on the floor at one time. Compressed-air, supplied through the house main at thirty pounds per square inch, is led through an adjustable reducing valve, and delivered at from three to five pounds pressure (through a pipe hung from the ceiling) to three outlets at the ends of vertical pipes which drop to within about 6½ feet of the floor. The embalming fluid, in five-gallon bottles provided with clamped stoppers bearing two glass tubes, is placed at the side of the embalming tables on small tabourettes, and the fluid is forced into the femoral arteries by connecting one of the glass tubes to the air outlet and the other (which passes to the bottom of the bottle) to the cannula. When injection is complete, the suspension hooks are placed in the ears and the bodies are lifted onto the track by the aid of a chain-hoist fastened to the ceiling. After the injected body has been thoroughly cooled in the cold-storage room, it is painted with melted vaseline, which instantly hardens upon the surface, and the extremities are wrapped in tissue-paper and muslin bandages.

A very careful record is kept of all bodies received. At the end of the dissection, as much as possible of each cadaver is gathered up in large covered cans kept for the purpose under the dissecting tables, and these remains are cremated separately, and the ashes preserved in case of claim.

SPECIAL COURSES; RESEARCH

It is intended in the future, as the staff grows larger, to supplement the basic courses by various special courses, to be given by members of the staff according to their own interests. Enrolment in these classes will of course be voluntary and the subjects will often change from year to year. The history of anatomy is taught indirectly by frequent references to older works and by the exhibition of books and portraits from time to time in the laboratories and dissecting rooms; in the future an informal course of conferences on this subject will be given when there is demand.

The professor of anatomy conducts a seminar composed of members of the staff and visiting workers, a few students admitted by invitation (including any who may be carrying on investigative work in the laboratory), and a few guests from other departments.

The staff of the department is now engaged in investigation as follows. Dr. George W. Corner: the reproductive cycle of the higher primates (Macacus rhesus and man), early human embryology, and special phases of the history of anatomy. Dr. Franklin F. Snyder: the reproductive cycle of platyrrhine monkeys, the production and function of fetal hormones, and the reproductive cycle of the rabbit. Dr. W. M. Copenhaver: factors governing growth of organs, by methods of experimental embryology, especially transplantation of the heart in amphibians; and factors regulating the heart-beat in amphibian embryos. Dr. Dorothy H. Andersen: structure of the lymphatic system of the female reproductive organs, structure of the tubo-uterine junction in mammals, and absorption of particulate matter from the Fallopian tube.

At the present writing five students, out of a total enrolment of fifty-four in the school, are engaged in research in the anatomical laboratory, all of them working on questions of physiological anatomy of the reproductive organs. There are also three visitors, two of them from other American laboratories and one from England on a travelling fellowship, all of whom are engaged in investigating problems of reproduction.

STAFF

George W. Corner . . . . . Professor of Anatomy
Franklin F. Snyder . . . Assistant Professor of Anatomy
Wilfred M. Copenhaver . . . . . Instructor in Anatomy
Dorothy H. Andersen . . . . . Assistant in Anatomy
[1] John C. Wells . . . . . Assistant in Anatomy

The personnel of the department includes also: one illustrator (serving the whole institution), one secretary, three technicians, one technician's helper (serving one other department also), and one embalmer, who is also caretaker of the animals maintained by the department. The administration of the hospital provides janitor service.

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $22,400.

[1] Part-time.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF PHYSIOLOGY

BY

WALLACE OSGOOD FENN, PH.D.

PROFESSOR OF PHYSIOLOGY

The chief responsibility of the Department of Physiology aside from its research work is a course in physiology for medical students. This course is taken during the student's first year and occupies half his time from the first of March until the end of the academic year. During the remainder of the year the staff is free for research work. In addition there is a small amount of instruction for nurses in collaboration with the Department of Anatomy.

With the present small classes which are being admitted to this institution, the staff necessary for this amount of teaching is not large and consists of the professor, the assistant professor, and one assistant. At the present time the assistant is a medical student with a special ability and interest in physiology who has elected to spend his second year largely in teaching and research in physiology and who holds a fellowship sufficient to pay his expenses. He is

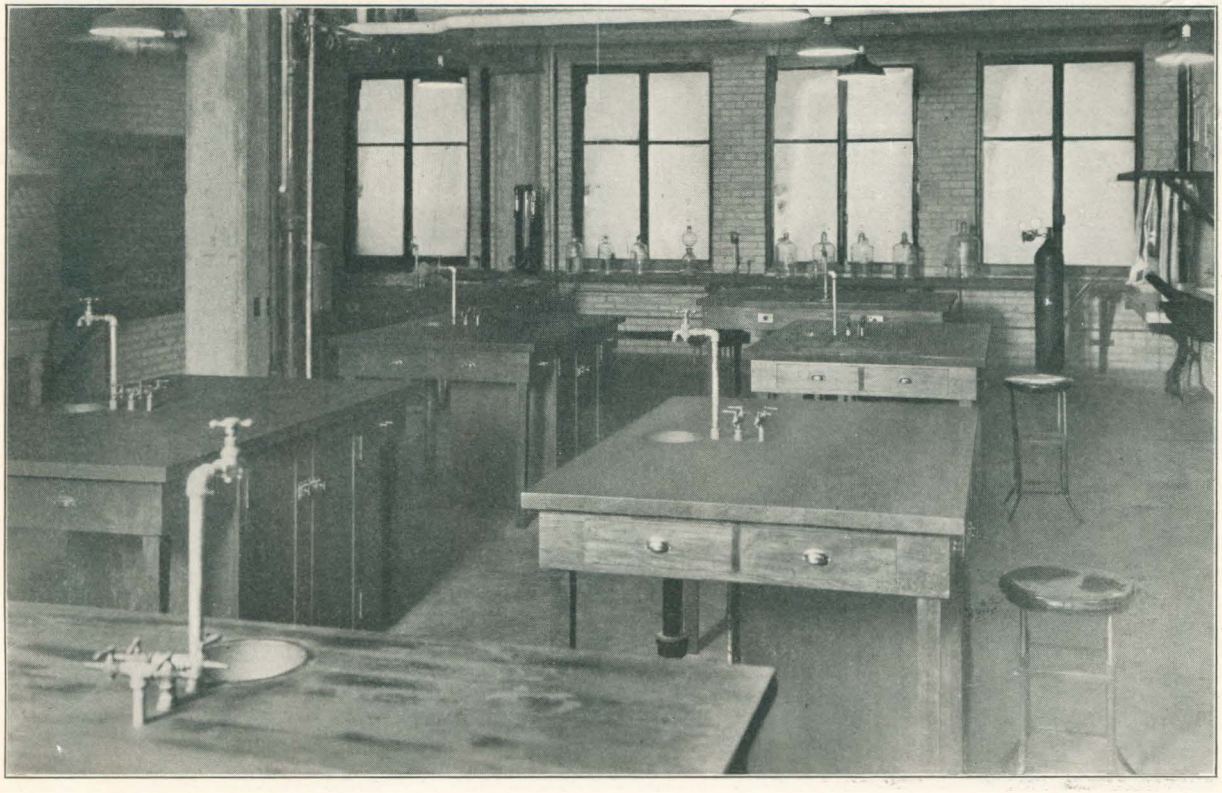


FIG. 1.—TABLES IN THE MAIN CLASS LABORATORY, ROOM L-405

entitled to live in the staff house during this time.

The technical staff consists of two men, who are more useful in dealing with the many necessary mechanical contrivances of a physiological laboratory than are women. Help in washing glassware, etc., as well as janitor service and secretarial work is shared with other departments.

EQUIPMENT

The space assigned to the Department of Physiology comprises 276 feet of corridor with its adjoining rooms, or 12,700 square feet of floor space. This exceeds the present needs and only about two-thirds of it is fitted up. The general type of tables, sinks, plumbing, and other fixtures is similar to that elsewhere in the building. The rooms thus far designated for class use are six in number including a storeroom, a seminar or demonstration room, and four laboratories. One of the laboratories (L-408, Fig. 6, page 6) to be used for mammalian experiments, has four long-paper, electrically driven kymographs, an overhead supply of gas, air, and

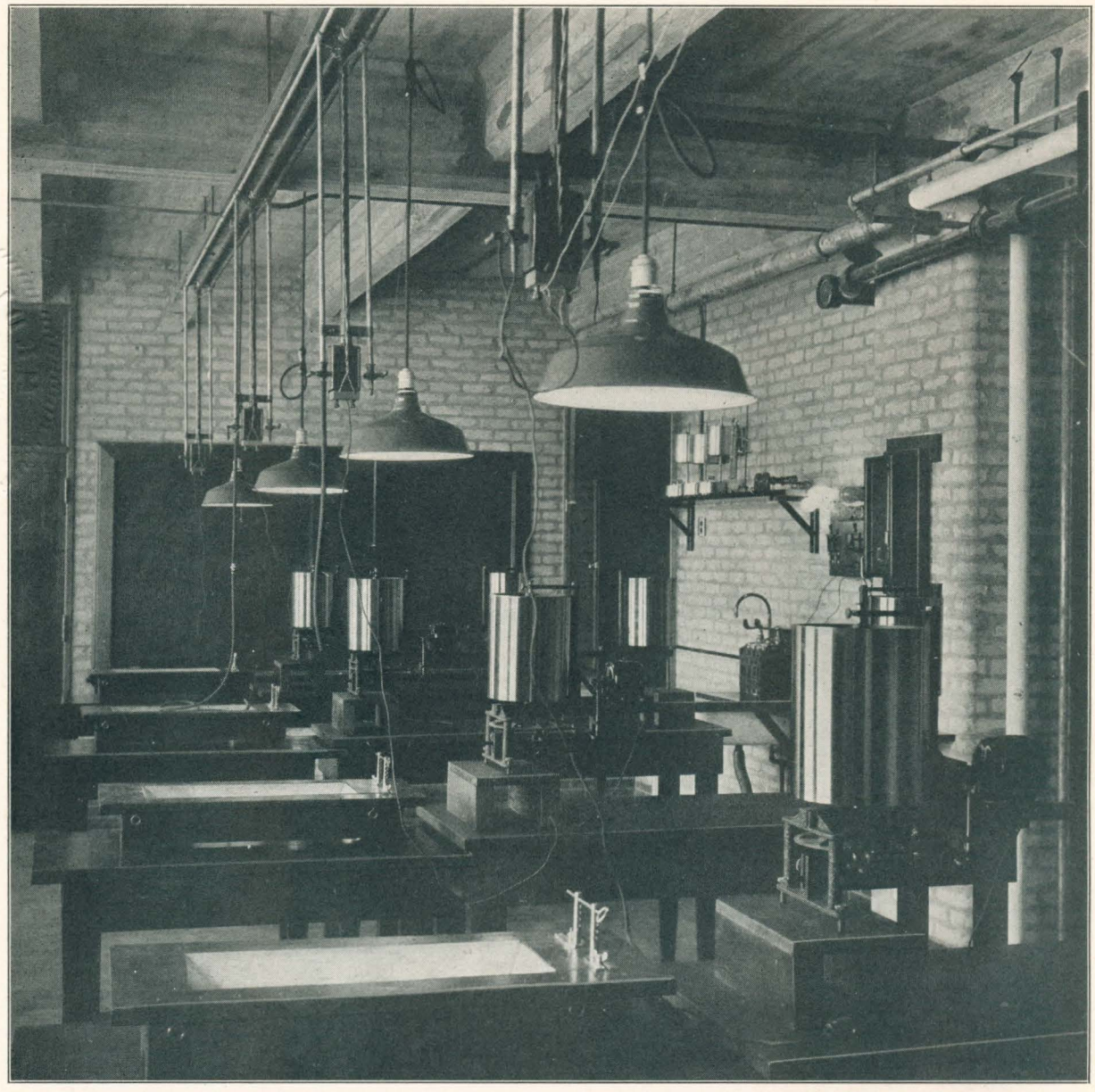


FIG. 2.—LABORATORY FOR MAMMALIAN EXPERIMENTS. DISTANCE BETWEEN TABLES IS FIVE FEET

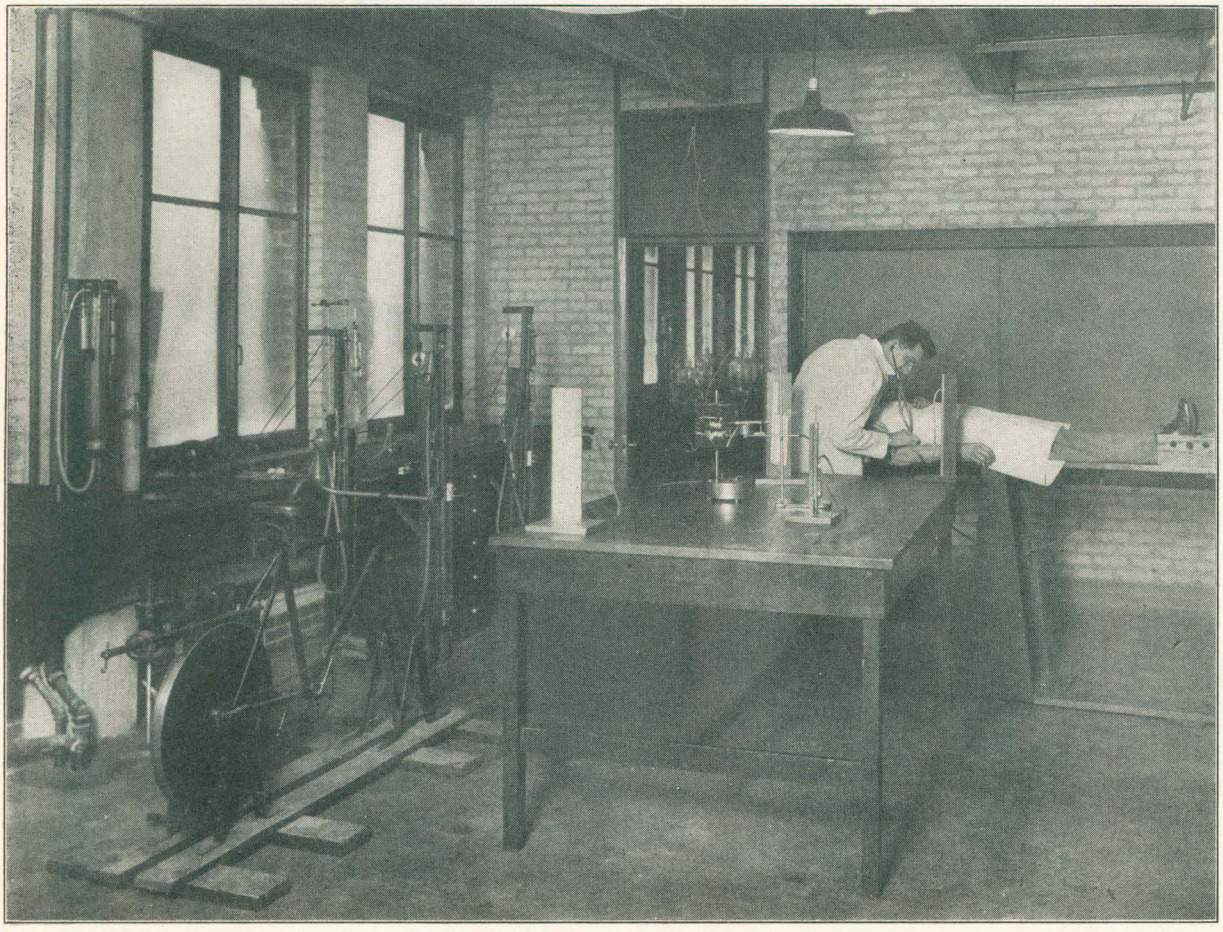


FIG. 3.—LABORATORY USED FOR EXPERIMENTS OF CIRCULATION AND RESPIRATION, ROOM L-406

electricity, a timing clock on the wall wired to each station, and a small hood for smoking long papers (Fig. 2). The main class laboratory room (L-405) is permanently equipped with eight tables (Fig. 1), each 4 feet by 6 feet, supplies of gas, air, cold water, a timing or low voltage circuit, and a 110-volt circuit which may be either alternating or direct current, according to the position of a double-throw switch in another room. It is expected that, when necessary, four students can work at each table in pairs. No one of the class laboratories will hold all the students in a full-sized class (seventy-five) at once. It is planned that they will always work in small groups at different experiments. In view of the small classes contemplated for the initial years it has seemed wise to equip the two remaining classrooms (L-406 and L-402) temporarily with large movable tables until longer experience makes more evident the most advantageous type of equipment for the purposes.

The seminar room (L-407) adjoins the mammalian room and is used for group instruction and for demonstrations of all sorts, such as those on animals, which it is difficult to move to one of the lecture-rooms on the floor below.

Apparatus for class use has been purchased in small amounts according to the immediate needs, certain special items having been made in our own shops. Some of it is shown in Figures 3 and 4 including a tilting board for demonstrating the effect of gravity on the circulation, a simple form of Lucas pendulum for measurements of refractory periods and the excitability of nerves, three Van Slyke manometric blood-gas analyzers; eight Henderson gas analyzers, and a large precision water-bath used for blood-gas analysis, micro-respirometer studies, etc. It has not seemed worthwhile nor possible to assign a certain standard kit and a locker to each student because most of the experiments require special instruments and material. This method develops carelessness in the use of the apparatus but it saves much duplication of costly apparatus and much organization machinery. Almost the only experiments

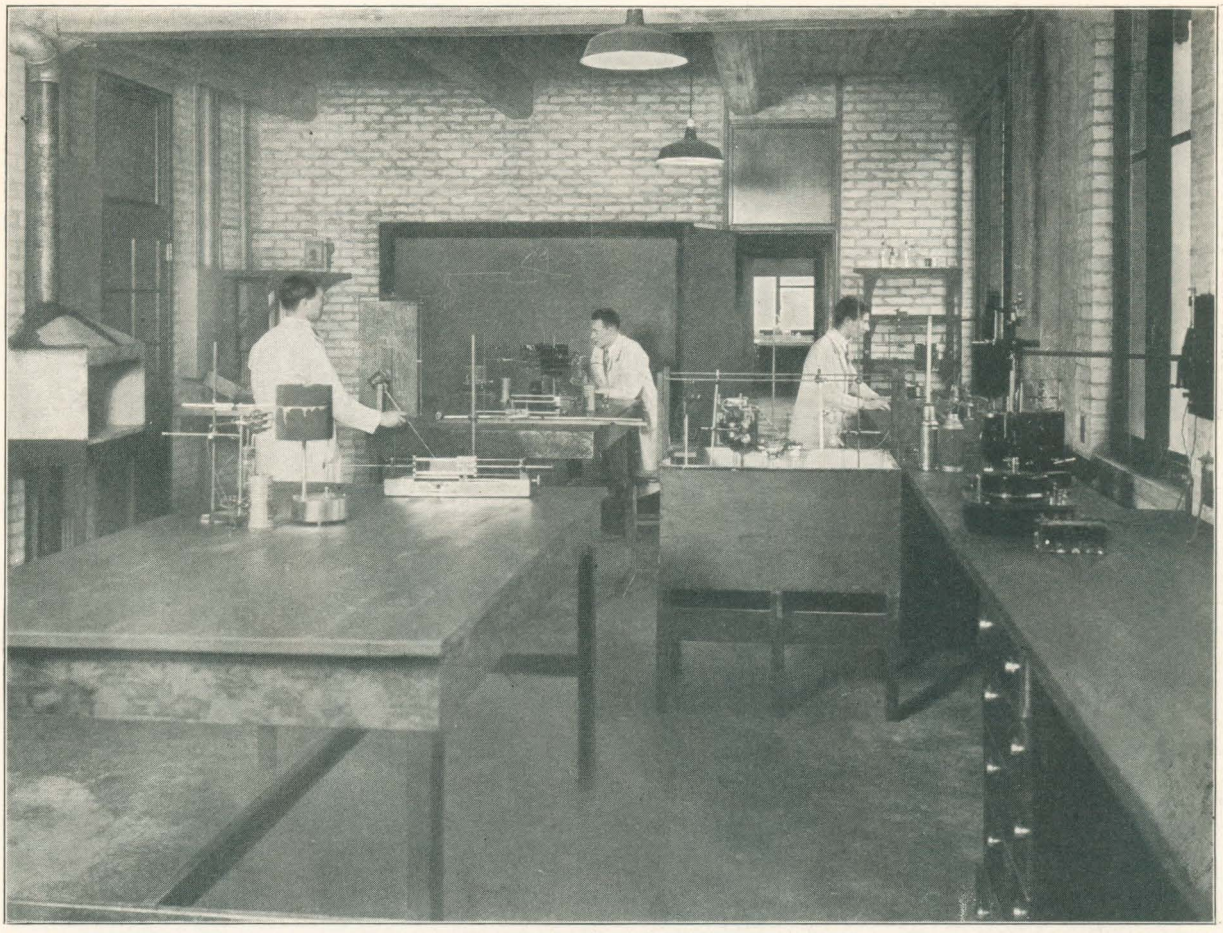


FIG. 4.—BIOPHYSICS LABORATORY, ROOM L–402

which can be done with a standard kit are the simple muscle-nerve experiments. These are widely regarded as chiefly for instruction in technique and have been largely omitted from our course, their place being taken by special experiments on muscles and nerves such as determinations of the refractory period and excitability of nerves, of the heat production of muscles in calorimeters, and measurements of the gas exchange of muscles, after stimulation, by microrespirometers. Once the method is learned and the apparatus provided, such observations are no more difficult for a beginner than the usual type of experiments and they are far more instructive.

INSTRUCTION

A generous share of the usual course in physiology is handled by the neighboring Department of Vital Economics. The Department of Physiology retains for its share the subjects of circulation, respiration, the central nervous system, nerves, muscles, and the special senses. This division of the course accords well with the special research interests of the members of the two departments, the one being concerned with the vegetative aspects of physiology, the other with problems directly or indirectly related to muscular exercise in its broadest interpretation. Muscular exercise is, therefore, chosen as a convenient subject around which our course is built. Beginning with an introductory consideration of exercise in the body as a whole to provide a background of information, the subject is thereafter dissected in lectures, conferences, and laboratory work in more and more detail and the student's work is finally concluded by a thesis on some topic selected early in the course. Attempts have been made to develop these theses into students' research problems and the results have been encouraging.

Of more detailed methods of instruction little can be said since they are as yet undeveloped in our hands. While the laboratory work is made the backbone of the course, we recognize the danger of making this part of

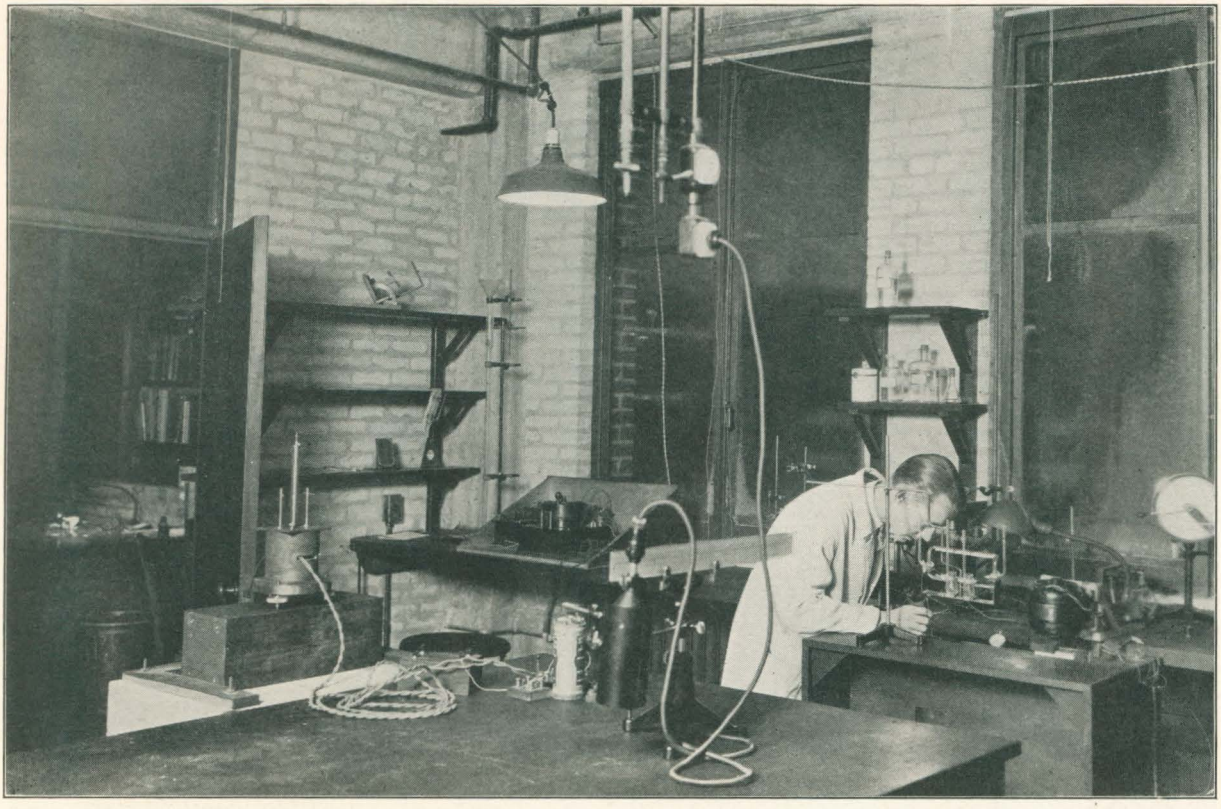


FIG. 5.—RESEARCH LABORATORY

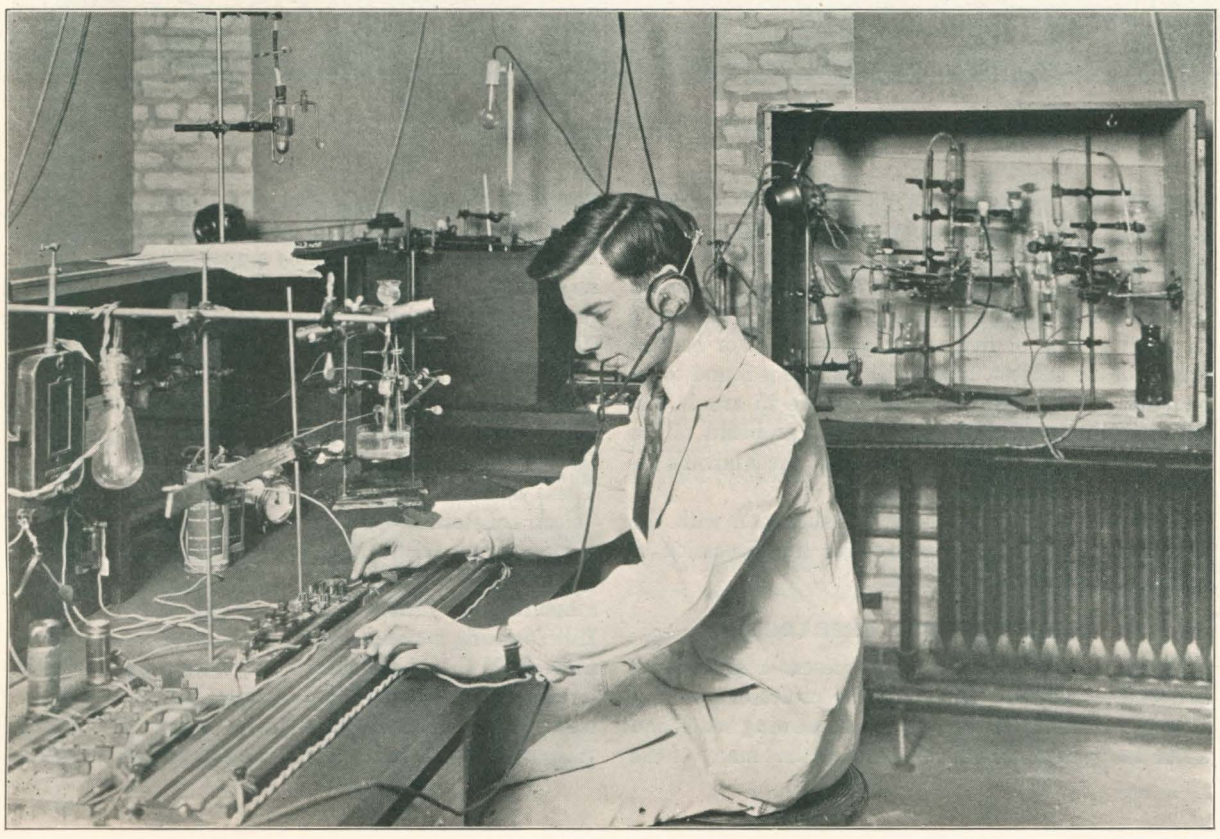


FIG. 6.—RESEARCH LABORATORY

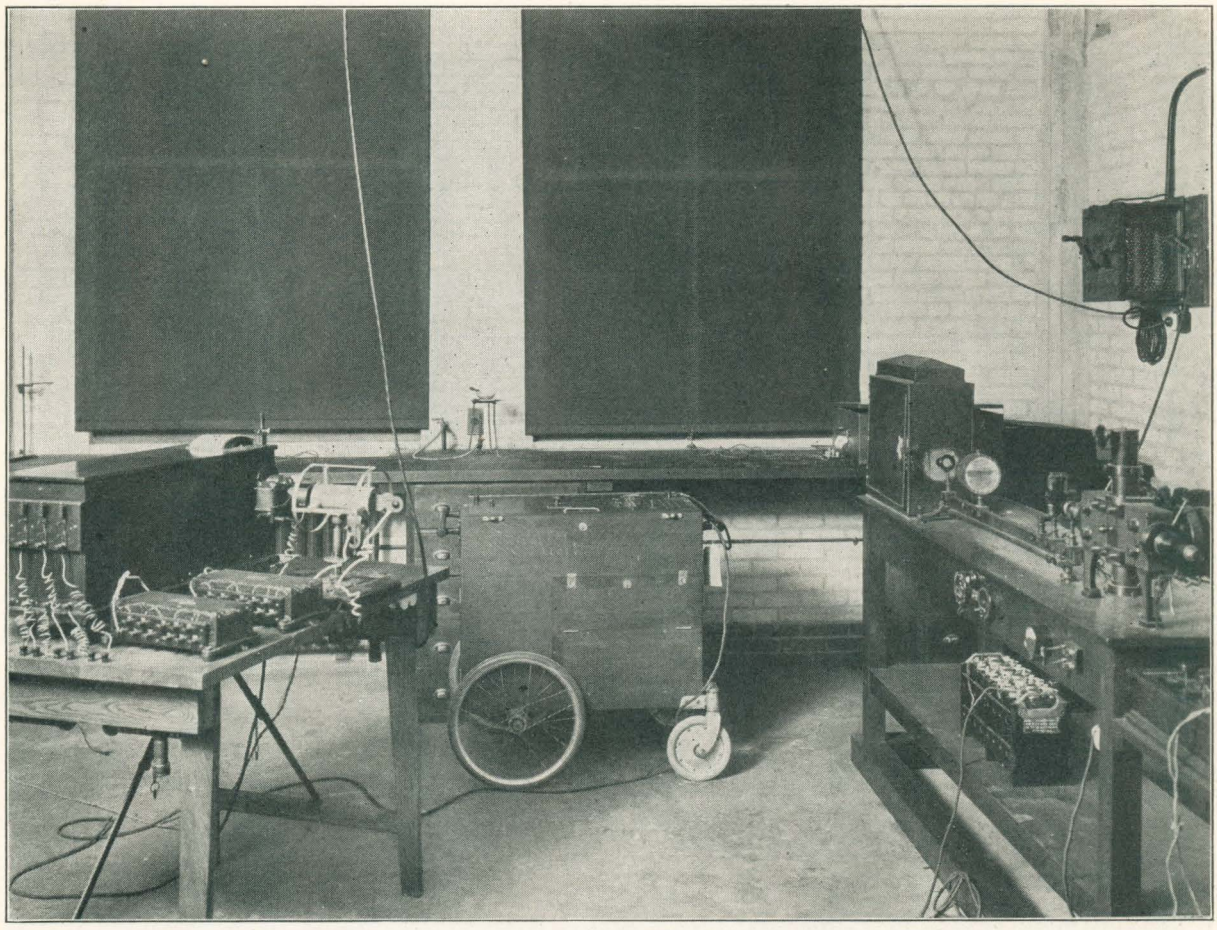


FIG. 7.—STRING GALVANOMETER, "ELECTRICAL STETHOSCOPE," AND OSCILLOGRAPH

the work merely a brave show of drudgery automatically performed. To offset this danger, emphasis is placed upon the interpretation and exhaustive analysis of the data obtained. The attempt is made largely to avoid lectures and to substitute for them informal conferences in small groups of five or six students. For certain phases of the subject, however, a lecture is found to be essential. No special attempt is made to arouse the student's interest by an appeal to the problems of the clinic. The appeal is made, rather, to the student's interest in experiments upon himself.

A weekly seminar is held in collaboration with the Department of Vital Economics for the discussion of topics of physiological interest.

EQUIPMENT FOR RESEARCH

Five rooms have been fitted up as research laboratories and two for offices. Adjoining the professor's laboratory is a workshop containing a glass blowing bench and a fair assortment of ordinary tools so that many of the necessary pieces of apparatus can be made there. For more difficult pieces of work access to the machine shop in the basement may be had by a qualified person or the services of the machinist may be requisitioned. At the present time one man in the machine shop nearly meets the demand from the whole plant. There is also a dark room and a cold storage room.

A view of the string galvanometer room containing in addition two pieces of apparatus purchased primarily for the Department of Medicine is shown in Figure 7. These additions are an amplifier and microphone or "electrical stethoscope" for chest and heart sounds and a three-string oscillograph for recording them. Other special pieces of apparatus are a complete outfit for measuring the heat production of muscles (Fig. 8), a Hill-Downing moving-magnet galvanometer with magnetic shield shown in Figure 5, which was manufactured for the department by Mr. Downing, and four precision water-baths which will regulate to nearly .001° C. at various temperatures. One of these can be set as low as

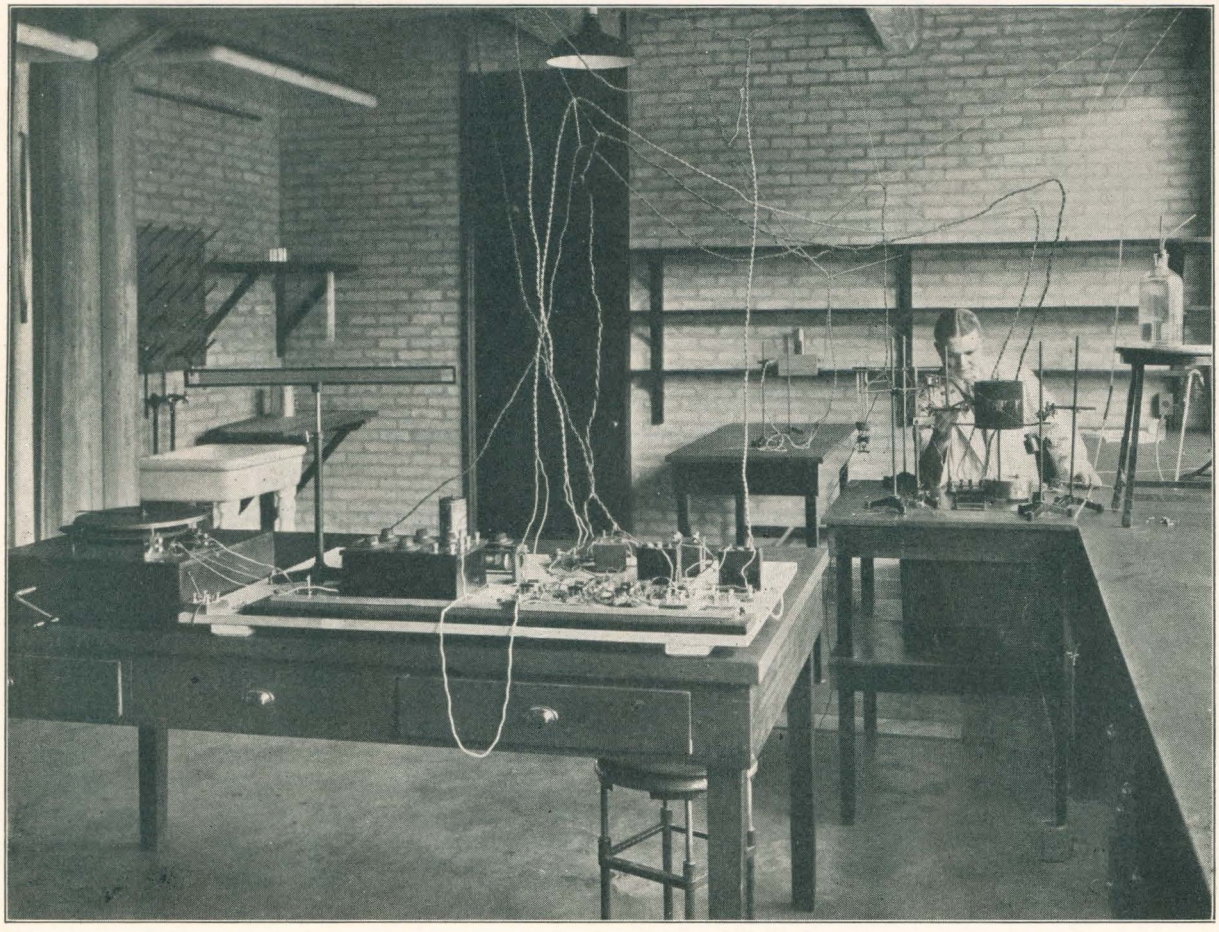


FIG. 8.—RESEARCH LABORATORY

12° C. This is satisfactorily accomplished by means of a cooling coil from a tank in the cold room, adequate circulation being maintained by means of a stream of bubbles from the compressed-air line.

In Figure 6 is shown a research laboratory with apparatus set up for electrical measurements on frog skin and other tissues.

RESEARCH PROBLEMS

Professor W. O. Fenn, is devoting his research work to a study of the gas exchange of nerves in activity and the energetics of muscle contraction. E. F. Adolph, assistant professor, is studying the activities of tissues such as frog skin concerned in regulating the water balance of various organisms; the mechanisms of secretion, with special reference to kidneys; and the control of size in various organisms and tissues, particularly during growth. D. S. Martin, Fellow in Physiology, is investigating heat production of muscles.

STAFF

Wallace O. Fenn.....Professor of Physiology
Edward F. Adolph . .Assistant Professor of Physiology
Donald S. Martin.....Fellow in Physiology

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $16,560.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF BIOCHEMISTRY AND PHARMACOLOGY

BY

WALTER RAY BLOOR, PH.D.

PROFESSOR OF BIOCHEMISTRY AND PHARMACOLOGY AND ASSOCIATE DEAN

INTRODUCTION

The Department of Biochemistry and Pharmacology occupies the entire third floor of the medical school axis, with the exception of the portion occupied by the amphitheater, and has a gross area of about 17,000 square feet. The division of the floor area corresponds roughly to the division of the activities of the department—division J containing the research activities, advanced students' laboratory, seminar and preparation rooms, constant temperature and incubator rooms, together with individual laboratories for staff members. Division K contains the staff quarters for the division of pharmacology, space for advanced work in pharmacology, together with the necessary storerooms and preparation rooms. In this part of the axis is one of the class lecture-rooms, and the dark area next the lecture-room is made use of as departmental storerooms for a small stock of apparatus and chemicals. Division L contains the laboratory for the medical student work in biochemistry and in chemical pharmacology with the necessary storerooms and issue rooms, a balance room for fourteen balances (about one balance to six students), and a large laboratory for the member of the staff who is responsible for the student area. In this division are the refrigerator room and the dark room. Laboratories have been equipped only as needed and there is available in the department considerable unassigned space for which use will be found later. The fact should be noted that while the arrangement of space and apparatus represents the ideas of the present staff, the movable partitions and the simple structure of the furniture make it possible at relatively little cost to modify the whole distribution to suit changing conditions.

CONSTRUCTION

The laboratories of the Department of Biochemistry and Pharmacology were planned in accordance with general principles of efficiency linked with economy and simplicity. No separate student laboratories were provided for the work in pharmacology; the two laboratory activities of that subject, the chemistry and the physiology, are carried on in the regular biochemical and physiological laboratories. Suitable quarters for the staff in pharmacology together with adequate laboratory space for advanced workers in that subject were provided. Since a chemical laboratory consists essentially of a properly equipped and lighted table area, care was taken to make this as generous as possible, making full use of the better portions of the rooms. The laboratory tables were made as wide as the average laboratory worker could conveniently reach across—thirty-six inches for the wall tables and sixty inches for the center tables. This width allows in many cases a double set-up of apparatus, a more or less permanent one near the back or center of the table and a temporary one in front. Fixed storage space in the laboratories was reduced to a minimum, especially in the rooms for individual workers. The custom which prevails in many laboratories of having a great amount of storage space in the form of fixed drawers and cupboards was felt to be not only a needless expense but actually to defeat the original purpose of having readily available a working equipment of apparatus and chemicals, since it provides places where considerable amounts of material are kept out of use until spoiled and sometimes practically lost. Enclosed space for storage was supplied as needed in the form of movable cabinets. In the student laboratories for elementary and advanced work, the fixed storage space was not markedly different from that in current practise. Wall shelving was provided where needed in the form of sets of three shelves, the width and spacing of which was chosen so as to provide the maximum of shelf area with a minimum of interference with the working surface of the tables. The shelves were, beginning with the lowest,

FIG. 1.—FUME-HOOD. TYPE USED IN MOST LABORATORIES THROUGHOUT THE BUILDING

6 inches, 8 inches, and 12 inches wide and placed 14 inches apart. In the laboratories for individual workers a single removable shelf 12 inches wide was provided for the center tables; in the general laboratories there is a fixed shelf of the same width running the length of the table.

Plumbing

There is no concealed plumbing. All pipes in the laboratory tables as elsewhere are directly available for inspection and repair and clean-out heads are provided for all waste pipes, so that the cost of repair or replacement is at a minimum. All the pipes are kept painted and the hot water pipes and the refrigerating brine systems are suitably insulated. On the student tables the supply pipes are arranged under the fixed shelf and the waste outflow takes the form of an open lead-lined drain running the length of the table.

Lighting

The abundant window area and the relatively narrow wings eliminate almost entirely the need of artificial lighting during the ordinary laboratory eight-hour day, but suitably placed, shaded lights are provided.

Corridors

The corridors were made as narrow as was consistent with safety and convenience leaving as much laboratory area as possible in the rather narrow buildings. At the ends of the wings the corridor, as such, has been eliminated, becoming the middle aisle of a laboratory which extends across the wing, thus making use of this space. The doors and transoms opening into the corridors are all of full-length glass, and where the corridors are not sufficiently lighted in this way, high windows are let into corridor partitions. The less well-lighted portions of the laboratories have been made use of for fume-hoods, wash-up sinks, etc., equipment which calls for less frequent use. The parts of the floor which have no outside windows have been put to full use for purposes which do not require continuous lighting, as for example elevator wells, storerooms for apparatus and chemicals, a dark room, a constant temperature room, incubator rooms, and cold storage rooms. The

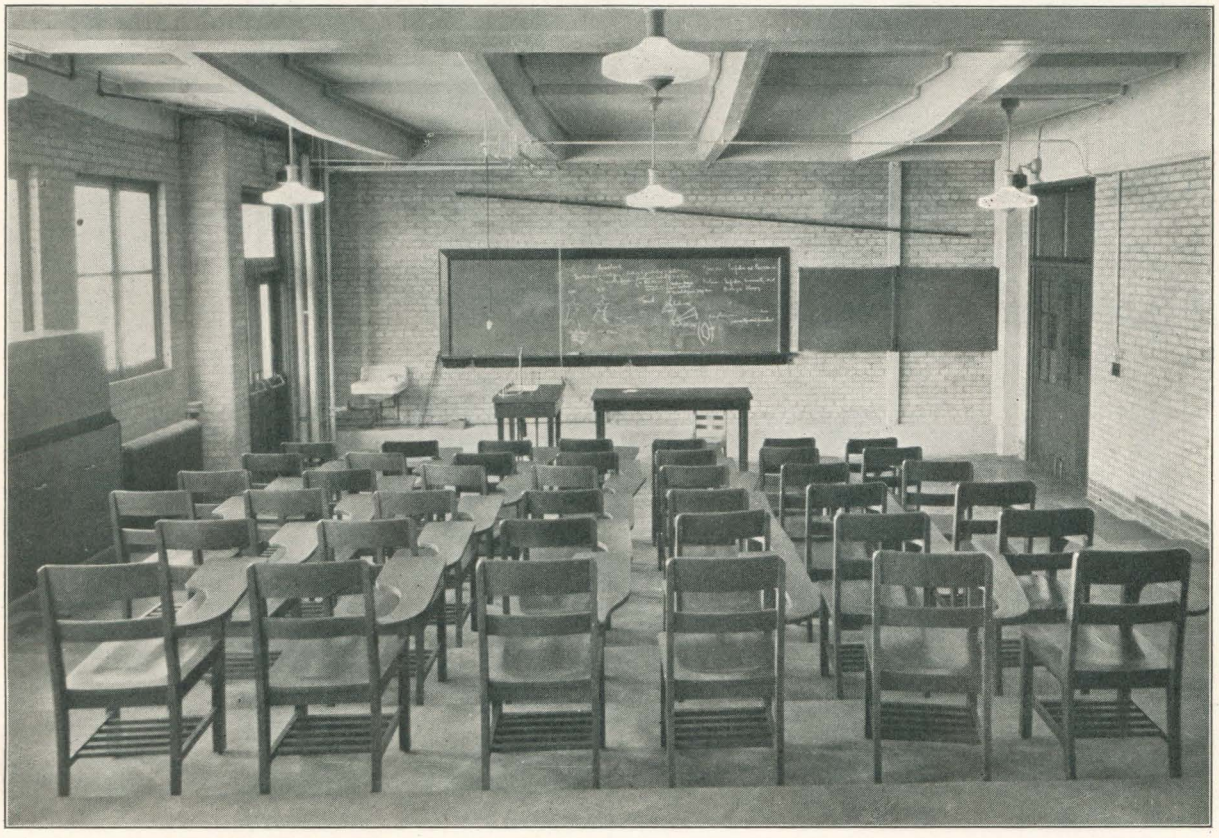


Fig. 2.—Class Lecture-Room, Seating One Hundred. Unit Ventilators at Side of the Room under Windows

latter three groups of rooms have no outside walls, which is a distinct advantage. Separate small rooms with large hoods are provided for occasions calling for the production of disagreeable fumes or odors, and preparation rooms for working up larger amounts of material than it is convenient to deal with in the individual laboratories have been equipped.

The chemical laboratories in most of the departments are fitted with the standard type of fume-hood (Fig. 1) consisting of an alberene stone table two inches thick and 36 inches by 40 inches in surface and enclosure as shown. Each opening has an upper fixed sash of wire glass and a lower movable sash which may be pushed up above the top of the hood. A sloping false roof is provided to direct fumes to the outlet seen in the upper left hand corner. Natural draft through individual flues is depended upon for ventilation although in some cases it has been necessary to install a blower. Steam, gas, compressed-air, electric current, water, and drainage are provided, the different openings being so placed as to be convenient and yet interfere as little as possible with the working surface of the table.

INDIVIDUAL LABORATORIES

The individual laboratories are fitted with ample laboratory table space for an experienced research worker, with fume-hood, waste and wash-up sinks, hot and cold water, drain-board and drying racks, shelving, and a writing-table with drawers and shelves. This latter is found more useful than the conventional office desk. The laboratories are supplied with high-pressure steam, direct and alternating current, and compressed-air.

LECTURE-ROOM

The lecture-room (Fig. 2) is intended to accommodate 100 students and is fitted with the conventional tablet armchairs, fixed and folding blackboards, screens for projection, and a demonstration table of which only a small portion, containing the gas, water, air, and electric outlets, is fixed, the remainder being movable so

FIG. 3.—ADVANCED STUDENTS' LABORATORY SHOWING ARRANGEMENT OF SHELVING, SUPPLY PIPING, AND DRAINS

that the demonstration material can be arranged in another room and then rolled into place when needed. The lecture-room is equipped for forced ventilation and has been treated to render its acoustic properties satisfactory.

SEMINAR ROOM

A general purpose room with blackboards and tablet armchairs is used for seminars, small lecture groups or quiz groups, a balance room for advanced workers, and as a reading-room, for which it is supplied with a small number of current journals and a few reference books. Seats are provided for thirty people.

ADVANCED STUDENTS' AND RESEARCH LABORATORIES

The advanced students' laboratory and research laboratory (Fig. 3) is intended for students who have had elementary work in biochemistry and who wish to take advanced work, either course work or research work. The amount of space allowed per student depends on the nature of the work. The table arrangement, gas, water, electricity, and drain are much the same as in the elementary laboratory except that high-pressure steam is distributed to all the tables.

TECHNICIAN'S LABORATORY

The technician's laboratory (Fig. 4) is an example of the concentrated or 'buffet' type of laboratory, planned to save steps. Under one of the chemical tables in this laboratory is to be seen one of the movable drain-racks of which wide use is made throughout the laboratories. These are made of 2-inch lumber in various sizes and mounted on casters after a design in use in the Harvard Medical School. The drain surface on top and on a shelf underneath consists of galvanized iron-wire mesh of various sizes to fit the apparatus used. The rack is loaded with apparatus to be washed, then rolled to a sink where the pieces are washed and returned to the rack to drain. After the washing is complete, the rack is wheeled back to the place where it

FIG. 4.—TECHNICIAN'S LABORATORY

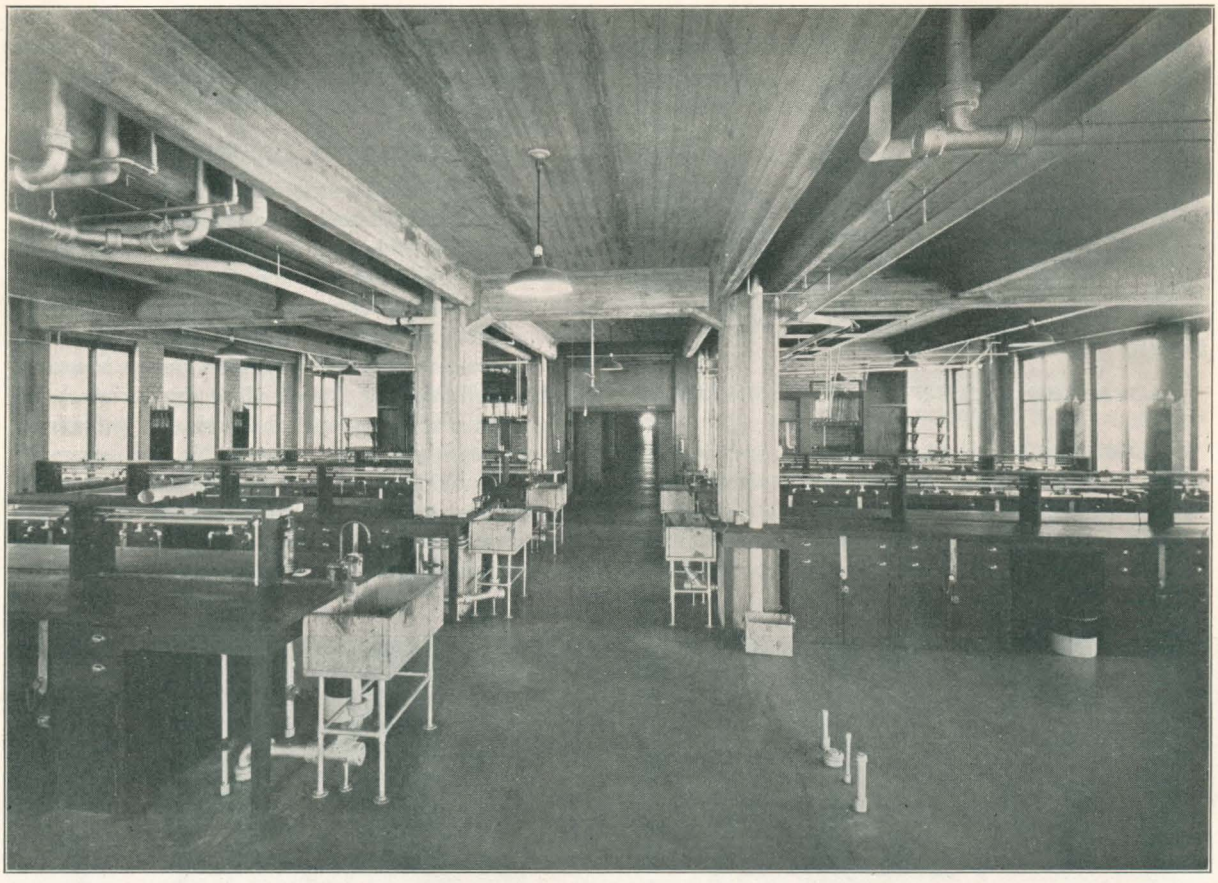


FIG. 5.—STUDENTS' LABORATORY, SHOWING DETAILS OF LOCKER ARRANGEMENT, SHELVING, SUPPLY PIPING, DRAINAGE, AND WASH-UP SINKS

is to be used. The racks may be made of any size and, if space is limited, may be made to fit under the laboratory table as shown in Figure 4.

ELEMENTARY STUDENT LABORATORY

Table area at the rate of ten square feet per student is provided for eighty students in the student laboratory (Fig. 5). Gas, hot and cold water, electricity, and storage space are supplied to each table. The aisles between tables are five feet wide so that each student has the same area of aisle as of table. The aisles were given this rather generous width so that stools could be used and room would still be left for an instructor to pass freely in and out among the working students. Space at the end of alternate tables is provided for colorimeters or for other instruments. An apparatus shelf and a lead-lined drain trough, 6 inches wide, run the length of the table and the piping is arranged under the shelf at such a height that there is room for the attachment of suction pumps, etc., on the water faucets. A wash-up sink of alberene stone is provided at the end of each table. Service tables of alberene, 2 feet wide and the length of the laboratory tables, are provided at the end of the laboratory nearest the storeroom, and on these and on a hanging shelf above are kept the chemicals and reagents in current use, together with scales, large graduated cylinders, etc., for measuring. The whole of one end of the laboratory is equipped with fume-hoods with the top sloping toward the vent at one end. Forced draft is provided. In these hoods are the Kjeldahl digestion racks and large steam-baths heated by high-pressure steam. At the opposite end of the laboratory are the Kjeldahl distillation racks on wide tables of alberene. Compressed-air is provided on these tables and on the service tables at the other end of the laboratory. Distilled water is available through two openings connecting with the central supply on the top floor. This central supply consists of a thirty-gallon-per-hour, steam-heated still and a supply tank holding 250 gallons. By a float-valve device, the tank is kept full; the falling of the float turns on the steam and starts the distillation. Much care

was taken to have the storage and the distributing system free from lead, the water in the storage tank and piping being in contact with tin only, and all joints are made with pure tin as solder. Water is distributed by gravity to all parts of the building.

RESEARCH

Since its establishment, the research activities of the Department of Biochemistry and Pharmacology have been applied in one field, the metabolism of fat or, more specifically, of the fatty acids. Members of the department are working on different phases of this problem. One of them is making a study of fat absorption; another is studying the excretion of the fatty substances through the intestine with special reference to the bile; another is investigating the mode of oxidation of the fatty acids; and still another is working on the functions of the various fatty-acid compounds in cell life. Knowledge of the exact chemical nature of the fatty acids and their compounds as they exist in living animal tissues is urgently needed and it is hoped that work in this direction will be started soon. Other problems dealing particularly with the function of the unsaturated fatty acids in life processes need attention.

STAFF

W. R. Bloor.....Professor of Biochemistry and Pharmacology
W. M. Sperry.....Instructor in Biochemistry
[1] S. H. Erlenback.....Instructor in Pharmacology
H. G. Smith.....Assistant in Biochemistry and Pharmacology
R. G. Sinclair.....Assistant in Biochemistry and Pharmacology
[1] R. W. Angevine.....Assistant in Biochemistry

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $22,040.

[1] Part-time.

UNIVERSITY OF ROCHESTER

DEPARTMENT OF VITAL ECONOMICS

BY

JOHN R. MURLIN, PH.D., SC.D.

DIRECTOR AND PROFESSOR OF PHYSIOLOGY

The Department of Vital Economics of the University, on account of the close identity of its interests with medicine, is housed in the Medical School. The department was founded by an endowment provided for in the will of Mr. Lewis P. Ross, president of the Board of Trustees from 1903 until his death in 1915. The staff of the department was assembled in 1919 and in September of that year began offering regular courses in the University for undergraduate and graduate students. Until July 1, 1925, the department occupied quarters on the third floor of the Eastman Building at the University campus. In moving to the Medical School where much better facilities could be provided for both teaching and research, particularly when these activities involved

FIG. 1.—GENERAL LABORATORY

FIG. 2.—PRIVATE OFFICE AND LABORATORY COMBINED

animal experimentation, the department retained only small laboratory and classroom facilities in the Eastman Building to take care of such courses for undergraduates as could not be given at the Medical School. The expected removal within a few years of the College for Men to the Oak Hill site, adjacent to the Medical School, made it possible to plan ultimately for all of the undergraduate work at the Medical School, except what might be demanded by the College for Women.

The department was assigned all of wing J, half of wing K, and all but three rooms in wing G of the fourth floor. The entire floor space occupied totals approximately 12,500 square feet. This space has been allotted to the three major activities of the department, namely, (1) teaching of undergraduates; (2) teaching of medical and other graduate students; (3) research. The rooms and facilities devoted to these purposes are by no means distinct from one another. The equipment has been chosen with reference to the particular phases of physiology in which the department is primarily interested and this equipment, with few exceptions, is employed interchangeably by graduate students and by the staff for research or teaching.

PHYSIOLOGY FOR UNDERGRADUATES

The department offers a one-semester course in general physiology which may be taken by juniors and seniors of the College of Arts and Sciences. The general laboratory (J-405), was designed and equipped for this course (Fig. 1). It contains approximately 1,200 square feet of floor space and will accommodate at the maximum forty students.

The thirty square feet of floor space per student is divided roughly into one-third table space, and two-thirds clear space. Table space is provided in three forms. There are five regular student tables, 3 feet by 12 feet, each having in the middle a porcelain lined sink, 18 by 24 inches, which divides the space into two working tables for four students. Each side of this table is designed for the use of two students for such

FIG. 3.—LABORATORY FOR CHEMISTRY OF NUTRITION

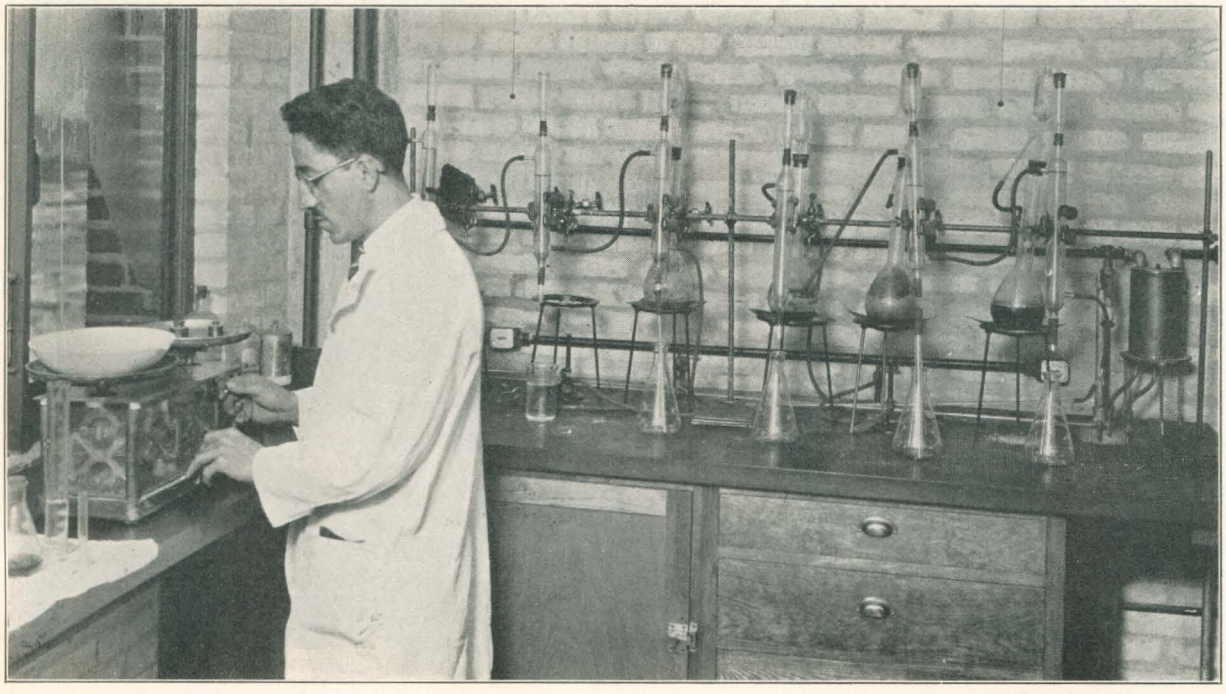


FIG. 4.—FECES ROOM WITH BATTERY FOR STEAM DISTILLATION

experiments as require only simple equipment. Each group stores its equipment in cupboards located near the sink, leaving the space beneath the ends of the table free for knee room. The laboratory is furnished further with a wall table 2 feet wide, running around the three sides of the room which have windows. These tables are used for set-up equipment and for accessory table space. There are also two demonstration tables 4 by 6 feet located near the inner wall. These tables provide space for demonstrations and for the distribution of supplies.

The room is designed to be used as a lecture-room as well as a student laboratory. A double-hung blackboard 8 feet wide is located between two of the large concrete pillars in front of the entrance. The side of this board toward the entrance is used as a bulletin which cannot escape the notice of students. The front side is visible to more than two-thirds of the room. Underneath the blackboard is a rolling platform 4 feet by 8 feet by 1 foot high which runs on ball bearing wheels, which can be clamped by compression door-stops in any desired position along the iron track made for these wheels. The platform can be used between the blackboard and the middle one of the long tables by a lecturer, or can be pushed back so as to clear this floor space when the students are working. The operation of releasing, pushing, and clamping the platform in place is easily accomplished with the toe. Shelves for wall reagents, racks for suspending shellacked records, table book-stands, and wall charts complete the furnishings at present.

Adjacent to this laboratory on one side of the hall is a stock room (J-406) for glassware, laboratory hardware, wooden ware, and porcelain ware, and, in short, all the classes of supplies except chemicals. On the other side of the hall is an office and private laboratory combined (Fig. 2), intended ultimately for the use of the member of the staff who will have immediate charge of the elementary courses in physiology.[1]

[1] At present the occupant of this room is a junior professor.

FIG. 5.—MAMMALIAN LABORATORY FOR EXPERIMENTS REQUIRING LONG-PAPER KYMOGRAPHS

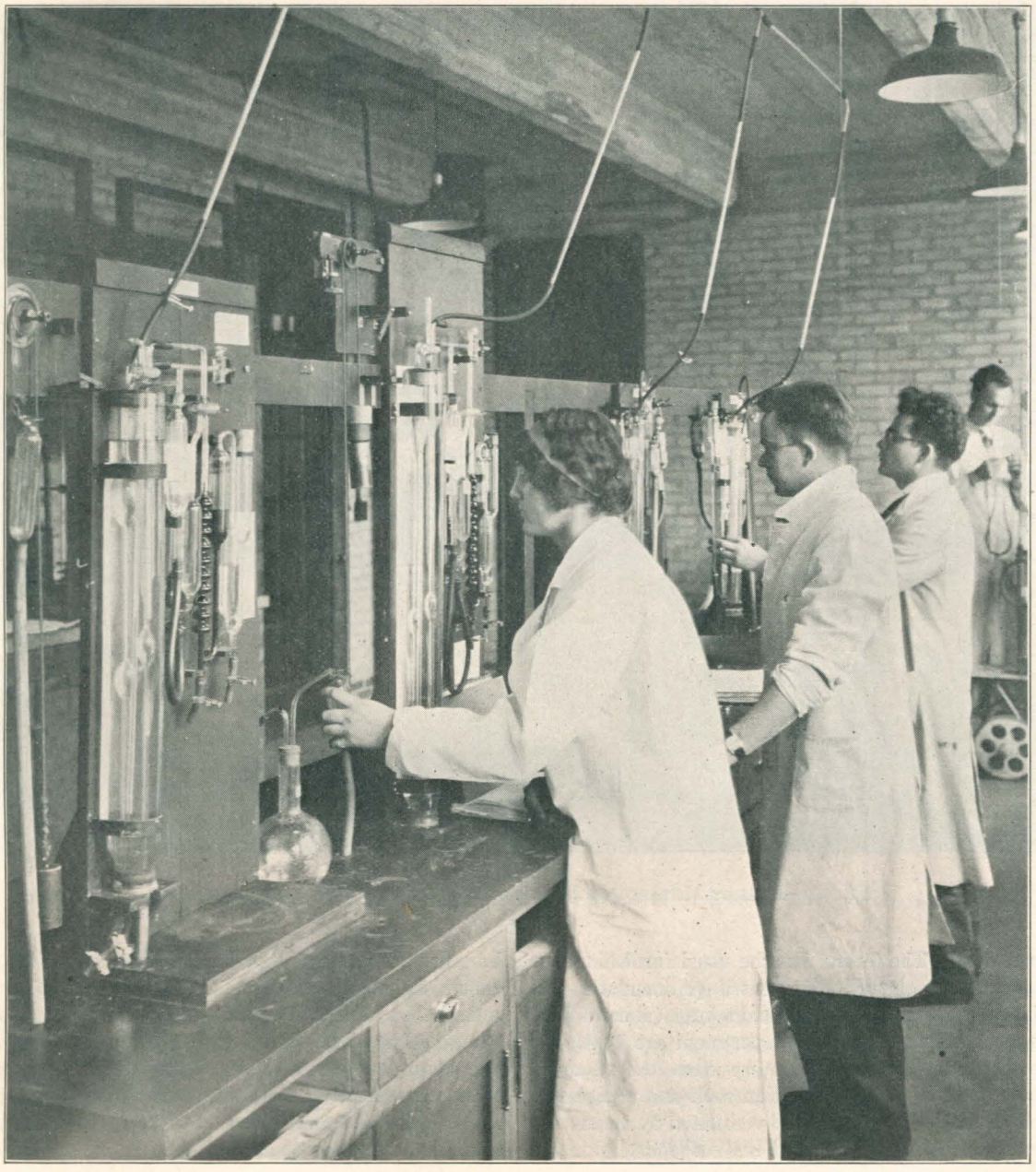


FIG. 6.—ENERGY METABOLISM LABORATORY. ROOM FOR AIR ANALYSES

Next to the stock room is a shop (J-407) in charge of a technician who also has the supervision of the stock room. Research workers are permitted free access to the stock room without restraint, but students are permitted to withdraw stock only on the presentation of a voucher.

PHYSIOLOGY OF NUTRITION AND ENDOCRINOLOGY

In addition to the laboratory described above, the department provides four other laboratories designed for teaching medical students and graduate students in sections not larger than fifteen. Two of these laboratories are located in wing J, immediately next to the portion just described. One (J-403) is a laboratory for the teaching of the chemistry of nutrition, and the other, J-408 described as the "mammalian room," is designed for long-paper kymograph work on the alimentary organs, the kidneys, endocrine organs, etc. Each of these rooms has a total floor space of approximately 560

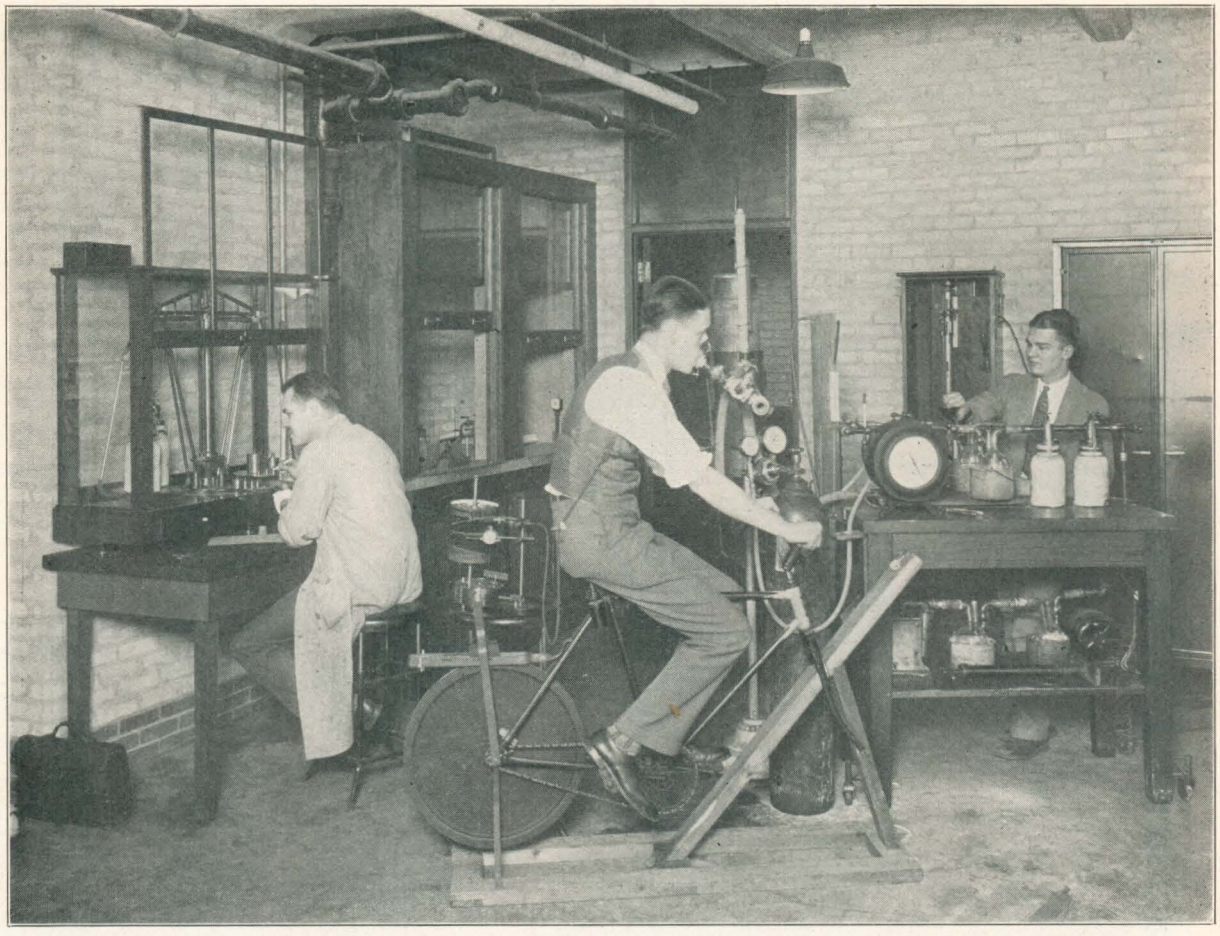


FIG. 7.—ENERGY METABOLISM LABORATORY. ROOM FOR WORK EXPERIMENTS

square feet. The former has the usual furnishings for biochemical work, including centrifuge, incubator, and balances, and contains at one end a large cabinet where the stock chemicals for the department are kept. At the other end of the laboratory from the chemical cabinet is a Kjeldahl distillation rack and a digestion shelf, the latter in a large hood ventilated by means of a blower placed above the hood but suspended from the ceiling (Fig. 3). The hood also houses a steam-bath and muffle. Next to the laboratory just mentioned is a room (J-402) especially designed for the handling and analysis of feces. It contains a large refrigerator (J-401) connected with the brine system of the building, a small commode room, a janitor's sink for the convenient disposal of discarded specimens, and a bench for the steam distillation of feces (Fig. 4).

The room J-408 (described on the floor plan as "mammalian room") is just across the hall from the chemical laboratory. It was designed to accommodate five animal experiments simultaneously. The tables for long-paper kymographs are arranged in a row along the (north) lighted side of the room (Fig. 5). Space for the mammalian tables is found between the kymograph tables. The power (direct current) for the kymographs, the compressed-air for artificial respiration, and wires from a time-interval clock, are carried on a beam overhead. All these connections drop directly to the operating table or kymograph table below. Along the corridor side of this room is a hood 3 by 6 feet and two sinks, one on either side of the hood. There is also over one sink a smoking frame for long papers. At the two ends of the room are shellac tables for long-paper records.

A special feature of this room is a long chemical table affording cupboard and drawer space for five groups of three students each and bringing gas, water, and electricity (alternating current) conveniently near the scene of experimentation. This table makes possible the simple chemical manipulations which one frequently wishes to make near at hand when an experiment is in progress. It is used also for short-time perfusions, for

FIG. 8.—SEMINAR AND DINING-ROOM. LUNCHEON OF JOINT SEMINAR BY DEPARTMENTS OF PHYSIOLOGY AND VITAL ECONOMICS

hydrogen-ion determinations, for preparations of solutions for injection, etc.

The two additional laboratories for experimentation for medical and graduate students are located in wing G-4. One of these rooms, G-403, 409, 410, 411, is described as the energy metabolism laboratory. It has about 1,500 square feet of floor space and is divided into four rooms, a small one (410) for a bed-ridden patient or other inexperienced subject for basal metabolism, a second for air analyses by the Haldane method in some one or more of its many modifications (Fig. 6), and a third and fourth for the use of more elaborate apparatus (Fig. 7) for the study of energy metabolism. The other laboratory in the same wing may be described as a diet laboratory. It consists of a kitchen (G-406), and a dining-room (G-404–5) which serves also as a reading-room and seminar or classroom. Here the medical and graduate students receive instruction in the composition and preparation of foods for metabolism experiments on the human subject. A joint seminar of the departments of physiology and vital economics is held in rooms G-404–5 once a week immediately following a luncheon served by the women members of the staff and women graduate students in the department (Fig. 8).

GRADUATE INSTRUCTION

The department offers special courses for graduate students in the science of nutrition and in endocrinology. The four laboratories just described which are used for the instruction of medical students are used also successively for small groups of graduate students who are candidates for the M.S. or the Ph.D. degrees.

RESEARCH

Any of the laboratories which have been described may be used for research work. In addition the department has a number of rooms which come under the class of general equipment for research; for example, an

FIG. 9.—PRIVATE RESEARCH ROOM WITH CHEMICAL EQUIPMENT

incubator room (J-413) 9 by 16 feet; a dark room (J-414) for polariscopic and photographic purposes; a food preparation room (G-408), situated next to the incubator room, which may be used for the drying of foods, for artificial digestion experiments, and the like; and an animal operating room (K-410), with recovery room (K-411) adjoining.

The department has eight private research rooms fully equipped and in use, namely, rooms J-404, 409, 410; K-402, 403, 412; G-403, and 411. The furniture is simple and inexpensive. Each of these rooms at present is being used by a single member of the staff or graduate student carrying on research, but at least three of them can accommodate two or more workers each when it becomes necessary. Four of these rooms are equipped primarily for chemical work (Fig. 9) and four primarily for physical work (Fig. 10). One other room (G-408), described above as a food preparation room, is used also as an office and laboratory by two graduate students who are working with the rat colony at the animal house.

Problems under investigation in the department at present are: the muscular efficiency of boys; the action of vitamin B and other extractive substances on the motility of the intestine; the excretion of putrefactive products formed in the human alimentary tract; the effect of cooking-time on the digestibility of cereals; the relative values of proteins from different sources for reproduction and lactation in the rat and dog; the functions of vitamin E; the influence of the nature of the diet on the vitamin E requirement; the influence of heavy metals on the vitamins of milk; intestinal bacteria and their products as modified by diet; the physiology and chemical nature of insulin.

ANIMAL QUARTERS

Only animals under direct experimentation are kept in the department. Rooms for the accommodation of stock animals have been assigned in the animal house. Two of these accommodate a considerable colony of white rats, another houses a colony of rabbits, and a

FIG. 10.—PRIVATE RESEARCH ROOM WITH PHYSICAL EQUIPMENT

fourth room is for dogs which are not under continuous observation.

STAFF

John R. Murlin.....Professor of Physiology
Henry A. Mattill.....Professor of Biochemistry
M. Elizabeth Marsh .....Instructor in Physiology
Estelle E. Hawley.....Assistant in Physiology
Charles A. Morrison .....Assistant in Physiology
Vincent du Vigneaud.....Assistant in Physiology

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $26,300.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF PATHOLOGY

BY

GEORGE HOYT WHIPPLE, M.D.

PROFESSOR OF PATHOLOGY AND DEAN OF SCHOOL OF MEDICINE AND DENTISTRY

The method of education of medical, dental, or professional students is a subject of lively discussion at the present time. The Department of Pathology intends to train its students as graduate students are trained in the university science departments, for example, in chemistry, biology, or physics. We hope to encourage initiative, studious thought, and personal responsibility. The attitude of mind of the student is of vastly more

FIG. 1.—STANDARD RESEARCH LABORATORY

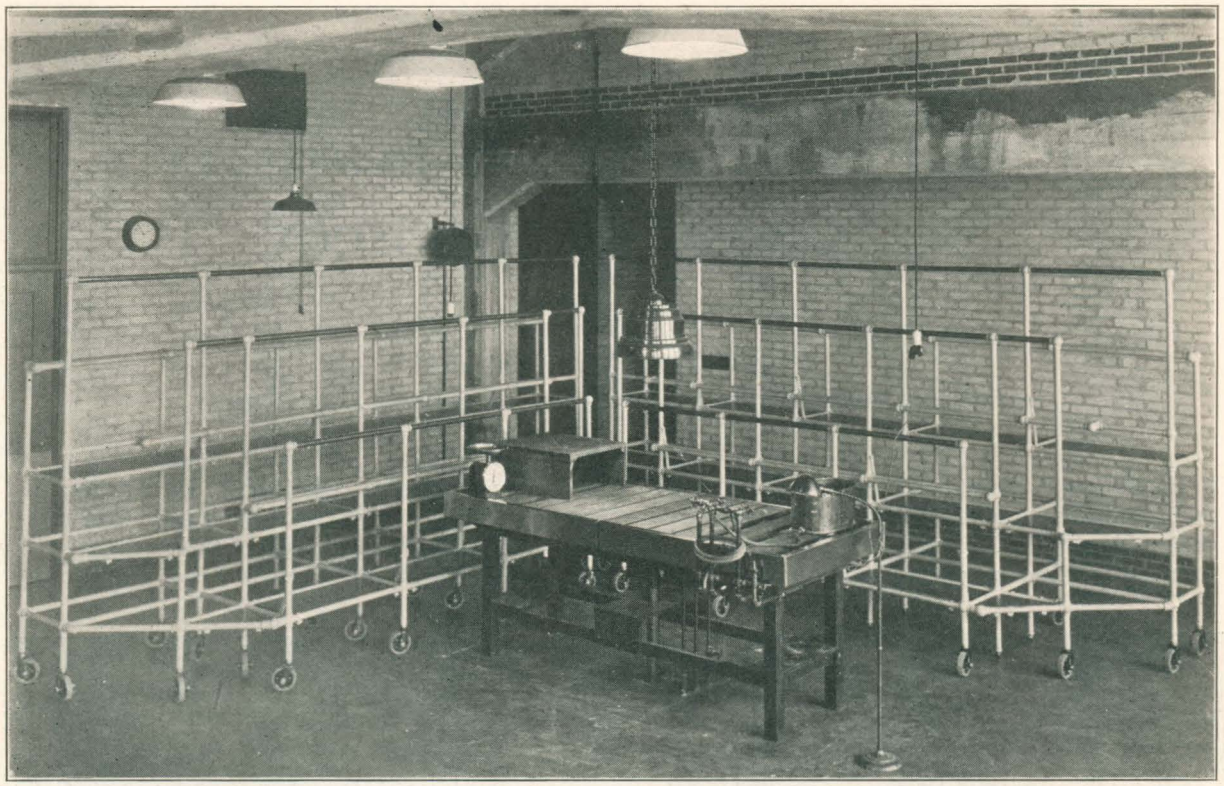


FIG. 2.—AUTOPSY TABLE AND STANDS

importance than is the accumulation of large numbers of interesting facts. Professor Bardeen in the first paper in *Methods and Problems of Medical Education*,[1] expressed my convictions on this subject so clearly that I refer the reader to that article rather than to go into further detail here. Our student laboratories of general histopathology and of experimental pathology are open every day of the year—Sundays, holidays, and during vacations—from 8:00 A.M. to 10:00 P.M. to the students of the second-year class and to any other special students.

The department places equal emphasis on the teaching of experimental pathology, histopathology, and gross anatomy. Special emphasis is placed on the study of fresh tissue both for gross observation and for histological work. Students are assigned to simple research problems to test their initiative and resourcefulness and to encourage a perusal of related literature. Students are assigned in groups of two or three to assist at autopsies and the gross description written by the students as well as the histological autopsy material is reviewed with each group by the instructor in charge of the post-mortem.

The rooms giving facilities for teaching, for staff and student research, and for autopsy work occupy a part of the western portion of the main building on the first and second floors. The staff rooms vary somewhat in size, the larger rooms giving the necessary additional space for the senior members of the staff. Practically all of the rooms are equipped so that the staff member can carry on research work of chemical, biological, or physiological nature (Fig. 1). All the rooms, therefore, with one or two exceptions, contain chemical tables and wall-benches with the necessary shelving and drawer space. Steel cabinets are used for the storing of material and apparatus because this is the most economical unit obtainable in this locality. Practically all the rooms have standard hoods and outlets for a high-power centrifuge. In practically every room the available equipment consists of direct and alternating current, gas, compressed-air, steam, hot and cold water, with ample sink, drain-board, and rack space. The simple construction of the walls makes it easy to set up shelving or apparatus in any portion of a given room. Ample dark room space and storeroom space is available. A seminar room is also included.

RESEARCH

Among the various research problems, the general metabolism of all body pigments is being studied,

[1] Series 1, pp. 1–23, Rockefeller Foundation, New York, 1924.

FIG. 3.—OPERATIVE EQUIPMENT FOR EXPERIMENTAL PATHOLOGY

particularly the production of hemoglobin in standard anemia animals as modified by various diet factors, and the systemic abnormalities are being investigated. Likewise the muscle hemoglobin of man and animals is being compared with various blood hemoglobins. The end products of its disintegration in the body as well as the factors which influence its construction in the body are being studied. A study of bile pigments is a necessary part of this general program.

The behavior of certain non-toxic dyes within the circulation and the physiology of various blood-plasma proteins are being studied. The elimination of bile salts in dogs with bile fistula as influenced by dietary factors and various abnormal physiological states is under investigation. The fluorescence of tissues in health and disease is also being studied.

RESIDENT STAFF QUARTERS

The resident staff in pathology, consisting of one resident and two assistant residents, has comfortable rooms in the adjacent staff house together with the hospital residents and interns. In fact all the science departments, including bacteriology, anatomy, chemistry, and physiology have similar resident staff quarters in the same building. This arrangement is appreciated by the junior staff members and helps to promote most cordial relations between the science and the clinical departments. All the various departmental residents receive food and laundry service as a part of their compensation.

CLASSROOM

The classroom for histopathology on the second floor has a seating capacity of seventy-five students. The students are seated at tables suitable for histological work and supplied with daylight lamps. In the center of the room are demonstration tables and sinks. Toward the eastern end of the room is blackboard space and a projection curtain so that demonstrations or lectures may be illustrated with lantern slides or by

projection of histological material. The majority of the students do not need to leave their desks to see these demonstrations. Connecting with this large room for histopathology is a sizable room for experimental pathology. Demonstrations and individual work in experimental pathology are adequately provided for. The classroom for histopathology is identical with that used for normal histology (Figs. 3 and 4, pages 23–24).

AUTOPSY SUITE

The autopsy suite was located purposely on the first-floor level adjacent to the dispensary with the hope that easy accessibility would mean frequent attendance at autopsies by various members of the out-patient staff. This area is properly ventilated by a powerful exhaust fan so that escape of odors from these rooms does not occur. This suite is a self-contained unit and with occasional rare exceptions no fresh autopsy material is removed from it. The transfer of fresh autopsy material to the student laboratories of histopathology is unquestionably a dangerous procedure. In addition the transfer of fresh autopsy material from the autopsy suite to some far distant incinerator or boiler house is unpleasant, troublesome, and always dangerous. We have done away with both of these procedures. Fresh autopsy material which is saved for museum purposes is placed in Kaiserling solution in the autopsy room, and within a few hours is transferred to the museum preparation room. All the demonstration of fresh material to students is done in the autopsy suite where there are ample small rooms for the purpose of group demonstration. Occasionally bits of organs are removed for the preparation of frozen sections but often such small specimens are placed in formol before removing them from the autopsy suite. The autopsy material, after study has been made and all the demonstrations to the students completed, is disposed of in the preparation room in a very simple manner. A moderate sized steam-jacketed soup kettle is installed in the preparation room and into this goes all the autopsy material which is to be destroyed. A little cooking with a solution of lye sterilizes and dissolves all of this material which then escapes into the sewer drain. The preparation room also contains a large steam sterilizer where all instruments used in the autopsy room are sterilized.

The bodies are stored in a vault which is a part of this suite and which is cooled by the central refrigerating plant. In the vault are swinging brackets on which boards supporting the bodies are placed. The chamber has a capacity of seventeen bodies. To one side of this chamber and opening into the autopsy room are small refrigeration compartments suitable for holding pans and trays of fresh organs. These boxes are fabricated from monel metal and can be easily cleaned and sterilized.

AUTOPSY ROOMS

Two autopsy rooms give ample space for three tables, two of which are installed at present. Movable stands of pipe-frame construction, as illustrated, enable the students and the staff members to sit or stand within a very short distance of the autopsy table (Fig. 2). We believe these movable stands are in every way superior to the old-fashioned amphitheaters, and the difference in cost is very great. These stands place the students within a few feet of the center of the autopsy table where they can see and hear well, whereas in the old amphitheater practically no student beyond the first row could see any detail. A modern daylight lamp is used for general autopsy work.

The autopsy table deserves a little additional description. It is of the utmost simplicity and can be constructed for less than $100. It consists of a simple hard wood frame supporting the top which slopes gently toward a large central drain. The edges of the table rise to a distance of 2½ inches above the level of the table top, giving security against the overflow and the escape of the fluid. The entire top and edges of the table are covered with monel metal which cleans with remarkable ease. Across the top, flush with the raised edges are twelve pieces of hard wood, five inches in width. These are movable so that the cross supports can be adjusted to suit any autopsy condition. The outside dimensions of the table are: length, 75 inches; width, 36 inches; and height, 36 inches. At one end of the table is supplied a mixing faucet for cold and hot water, a cold water outlet, and a gas-cock. This table in use has proved eminently satisfactory and can be cleaned with the greatest ease and kept as clean as a silver plate. This has distinct advantages for autopsy work.

The autopsy service of this school and hospital has been active from the start, and during the first year 143 post-mortem examinations were performed, not including thirty-one coroners' cases. The autopsy permission percentage of deaths in the hospital for the first year was 72.

To gain the friendly cooperation of the funeral directors and to overcome the hostility of this group to the post-mortem examination, the department technician embalms all bodies when consent is given by the funeral director. In fact, nearly all the cases are embalmed here during or after the post-mortem examination. Certain funeral directors send out their own representatives to embalm the body during or immediately after the post-mortem. They are given every facility at our command to expedite this work. We are confident that this policy increases materially the hospital percentage of autopsy permissions.

As stated in another part of this volume there is a modern crematory in the Department of Anatomy

(pages 27–28). Occasionally, on request, the Department of Pathology refers bodies to the Department of Anatomy for cremation. The ashes are then turned over to the relatives. We have found that in some instances the relatives were glad to give permission for post-mortem examination on condition that without charge the remains were to be cremated according to modern approved methods and the ashes turned over to them for disposal. We see no reason why this practise should not become more common.

Facilities for experimental pathology and surgical pathology are found in adjacent rooms on the second floor. This arrangement, it is hoped, will give rise to joint problems between surgery and pathology and to further cooperation between members of the departments. These rooms are equipped with the necessary apparatus for experimental surgery, physiology, and pathology; aseptic operations can be performed here with the same ease and security as in the general operating suite (Fig. 3).

MUSEUM

The museum of special and general pathology is placed in this same area and a large preparation room is situated between the two museum stack rooms. The museum is handled executively exactly like the library. All the specimens are given out by the secretary in charge on signed requisitions and she follows up this material to insure its prompt return after use in lecture or demonstration. In the museum storeroom we have purposely used open steel stacks exactly like those commonly used in large libraries. We have found that doors, whether glass or metal, are a constant nuisance and add enormously to expense. Instead of darkening the individual cabinet we keep the entire room dark at all times, using artificial light when the museum materials are to be removed or returned. The usual Kaiserling specimens are being prepared by the technician in charge, but we expect to supplement this expensive gross material with colored films and plates which can be taken with much less expense and which

FIG. 4.—PREPARATION FOR HISTOPATHOLOGY

assure permanent colors. We realize that these colored prints can only supplement the gross specimens, but we believe the two together will give a more complete picture than either alone. The museum also contains all histological slides from autopsy and surgical material with the necessary card indexes. Here are kept duplicate autopsy records, the originals being kept in the secretary's office of the Department of Pathology.

Because of the intimate relation between the museum and photography, the Department of Photography was placed in physical contact with the museum on the same floor. Here are ample facilities, dark room space, and illuminating devices to care for modern microphotography, still photography of all sorts including color photography, as well as general and colored motion picture photography. We are assured of the most intimate cooperation on the part of the Eastman Kodak Company in developing photography in these special fields. This area was designed and equipped according to specifications of the experts of the Eastman Kodak Company. We are greatly indebted to Dr. Mees, Mr. Lloyd Jones, Dr. Capstaff, and others for much valuable assistance.

The rooms for teaching and staff work in special pathology are placed in this same area (Fig. 4). The clinical staff members are responsible for this routine but all material is reviewed by the staff of general pathology who act as consultants. All histological specimens for general and special pathology and for research work, including all departments except anatomy, are prepared in the technical laboratory where several workers have ample accommodations. This arrangement makes for economy and the prompt return of material.

STAFF AND GENERAL PERSONNEL

G. H. Whipple..... .....Professor of Pathology
H. P. Smith.....Assistant Professor of Pathology
Frieda S. Robbins.....Associate in Pathology
[1] Floyd S. Winslow.....Associate in Pathology
R. P. Kennedy.....Fellow in Pathology
W. Warriner Woodruff.....Assistant in Pathology

The department personnel consists of a secretary, two men assistants in animal work who divide their time between the laboratory and the animal house, one man assistant for autopsy work, one museum technician, and two technical assistants in histological preparation who serve other departments in addition to pathology.

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $25,380.

[1] Part-time.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF BACTERIOLOGY

BY

STANHOPE BAYNE-JONES, M.D.

PROFESSOR OF BACTERIOLOGY

The Department of Bacteriology has been organized in accordance with a comprehensive plan of uniting in one division of the Medical School all the laboratories and all the workers engaged in research, teaching, and practical applications in bacteriology, immunology and serology, protozoology, and some phases of helminthology. In view of these diverse interests, it would be more appropriate to designate it a department of medical microbiology than to use the somewhat limiting, although conventional, term of bacteriology. This organization includes the Department of Bacteriology of the School of Medicine and Dentistry, the laboratories of the Health Bureau of the city of Rochester, and the bacteriological laboratories of the chief services of the Strong Memorial Hospital and the Municipal Hospital.

The department occupies three and a half wings, F, H, K, and L, on the second floor of the medical school building (Fig. 4, page 4), having a total floor space of approximately 15,750 square feet, inclusive of corridors. The Medical School section of the department occupies wing L, with classrooms in wing H. The central media kitchen, supply rooms, sterilizing rooms, and glassware washing rooms are in the south half of wing K. The laboratories of the Health Bureau of the city have one room in wing H, and six rooms in wing F. The bacteriological laboratories of the departments of medicine and pediatrics have been established in rooms in wing F. The location of all of these divisions of the department on one floor aids their coordination and secures many other advantages. The rooms, including the classrooms, are about 17 feet in depth by 19 to 20 feet in length, lighted by two or more large windows. Three of the rooms are somewhat larger than these. The laboratory floors are cement, the walls are bare sand-lime brick, and the work benches along the walls are made of wood, 30 inches wide and 34 inches high. The water pipes, gas pipes, and fixtures are exposed, running along the ceilings and walls, as in the other parts of the building. Sets of wooden drawers are fixed by angle irons under the work benches. Additional wooden tables are placed in convenient positions in the rooms. The cabinets, measuring 3 by 6 feet by 18 inches, used for the storage of instruments and special apparatus are made of steel and are fitted with shelves.

INCUBATOR AND REFRIGERATOR ROOMS

The dark corners of the junctions of wings H and K and H and F have been utilized for refrigerator rooms and incubator rooms. These rooms measure 15 feet in depth by 6 feet in width. The incubator and refrigerator rooms have one wall in common. The thick insulation, composed of eleven inches of cork covered with a layer of rough plaster, in the walls of these rooms effectively protects them against changes of temperature. Both cold rooms are kept at about 4° C. by a circulating brine system pumped up from the ground floor and passing through pipes along the walls or across the tops of the rooms. The incubator rooms are heated electrically with nichrome heating units placed eighteen inches from the floor and six inches from the walls, behind a baffle-board of transite, which is set out eight inches from the wall. This baffle-board is six feet high, making a sort of broad flue along the lateral walls, forming a passage for the rising warm air above the heaters. The temperature is regulated by an automatic device. These rooms afford a large space for the storage of media and sera and for the incubation of cultures. A special differential microcalorimeter for the study of heat production by bacteria is set up in one of the incubator rooms.

MEDICAL SCHOOL SECTION

The central organization of this group of laboratories is the Department of Bacteriology of the Medical School. The staff of this department consists of four members of the faculty, a secretary, two technicians, and a laboratory helper. The head of the department

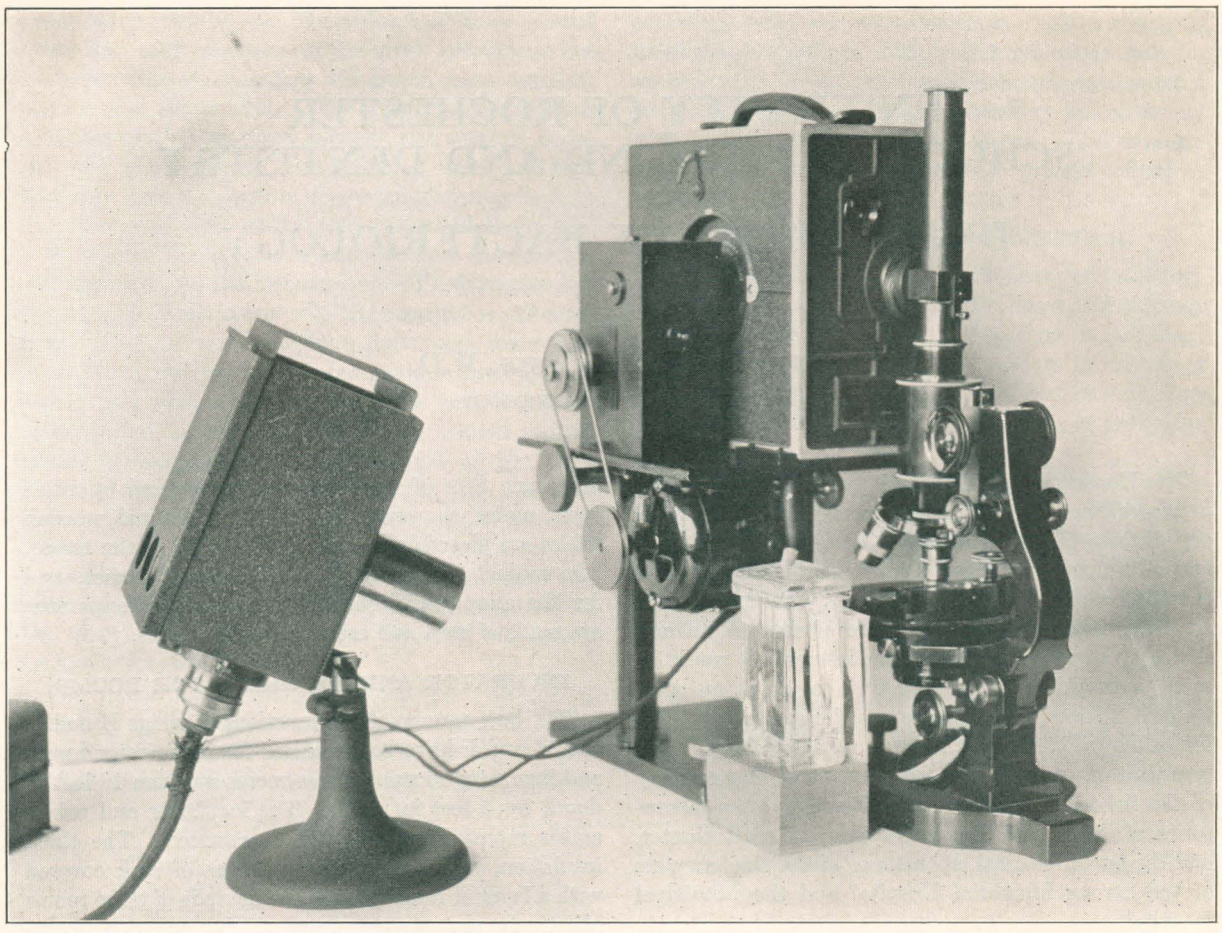


FIG. 1.—APPARATUS FOR MOTION PHOTOMICROGRAPHY

has direct supervision of the research and teaching, and of the work done by the laboratories of the Health Bureau of the city. In addition he has a less formal supervisory relationship with the associated bacteriological laboratories of the Strong Memorial and Municipal hospitals. The offices and laboratories of these members of the staff are situated on the second floor in wing L. The laboratories are equipped with the usual bacteriological apparatus and with special apparatus, such as a galvanometer, pressure filters, tooth sectioning machines, and an apparatus for motion photomicrography, as required by the needs of research. The latter apparatus (Fig. 1) was developed in collaboration with the Research Laboratory of the Eastman Kodak Company. Continuous photographic records of the growth of bacteria and of the movements of ameba and other organisms have been obtained by this apparatus, which has the advantages of being relatively simple in construction and operation. As the motion picture camera used is a stock Model A Ciné Kodak, the expenses connected with the purchase and processing of the 16 mm film are much less than those incidental to the use of a standard film.

A small seminar room, equipped with a blackboard and seats for about twenty persons, is located in this section (room L-211). Members of the staff of the department, workers in the Health Bureau laboratories, and some of the technicians have attended and taken part in the weekly seminar. It has been an instructive activity and is useful in aiding the coordination of the laboratory work by affording a common meeting place for those who do the work.

Investigations and teaching in dental bacteriology are conducted by a dentist who is an associate in the department. Provisions are made which will allow the man in this post to practise his specialty in a manner which will provide clinical material for continuous observations. The laboratory of dental bacteriology occupies one of the rooms in wing L-214 and is equipped with special apparatus for the sectioning of

teeth in addition to the usual bacteriological apparatus (Fig. 2).

A chemical laboratory (partially equipped at present), two stock rooms with shelving, and a dark room for photography complete the list of rooms which may be properly assigned to the medical school section of the Department of Bacteriology. The media preparation rooms and sterilizing rooms are used in common with the other sections of the department.

TEACHING

The course in bacteriology is based upon the experience of hospital and public health laboratories and the material from medical sources is used both for its practical value and as a basis of teaching the fundamentals of infection, immunity, and the prevention of infectious disease. It is believed that broad biological principles can be developed as well from experiments upon material which is medically interesting as from the study of micro-organisms and reactions which have less connection with medical problems. This course includes two phases of the work of medical students which are often placed in clinical microscopy. These are studies of a few of the medically important protozoa and helminths.

The time allotted to the course is approximately 180 hours in the second year. Of this, about 100 hours are devoted to bacteriology, mycology, serology, and immunology, and 80 hours to the study of protozoa and helminths (chiefly the intestinal worms and their ova). Lectures and recitations occupy approximately a quarter of this time. In addition, autopsy conferences are held from time to time, in conjunction with the staff in pathology. At these conferences, a group of students who have worked up the bacteriology of a fatal case of some infection, report their findings to the class and the pathological anatomy of the subject is then discussed in reference chiefly to the specific infectious process. Owing to the close coordination of the departments in this school, it has been at times possible

FIG. 2.—RESEARCH LABORATORY IN DENTAL BACTERIOLOGY

to fit in the demonstration at the weekly medical clinic with the subject being studied by the class in bacteriology at that time.

The materials used for the teaching of bacteriology are pathogenic organisms, which are given to the students in pure culture, in infected animals, and in discharges from patients with infectious disease. The unique relationship between the Health Bureau laboratories and the Department of Bacteriology makes a great deal of actual "field material" available for study by the class. The daily throat cultures for diphtheria, sputum for the diagnosis of tuberculosis or pneumonia, smears of gonorrheal pus, and a variety of sera for the Wassermann and other tests are materials which have a naturally instructive value and illustrate numerous problems.

No special course in immunology or serology is given at present. Immunological principles are presented along with discussions and laboratory exercises in parasitism, infection, and resistance, and many serological procedures are used as part of the differential studies of micro-organisms.

The work in dental bacteriology deals chiefly with dental caries and with the effects of the Lactobacillus acidophilus group of organisms. Spirochetal infections of the mouth are studied during the time devoted to spirochetes. In the future, dental and oral bacteriology will be more largely developed.

The large type of class laboratory has been abandoned in favor of small rooms capable of accommodating five to ten students. These rooms, measuring 20 feet long by 16 feet deep are fitted with a work-bench along the outside wall and a narrow table in the center of the room. About three feet of table length is allotted to each student, and each space of this size is provided with a gas and an electric outlet. Small table sinks are not used. Each room contains one or more steel lockers, giving a shelf to each student, an incubator, a small water-bath, and a sink (Fig. 3). The advantages of these small rooms over the larger laboratory are that less

FIG. 3.—CLASSROOM

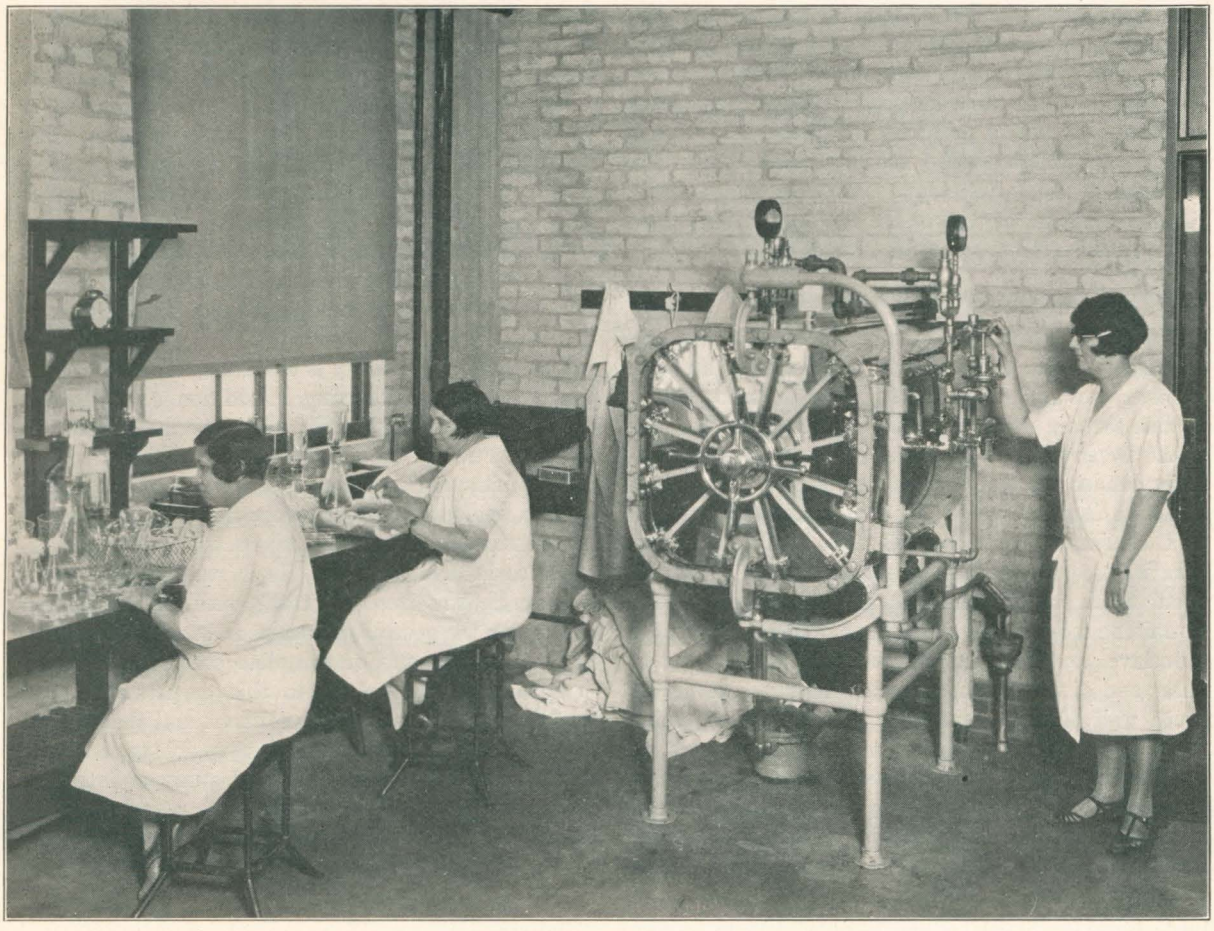


FIG. 4.—STERILIZING ROOM

contamination of cultures occurs in them, they are quieter, and each group of students can work independently of the rest of the class without causing interruptions. In addition, these rooms can be used as research laboratories when teaching is not going on. They do not present any new important difficulties from the point of view of instruction. Media for the class is supplied from the central media kitchen, although instruction in the elements of media making is given to the students as a part of the course in bacteriology.

HEALTH BUREAU LABORATORIES

The laboratories of the Health Bureau of the city of Rochester are incorporated in the Department of Bacteriology of the Medical School. The agreement with the city, upon which this arrangement was made, places the personnel of these laboratories under the direction and the control of the Medical School, as represented by the head of the Department of Bacteriology. This does away with division of authority and responsibility. The arrangement has proved to be mutually advantageous to both parties. These laboratories during the past year have made more than three times the usual number of examinations of all kinds for the Health Bureau and for physicians of the city, and they have brought a large amount of valuable bacteriological and serological material into the Medical School. The facilities of the Medical School are available to these laboratories and through them aid is given the Health Bureau in any type of investigation for which the school or the Department of Bacteriology is fitted. The subdivisions of these laboratories deal with the Wassermann reaction, medical bacteriology, and the bacteriological and chemical examination of water, milk, and other foods. Toxicological examinations are occasionally made by the chemist. At present, the Health Bureau laboratories occupy one room in wing H and six rooms in wing F on the second floor. An incubator room and refrigerator room are built in conveniently at the

junction of wings F and H. Adjoining rooms contain the bacteriological laboratories of the medical and pediatric departments, and space is provided in wing F for laboratories of the other hospital services. This group constitutes a unit of primarily diagnostic laboratories closely related physically and organically with the Department of Bacteriology. Problems under investigation in them, as well as the material brought into them, broaden the scope of the general department.

CENTRAL MEDIA ROOMS AND SUPPLY ROOMS

The media kitchen, the storage and stock rooms, the sterilizing rooms, the glassware wash-rooms, and the supply rooms are located in wing K on the second floor. In this section, media is made for all of the divisions of the Department of Bacteriology and related laboratories, under the direction of one person. The chief media kitchen measures 17 by 40 feet, and is fitted with wall benches, a large central table, sinks, cabinets, titration apparatus, and a ten-gallon steam kettle. Next to this, on the west side, is the sterilizing room, containing a large steam autoclave, a small gas-heated autoclave, and dry-heat sterilizers. The plugging of flasks and of test-tubes is done at the bench along the south wall of this room (Fig. 4). In the adjoining room to the west of this, glassware is washed. A large hotel-type of plate warmer, heated by steam, is used to dry the glassware. On the east side of the media kitchen, the first room is an office and laboratory for the head of the media and supply section. The adjoining room on the east is used in the packing of many kinds of "outfits" supplied to the Health Bureau for use by the physicians of the city. These "outfits" are designed for the collection and transportation of blood for Wassermann tests, sputum, feces, water samples, throat cultures, blood cultures, and slide-smear preparations. In addition, certain sterile containers, media, and staining solutions are supplied to the Strong Memorial and Municipal Hospitals from this section.

RESEARCH

Almost two-thirds of the year is available to members of the department for research, although investigations are carried on also during the teaching sessions. The following problems are under investigation at present: A study of the calorimetry of serological reactions and of the growth of bacteria is being made, using Hill's differential microcalorimeter. The morphological changes of bacteria during their growth are being studied with the apparatus for motion photomicrography developed in the department in collaboration with the Research Department of the Eastman Kodak Company. Work on rat-bite fever, rabies, and other bacteriological problems is continued when time and material permit.

Dr. K. E. Birkhaug has continued his researches on the streptococci of scarlet fever and erysipelas. His investigations in erysipelas, which resulted in the production of an effective curative serum and a method of active immunization with the toxin of the erysipelas streptococcus have been elaborated during the past year. In conjunction with the Department of Pediatrics, he has begun an investigation of some phases of rheumatic fever.

Dr. James A. Kennedy is continuing his work on the blood-groups, and is making, in addition, a study of the action of bacteria upon bile, with especial reference to the production of urobilin by micro-organisms.

Dr. Philip Jay is engaged in a study of the Lactobacillus acidophilus group, from the point of view of the relationship between these bacteria and their significance in dental caries. He is studying also other micro-organisms from the teeth, with the intention of developing the general subject of oral bacteriology.

The Fleischmann Company has granted a fellowship in intestinal bacteriology to this department. The relationship between the department and the Department of Vital Economics makes it possible to conduct a joint bacteriological and chemical study of intestinal putrefaction, and of the metabolism of some of the organisms found in the intestinal tract.

STAFF

Stanhope Bayne-Jones . . . . . Professor of Bacteriology
Konrad E. Birkhaug
Assistant Professor of Bacteriology
Philip Jay . . . . . Associate in Dental Bacteriology
James A. Kennedy . . . . . Instructor in Bacteriology
[1] Ralph Mellon . . . . . Instructor in Bacteriology

The non-professional staff consists of one secretary, two technicians, and one laboratory helper.

The staff of the Health Bureau laboratories is composed of one serologist, one bacteriologist, one assistant bacteriologist, one chemist, one secretary, four technicians, and three laboratory helpers.

BUDGET

The gross total yearly budget for the Department of Bacteriology, exclusive of the Health Bureau, including salaries, wages, equipment, and supplies amounts to $25,280.

[1] Part-time.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF MEDICINE

BY

WILLIAM SHARP MCCANN, M.D.

PROFESSOR OF MEDICINE

The University of Rochester is in the enviable position of being able to begin its clinical teaching under circumstances which permit the greatest freedom in adopting new methods and in pursuing a course which will put clinical teaching on a plane with the highest type of graduate work in scientific departments. In the following paragraphs will be described the guiding principles, the organization, the housing, the equipment, and the plans for teaching and research of the medical clinic. The plan is not entirely in operation at the time of writing and both time and experience will be necessary to determine the results of the innovations.

GENERAL PRINCIPLES

In planning for the training of students in internal medicine, the first consideration must be given to the acquisition by the student of a technique, which, once acquired, will permit him to pursue clinical studies independently. In this respect, the clinics are under a handicap not shared so largely by the scientific departments of the school. The student entering biochemistry, for instance, already possesses considerable technical knowledge derived from his previous study of general inorganic, organic, and physical chemistry with laboratory practise in quantitative chemical and physical methods. The clinics must begin with the most elementary instruction in the technique of interrogating patients and of physical diagnosis. Once the student gains proficiency in these arts, he is in a position to watch the development of the pictures of disease, and to make his own album of nosography.

As the student becomes proficient in his art, his natural curiosity, if it has not been previously destroyed or atrophied, may lead him to investigate scientifically the causes, pathogenesis, and the structural and functional changes in disease in the search for prevention, cure, or palliation. Presumably, he will enter the clinics with a fair degree of technical training for such researches. The clinic must provide him with facilities to carry out such work; its personnel must be alert to see each tiny spark of interest or curiosity and to fan it into flame.

It is a matter of the greatest importance that the student be not allowed to let his interest and investigations run in narrow channels. The teaching of specialties as such should have no place in the medical curriculum. This does not mean that specialists have no place in medical and surgical teaching clinics. They should contribute to the students' training in the technique of examination of special organs and systems. They also contribute greatly to the general training of students in the ordinary course of their duties as consultants.

In the projected development of the medical clinic, neurology and dermatology will constitute subdivisions without special segregation of patients. It is believed that the greatest progress in the knowledge of nervous and skin diseases will come from their study in clinics where both the patient as a whole, and the disease as a whole are under active investigation.

For a full development of psychiatry somewhat more autonomy is required, if for no other reason than the fact that the patients must be segregated. Psychiatry can gain greatly by close affiliation with a general medical clinic, and the internists greatly need to develop more skill in handling the minor psychic disorders of their patients.

These features of the organization of the clinic also possess decided advantages for the advanced training of men who have selected internal medicine as a career. The ideal internist of old was a general consultant. If the modern tendency persists, it will soon be impossible for a man to train himself as a general consultant. Many of our medical clinics are being subdivided, making specialties of tuberculosis, syphilis, cardiology, metabolic disorders, dermatology, and neurology without the important provision that all men aspiring to call themselves internists should serve for a

time in each subdivision. It is hoped that some of the worst evils of this tendency may be avoided, and that a medical clinic may be developed in Rochester in which men may train themselves as general consultants, having a good working knowledge of the many branches of internal medicine. The assistant, whose primary interest lies in the investigation of metabolic disorders, can find much to interest him in patients with tuberculosis, or with cutaneous disorders. The cardiologist and the neurologist need the experience of working in the isolation divisions for the study of contagious diseases or in the syphilis clinic.

INTRODUCTION TO CLINICAL TECHNIQUE

The traditional method of introducing students to clinical technique has been to give two courses under the Department of Medicine, one in physical diagnosis and one in clinical microscopy. Under this system, in most schools, physical diagnosis consisted chiefly of the examination of the heart and lungs, with lack of sufficient emphasis on history taking and of simultaneous regional examinations, leaving instruction in these until the entrance of the student into his courses in the specialties, and leaving the fine art of history taking largely to chance development. Thus it was rare for a student to see a patient completely examined from head to foot before his advent into the clinical clerkship in medicine which in many schools is deferred until the fourth year. As for the courses in clinical microscopy, they have generally grown into great "hodgepodges," duplicating the equipment of departments of bacteriology and biochemistry, and often repeating their functions in a very inferior manner.

Steps are being taken at the University of Rochester to remedy this situation. The heads of the preclinical departments have included in the student's laboratory practise the basic training in technique which the clinics expect the students to employ later as clinical clerks. Thus the Department of Anatomy introduces its students to the preparation and study of the normal formed elements of blood and of bone marrow, both in fixed preparations and in the supravitally stained preparations recently developed by Sabin and her co-workers.

The Department of Biochemistry includes in its laboratory training those chemical examinations of blood and urine, gastric contents, etc., that are in current use in the clinics. The Department of Bacteriology employs for laboratory practise chiefly organisms pathogenic for man and also includes practise in the identification of the common animal parasites, and the various serological tests. The cooperation of these departments makes it unnecessary for the Department of Medicine to go over all this ground again in the introductory course. Six weeks are set aside at the end of the second year in which the clinics may concentrate their efforts in preparing the students to begin work as clinical clerks.

For six weeks, the first two hours of the day are devoted to those parts of clinical microscopy not previously covered by the preclinical departments, such as blood counting. The course will include the examination of all of the various types of abnormality of blood, blood grouping, the taking of blood cultures, the study of spinal fluids, of sputum, of clinical urine analyses with special emphasis on sediments, and the microscopy of feces and of various exudates and transudates from the body. Following this, one hour daily is taken by the surgical department for the teaching of regional examinations in surgical patients, including the use of the ophthalmoscope, the otoscope, the laryngoscope, the proctoscope, etc. Students will be urged to purchase ophthalmoscopes and otoscopes and to employ them routinely in their examination of all patients in each clinical clerkship. In this way only can they become familiar with the use of these instruments without the sacrifice of time.

During this preliminary six weeks, only three afternoons each week are available for formal instruction in the examination of patients. Three afternoons are given to the students as free time. On the other days, the first half of the time is used by the Department of Medicine, and the second half by the Department of Pediatrics. In the Department of Medicine, instruction will begin with the taking of histories, followed by the special technique of examination by inspection, palpation, percussion, and auscultation. The students for this purpose should be divided into groups of not more than four or five, each group having its own instructor. While the emphasis at any particular period of instruction must be laid on a special method, the instructor should complete the picture by filling in the details not covered. Such a course can accomplish little more than to give the student a comprehensive view of the scope of physical diagnosis and an introduction to the technique in which he must perfect himself in the succeeding months of his clinical clerkship.

CLINICAL CLERKSHIPS

The clinical clerkships begin in the third year. The clerks are first assigned to duty on the ward-divisions for it is felt that there are numerous advantages in starting with bed-patients, the first and chief of these being that practise in history taking and physical diagnosis is much easier for the beginner on the division than it would be if he were working with ambulatory patients in an out-patient department. In the case of bed-patients, he can repeat his examinations several times until each detail is mastered. In the second place bedridden patients usually present the completely

FIG. 1.—ONE OF THE FOUR-BED CUBICLES OF A TYPICAL DIVISION

developed pictures of disease, easily correlated with what the student has seen and will see in the post-mortem room. In general, the diagnosis of disease as seen in hospital patients is much more easily made and requires a lower order of clinical skill than is required in an out-patient practise. Clerking in the ambulatory clinic will, therefore, be reserved for senior students.

A group of clerks will be on duty in each division. Patients admitted to these divisions will be assigned to the clerks in rotation. Each will proceed at once to the examination of his patient, recording the history and physical findings, making such laboratory examinations as may seem to him necessary for the complete study of the case. This history may be admitted to the hospital record, having been approved by the house officer who is responsible for the patient. The house officer records the official physical examination, though the student's examination may be admitted likewise to the record, if it is found to be accurate and complete. In like manner, blood counts, urine analyses, sputum examinations, etc., are done by the student, and are admitted to the record as soon as the instructor is convinced that the findings are accurate and reliable.

It is planned to provide formal instruction during the first hour of the working day by means of rounds held by the members of the senior staff, in which the more instructive cases are discussed at some length with the groups of clinical clerks. Such teaching rounds should never last over an hour. When the hour is up, the senior staff men proceed to visit the remaining patients, and each patient can be taken up individually with the clerk to whom he has been assigned. This affords an excellent opportunity for personal coaching in the examination of patients. Figure 1 shows a typical cubicle. During the rounds the discussion of cases in any given cubicle need not interrupt the nursing activities in other cubicles of the division.

At 11:30 daily, the patients receive their lunch. From 11:30 to 12:00 instructors will be in the clinical laboratories to advise and assist clerks with their clinical microscopy. The hour from 12:00 to 1:00 each day is reserved for formal teaching exercises. One amphitheater clinic is held weekly in medicine, surgery, and pediatrics; one hour is devoted to preventive medicine for lecture, clinic, or demonstration; one hour for therapeutics, and one for the clinical pathological conference.

The weekly medical amphitheater clinic is held on Saturday. The subjects dealt with in these clinics are so chosen that in each two years the cycle of sixty clinics will cover the most important general topics in the field of internal medicine. These exercises are open to all students of the third and fourth years, and to any others who have time to attend.

A similar series of sixty clinics or lectures, completing a cycle in two years, will be devoted to the subjects of therapeutics. The clinics demonstrating the use of drugs in therapy can be held during the part of the year in which pharmacology is being taught and can be correlated with pharmacology. For instance, when the class in pharmacology is taking up the study of digitalis, the clinic may present cases illustrating the therapeutic use of digitalis. Likewise dietotherapy can be presented during that portion of the year in which the students in physiology are taking up the subject of metabolism and nutrition. Serotherapy can be discussed synchronously with the course in bacteriology. Certain clinics may be devoted to heliotherapy and radiotherapy and others to physical therapy, etc. In making up the list of such clinics, the different clinical departments should cooperate, and in each branch of therapeutics the subjects should be assigned to the individuals best qualified to present them.

In the same way, a course of weekly lectures or clinics may be systematically presented by the clinical staff in cooperation with the health officer of the city, Dr. George W. Goler, who is a lecturer in preventive medicine. The schedule has not yet been worked out. With a little planning, the general scheme of this course can be made to dovetail nicely with those of the weekly clinics in medicine and pediatrics.

FOURTH YEAR CLINICAL CLERKSHIPS IN MEDICINE

From the time of the present writing, eighteen months will elapse before students actually enter the fourth-year clerkships. Nevertheless, plans are being carefully laid to develop the out-patient medical clinic in such a way that it will be suitable for fourth-year instruction. To this end the nucleus of the out-patient staff centers in two interns, who serve for four months of their year entirely in the out-patient department. These interns see all patients by appointment. New patients are allowed on the average an hour and a half for a visit, and old patients are given half an hour for return visits. At present, the interns on duty study their patients with precisely the same degree of care which they would give to the same patients in the hospital; the records are as complete, and the laboratory studies as detailed. The patient, having been "worked up," returns to the out-patient department to be seen in consultation by a member of the visiting staff. At present, general consultations are held on Tuesday mornings by the professor of medicine. On the same morning, another member of the staff sees patients presenting allergic disturbances. On Wednesdays another consultant sees patients with heart disease, and on Thursdays one consultant sees pulmonary cases and another skin disorders. On Friday mornings, the associate professor of medicine holds neurological consultations, etc. Many of the patients referred to special consultants have first been seen by the general consultant.

When students are available to serve as clerks in the out-patient department, they will take histories and examine patients under the supervision of the interns and residents. They will have their cases reviewed by the consultants who will be able to discuss those of general interest with the whole group of clinical clerks. In addition, these clerks are free to attend the rounds held on alternate mornings by the professor of medicine and the professor of pediatrics.

The students in both the third and fourth years may use their elective time (Tuesday, Thursday, and Saturday afternoons) in any way they choose. Undoubtedly many variations of procedure will be found. The experience of the first two years has justified the expectation that many students would be drawn to investigation. Some may continue work which they have already started in the preclinical departments. A fair share, no doubt, will seek opportunities to investigate interesting problems suggested by their clinical work, or to participate in the various investigations of members of the clinical staff. Others, with no bent for laboratory investigation, may employ their extra time in the hospital or library.

ELECTIVE COURSES

There will, undoubtedly, be a tendency to offer formal elective courses on the students' free afternoons, such as courses in roentgen diagnosis, special courses in neurology, dermatology, syphilology, tuberculosis, etc. If members of the staff desire to give such courses as electives, it is perhaps advisable to offer them, though in so far as they are successful in inducing students to become mere passive recipients for knowledge, they will defeat the purpose for which the free time was set aside.

PERSONNEL

The personnel of the department for the year 1926–1927 consists of a professor, one associate professor, one instructor, two assistants, and five interns, giving their whole time to the department. In addition, the health officer, Dr. Goler, is a consultant and lecturer in preventive medicine, and the assistant health officer, Dr. Roby, is also a consultant physician with the rank of lecturer in medicine. Nine other

physicians in active practise in the city serve as part time instructors. Of these men, two are concerned chiefly with pulmonary tuberculosis, one with cardiac disease, one with gastro-intestinal problems, one with dermatology, and two others are general practitioners. Two members of the staff of the Rochester State Hospital will serve as consultants in psychiatry. An assistant professor in charge of the psychopathic observation division is engaged for half his time in establishing a mental hygiene clinic for children under the Health Bureau. This work is only in its inception. Plans for the year 1927–1928 include another associate professor and another instructor on whole time.

RESEARCH

The members of the whole-time staff are variously engaged in investigations. One of the assistants is occupied with the general problem of the secretion of urine in its applications to renal disease. Another is engaged in electrocardiographic studies. The resident physician with the rank of instructor is engaged in the study of pneumonia. The assistant professor, Dr. Stafford Warren, in charge of the Department of Roentgenology of the hospital, is working on the study of the effects of radiations with a view to their use in therapy. The associate professor, Dr. Richard Lyman, is devoting special attention to neurology and also to various physiological investigations in neurological cases. He is perfecting methods for the graphic registration of sounds and with the assistance of one of the students is carrying on studies of the acoustics of the chest, which promise to be invaluable in connection with the theoretical aspects of physical diagnosis. He has also collaborated with the professor in making extensive preparations for the study of the reactions of pathological individuals to muscular activity. In this connection he has been instrumental in developing a new ergometer, and a new apparatus for the rapid, complete analysis of air by the measurement of thermal conductivity.

Preparations are well under way for the clinical study of the vascular reactions of patients who are

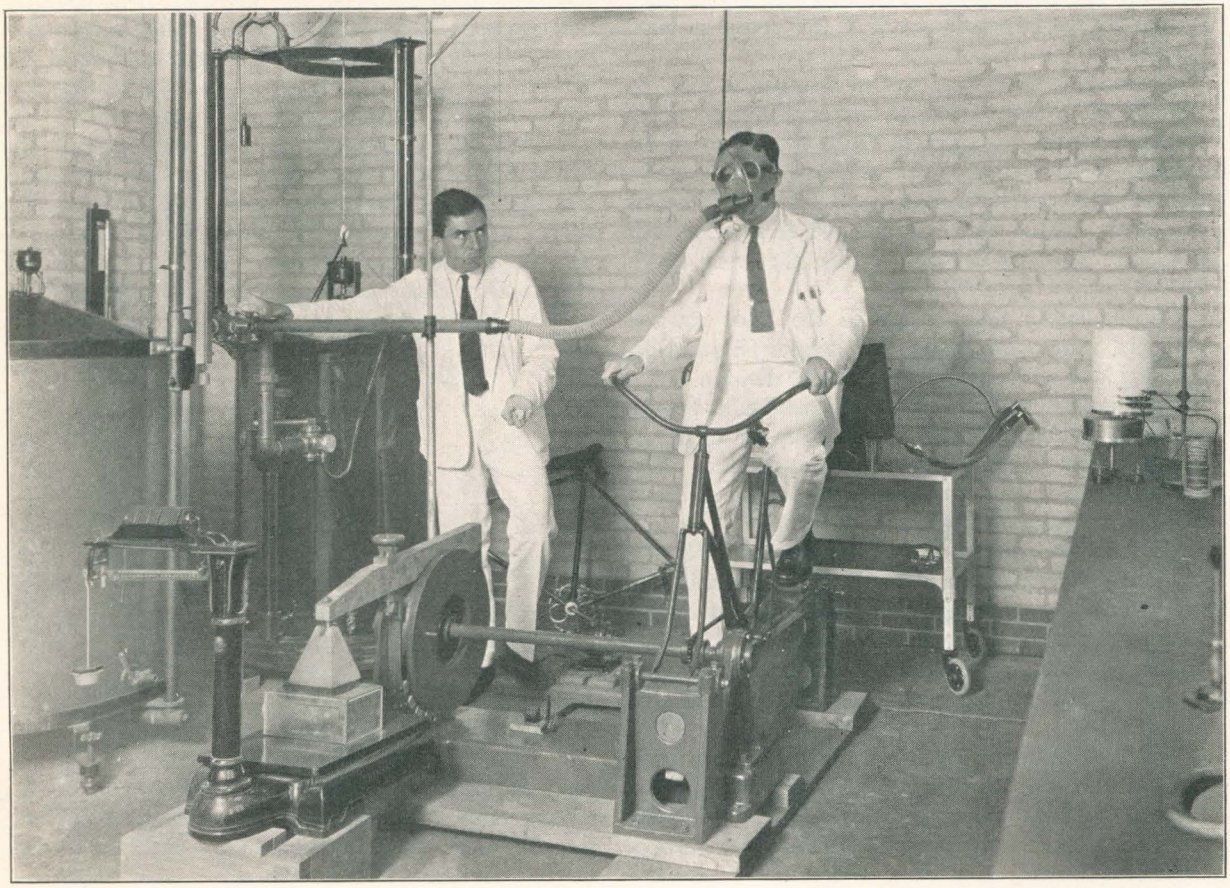


FIG. 2.—RESPIRATION LABORATORY, MEDICAL CLINIC, SHOWING THE ERGOMETER AND LARGE SPIROMETERS

rebreathing carbon dioxide. In this work two of the students are planning to participate, as the problem is more or less a continuation of one which was begun in the physiological laboratory.

A study of serum sickness is being started, which promises to be of considerable interest, and possibly of value. The clinic provides a considerable number of patients for such study since sera are administered in diphtheria, scarlet fever, erysipelas, and type I pneumonia.

LABORATORIES

The laboratories of the Department of Medicine are ample for many more workers than are at present available. Two good-sized chemical laboratories on wing G-3 (Fig. 5, page 5) are available. Only one of these has been equipped as yet. A respiration laboratory has been equipped with spirometers and an ergometer (dynamometer), and also a portable metabolism apparatus. In the adjacent room, the gas analyses are carried out (Fig. 2). These are on wing E-3. Another laboratory 17 feet by 35 feet on wing E-3 can be assigned to another associate professor. Next to it is the laboratory in which the house staff and clinical clerks will carry on the clinical laboratory work of two of the medical divisions.

In the same wing is a four-bed metabolism unit, E-304 and 309. This consists of two bedrooms on either side of a special diet kitchen. In this unit, it will be possible to carry on accurate metabolic studies involving the most careful measurement of food intake and of excreta. This unit has not yet been employed, but will doubtless be used during the year 1927–1928.

On the fourth floor, G-414, is the heart station, equipped with a string galvanometer for electrocardiography, and with a polygraph. Every division of the hospital is wired so that patients need not be brought to the heart station. There is a dark room, an office, an anteroom, and a dressing-room for out-patients. The heart station is at present in charge of an assistant aided by one of the part-time instructors.

On the second floor of wing F (Figure 4, page 4), the medical clinic uses one room in the bacteriological wing for its own diagnostic work and investigations. At present, the resident physician is in charge of this laboratory, assisted by the intern in charge of the contagious division for adults of the Municipal Hospital.

On the third floor, wing D-307, a laboratory has been equipped for the physiological investigations of the associate professor in charge of neurology. This equipment consists of an oscillograph, an electric stethoscope, apparatus for psychogalvanic reactions, for Bárány tests, etc.

At the present time, the staff has not reached its full size and it has not yet been possible to strike a proper balance in the distribution of time between clinical duties and research. It is hoped that in the coming year 1927–1928 these duties can be so arranged that each member of the whole-time staff may count on having half of his time free for his own researches.

The medical clinic must be prepared to care for ninety general medical patients, twelve patients under combined medical and psychiatric observation, and from ten to fifteen adults who may be admitted to the contagious divisions in the Municipal Hospital, making a total of nearly 120 patients. In addition, the medical out-patient clinic cares now for 160 patients each week, thirty of whom are new patients. This out-patient clinic shows every evidence of growth. Appointments for new patients are often made from seven to ten days in advance. It will be difficult to meet the natural growth of the out-patient department until fourth-year students are available. The alternative of increasing the number of patients seen by taking less care in examinations and records is not to be thought of seriously. Such a course would lessen the principal attraction of the clinic for new patients. It is the firm belief of the writer that if the present plan can be adhered to, a unique contribution will have been made to clinical teaching in America—one which may come to displace bedside teaching as of first importance.

During the first fifteen months of the operation of the medical clinic, there have been 1,127 new patients admitted, with ninety-six deaths and seventy-one autopsies. The percentage of deaths in which permission for autopsy was obtained is 72.5. The rate of growth of the clinic may be seen from the tabulation by months of the new patients admitted:

1926		1927	
January	26	January	108
February	34	February	93
March	84	March	147
April	61		
May	70		
June	64		
July	52		
August	60		
September	83		
October	87		
November	83		
December	75		

At the present time the clinic presents more than enough varied material for teaching a larger class than the one which will enter the clinical clerkship in the autumn of 1927. The growth will undoubtedly continue, assuring an adequate number of patients for the instruction of two classes in the years 1927 and 1928.

STAFF

William S. McCann . . . . . Professor of Medicine
[1] George W. Goler. . . . Lecturer in Preventive Medicine
[1] Joseph Roby . . . . . Lecturer in Medicine
Richard S. Lyman . . . Associate Professor of Medicine
[1] Charles E. Gibbs . . . . . Consultant in Psychiatry
Stafford L. Warren . . Assistant Professor of Medicine
Eric Kent Clarke . . . . Assistant Professor of Medicine
[1] Louis B. Baldwin . . . . . Instructor in Medicine
[1] John R. Booth . . . . . Instructor in Medicine
[1] David A. Haller . . . . . Instructor in Medicine
[1] John J. Lloyd . . . . . Instructor in Medicine
[1] A. R. McFarland . . . . . Instructor in Medicine
[1] Alvah S. Miller . . . . . Instructor in Medicine
[1] E. K. Richard . . . . . Instructor in Medicine
[1] C. P. Thomas . . . . . Instructor in Medicine
[1] S. S. Bullen . . . . . Instructor in Medicine
[1] Evelyn B. Reichenbach. . . . . Instructor in Medicine
Lawrence A. Kohn . . . . . Instructor in Medicine
David Rioch . . . . . Assistant in Medicine
Bernhard A. Rogowski . . . . . Assistant in Medicine
Walter F. Fray . . . . . Assistant in Roentgenology
Morgan John Rhees . . . . . Assistant in Medicine

BUDGET

The gross total yearly budget for the Department of Medicine including salaries, wages, equipment, and supplies amounts to $26,700.

[1] Part-time.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF PEDIATRICS

BY

SAMUEL WOLCOTT CLAUSEN, M.D.

PROFESSOR OF PEDIATRICS

The aims of instruction in pediatrics are to acquaint the student with normal growth and development; to teach prevention of disease whether it is nutritional, infectious, or mental; to teach first-hand the methods of examining children; to study the child, as far as possible, in his environment; and to familiarize the student with disease and its treatment in children. On the one hand, the fundamental sciences are emphasized but on the other, therapeutic aims are never lost sight of. Pediatrics is set apart from medicine in general very

FIG. 1.—RESEARCH LABORATORY FOR CHEMISTRY

FIG. 2.—OBSERVATION UNITS FOR OLDER CHILDREN

largely as a matter of convenience in the study of special problems of development, infant feeding, and contagious diseases. As a matter of fact, no sharp line divides the field. Consequently, the student is never led to believe that he is studying a specialty.

STAFF

The whole-time staff at present includes one professor, one assistant professor, one instructor who is also resident of the hospital staff, and two assistants who are also assistant residents of the hospital staff. As need arises, the whole-time staff will be increased. The part-time staff includes one assistant professor, five instructors, and one assistant. These individuals are all physicians of the city limiting their practise to pediatrics. One other instructor is the chief psychological examiner at the Shelter for Children. The part-time staff, assisting in clinical instruction during the fourth year in the divisions of the hospital and in the out-patient department, brings the student in contact with the art of medicine as practised by the private physician.

The resident staff of the hospital includes one resident, two assistant residents, and four interns. Candidates for internships must have already completed one year's internship in medicine, pathology, or pediatrics. Contact with men of junior rank but of considerable experience is thought to be of great value as an aid in the instruction of the clinical clerks during their third year.

INSTRUCTION

The facilities for teaching include the clinical material, the laboratories, and the out-patient department. The clinical material consists of beds for thirty-three older children, eighteen infants, and thirty-five contagious cases. The infants and older children are invariably examined for the presence of contagious disease before admission to the division either in the out-patient department or in the emergency division. The older children are admitted to their division in

separate cubicles for at least twenty-four hours and until nose and throat cultures have been proved negative for diphtheria. The divisions for these children consist of four-bed units where isolation technique can be carried out as necessary. Infants up to two years of age are cared for in the Infant Division in separate cubicles. Those children suffering from active infection are placed in a separate room. Special isolation-technique is carried out with all the infants. The nursery for the Department of Obstetrics closely adjoins the Infant Division and contains a room for the care of premature infants. Students, therefore, have the opportunity of observing infants from the time of birth. The Municipal Hospital, under the clinical control of the University, furnishes an active service for contagious cases. In the division of the Municipal Hospital for the observation of psychopathic patients, the children will be under the medical care of the Department of Pediatrics, and will thus be available for demonstration.

The clinical laboratories adjoin the divisions for patients. These laboratories are equipped with facilities for microscopic, chemical, and bacteriological examination and are provided with desk space for the use of students. The research laboratories of the department (Fig. 1) are open to students undertaking investigation in biochemistry and in bacteriology and serology.

In the out-patient department patients are seen by appointment from 9:00 A.M. to 4:00 P.M. A small waiting-room is provided in the department. The patients have little opportunity of gathering in any number and the danger of cross infection is minimized. This department contains a room for weighing and measuring infants and older children and for the taking of temperatures, three small individual examining rooms, and a large room for demonstrations containing a blackboard and laboratory equipment. As far as possible, the development of special clinics for tuberculosis, heart disease, well babies, etc., is limited, although a clinic exists by necessity for the treatment of congenital

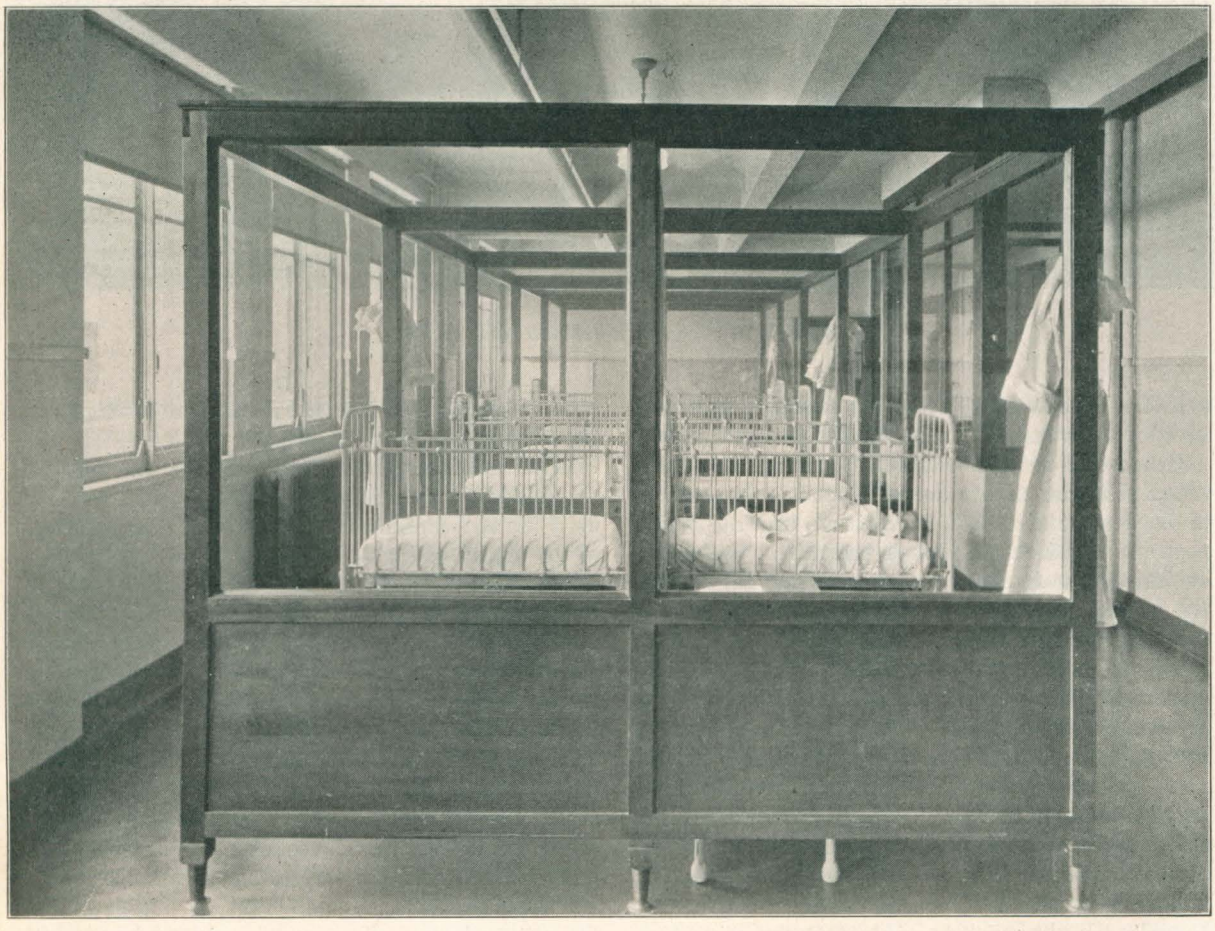


FIG. 3.—CUBICLES FOR INFANTS

FIG. 4.—UNITS FOR ISOLATION OF INFANTS

syphilis. The worker in the out-patient department thus secures a better assortment of clinical material.

Instruction in pediatrics will begin in the second school year with an introductory course in the methods of diagnosis conducted in coordination with the similar course in medicine. Although practise in the taking of histories must be deferred until the third year, the general plan and purpose of the history will be discussed. From the beginning, the student will be taught to practise the technique for preventing the spread of infectious disease. He will be taught to proceed in the examination in a systematic way as follows: general inspection of the whole body entirely nude, palpation, and regional examination, including percussion and auscultation. The student will learn to recognize by inspection acute and chronic illness, will gain an objective standard for judging nutrition, and will check his judgment by measurements and reference to tables. In the infant, he will learn to recognize dehydration and athrepsia. He will note the state of physical development and estimate the mental development. He will note the posture and gait.

Brief mention will be made here of the regional examination. In children, it is usually wise to defer until the last certain examinations, for example, those of the throat, of the ear-drums, or of any painful part and to begin with the extremities and to proceed with the chest, the abdomen, and the head. The electric otoscope will be used in every routine pediatric examination. Attention will be paid to the buccal mucosa, the teeth, the tonsils, and the adenoid tissue. Obstruction, the character of the mucosa, and the inflammatory exudates will be studied in the nose. Attention will be paid to the lymph glands and to the thyroid in the neck. The student will observe the change in the form of the thorax with age, anomalies due to rickets, and to heart disease, etc., the respiratory movements, costal and diaphragmatic. He will learn the topography of the lung, and observe by percussion the excursion of the bases of the lungs. He will compare the breath sounds

FIG. 5.—SUN PARLOR FOR OLDER CHILDREN

of the developing child with those of the adult. He will examine cases of pulmonary disease with clear-cut physical signs. The fluoroscope and the X-ray will be used as an aid in explaining physical signs. In studying the circulation, the student will observe the pulse; observe with his eyes and palpate the precordial region; outline the heart by percussion, and check his findings by means of a fluoroscope. He will observe the differences which characterize childhood. Examples of the commoner types of heart-disease will be demonstrated. In the examination of the abdomen, inspection will be emphasized. Palpation will reveal abnormal degrees of resistance, of tenderness, and abnormal masses. The development of the genitalia will be studied. The student will make and study vaginal smears. In the neurological examination, attention will be especially paid to the normal and pathological development of the nervous system and to those diseases peculiar to childhood, such as birth injuries, hydrocephalus, and congenital defects. The behavior of the patient and his social adaptation is never neglected. Finally, the student must summarize his findings, state the deviations from normal, and interpret them as far as possible in terms of pathology, anatomy, and physiology.

For the purposes above mentioned, the class will be divided into small groups for individual instruction at the bedside with the actual material present in the hospital (Fig. 3). Provision will also be made for the study of ambulatory material in a room of sufficient size. The hours of instruction are arranged so as to interfere as little as possible with the routine care of patients on the divisions. The material will include from the first not only older children but also infants and those suffering from contagious diseases.

In the course in the clinical laboratory, normal material will be examined in so far as it differs from that of adult life. Examples will also be studied of materials characteristic of childhood such as the blood in anemia, the routine nose and throat cultures, and the urine in cases of orthostatic albuminuria. The more important

quantitative analytical methods useful in pediatrics, such as the determination of the glucose, the non-protein nitrogen, and the carbon dioxide capacity of the blood are already familiar to the student. He has opportunity in his third year to perform those tests in actual cases and to learn their significance.

THIRD YEAR

The chief purpose of the third year, a year of clinical clerkship, is to train the student in the application of methods of clinical diagnosis. He must in particular learn to take a clinical history from the parents of the child. He is taught such nursing procedures as the taking of temperatures, the feeding of infants, the giving of enemas, lavage, and gavage. He learns from observation and participation such therapeutic procedures as the parenteral administration of fluids, the giving of serum, prophylactic immunization, the transfusion of blood, and the use of the quartz lamp.

It is unquestionably desirable though certainly inconvenient to permit clinical clerkships in pediatrics. Nevertheless, the students will be assigned to patients in the division for older children, for infants, and for contagious cases. What the student chances to miss in contagious work during the off-season, he will see in his fourth year. The most serious drawbacks to the plan are: (1) the danger of carrying infection among patients, especially infants; (2) the interference with the nursing routine, which for children is always more exacting than for adults. These drawbacks can probably be met by a rigorous insistence upon the technique for isolation and by a strict adherence to a time schedule on the divisions. As already mentioned, the house staff is mature, the interns having had one previous year of internship. The great advantages of clerkships in pediatrics are: (1) an immediate experience with sick children; (2) the development of a sense of responsibility, not only for the welfare of the patient but also for the gathering of actual data concerning him; and especially (3) the opportunity for informal discussion with junior members of the staff.

Students who are up for cases will be in touch with the hospital day and night and will appear as soon as notified of the arrival of a patient. They, therefore, have an opportunity to observe those earlier signs and symptoms which in children change so rapidly. The clerk is under the immediate supervision of an intern upon whom the responsibility for taking the history and making the examination rests. The clerk follows the case to which he is assigned through all special examinations; radiographic, surgical, or otorhinolaryngological. He has an opportunity to observe the performance of intelligence tests. He, therefore, learns to view special examinations in their true light as related to the study of the case as a whole. He aids in the performance of quantitative chemical analyses, in the bacteriological examination, etc. During the rounds the student presents his case to the whole group. Although the chief problems for discussion are diagnostic, the findings are always presented as indication for therapy. There are no didactic lectures.

In the rather abundant free time, the student gathers clinical data, reads on his cases, gains systematic knowledge of the subject, and discusses his problems with an instructor. Abundant time may be devoted to investigation. It is hoped that many students will continue investigation in preclinical departments. Many others, however, will assist in working upon the problems of the department.

Surgical cases are cared for in the divisions devoted to children. This material proves of great value in rounding out the experience of the clinical clerk. Clerkships are available during the summer months. At this time, the student will observe such diseases as dysentery, poliomyelitis, hay-fever, etc.

FOURTH YEAR

In his fourth year the student will enter the out-patient department. He will have acquired enough experience to take an adequate history and to make a physical examination. Patients come to the out-patient department by appointment and will return, so far as is possible, for observation by the same student. All work will be supervised by a member of the whole- or part-time staff. The emphasis in out-patient teaching will be chiefly upon problems of therapy and preventive medicine. The student will be taught the art of dealing with patients and with their families. He will follow his patient to any special clinic to which he may be referred. Special cases will be presented each day from 11:00 to 12:00 A.M. In the rounds in the fourth year, emphasis falls upon the disease as such, especially upon problems of therapy, differential diagnosis, and the environment of the child, prophylaxis, and the social aspect of children's diseases. As the groups attending rounds will be fairly large, rounds will frequently be conducted in the fashion of a clinical demonstration in a large seminar room adjacent to the wings E-4 and B-4.

Amphitheater clinics are conducted from 12:00 to 1:00 on Thursdays for all students. Cases will be presented by a member of the fourth-year class in the medical-pediatrics semester. Effort will be made to demonstrate in the course of two years all the chief pediatric conditions of importance, as well as cases of great rarity.

At the clinical-pathological conferences such important pathological material as becomes available will be presented at weekly conferences in the pathological

amphitheater in conjunction with members of the staff in pathology.

RESEARCH

Research is facilitated by the close physical coordination of the Department of Pediatrics with other departments. The nursery of the Department of Obstetrics in wing E-406 (Fig. 6, page 6) adjoins the infant division of pediatrics and affords ample opportunity for the staff to observe the normal and abnormal newly-born infant. The Department of Vital Economics in wing G-4 adjoins both the infant division E-4 and that for older children in wing B-4. Adjoining the laboratories for chemistry are those of the other clinical departments and the Department of Biochemistry in wing J-3. The bacteriology laboratory of pediatrics in wing F-205 (Fig. 4, page 4) adjoins the laboratories of bacteriology of the Health Bureau. Much free laboratory space is available in the department and will be equipped as need arises. Among the problems at present under investigation are the following:

(1) The nature of the surface-active substances of the urine in nephrosis.

(2) The effect of focal infection upon nutrition in infants and older children.

(3) The action of novasurol upon the kidney.

(4) Lipide metabolism in normal and epileptic children before and during dietary ketosis.

(5) The effect of ultra-violet irradiation on the lipide metabolism in experimental rickets.

(6) The diurnal variation in the acetone bodies of the blood and urine in children on high fat diets.

(7) Study of the stability of isoagglutinins and isohemolysin towards ultra-violet light.

(8) The degree of transmission of ultra-violet light through various fabrics.

STAFF

S. W. Clausen ..... Professor of Pediatrics
Irvine McQuarrie.... Assistant Professor of Pediatrics
[1] Albert D. Kaiser .... Assistant Professor of Pediatrics
[1] Paul W. Beaven ..... Instructor in Pediatrics
[1] H. C. Soule ..... Instructor in Pediatrics
[1] H. F. Rowley ..... Instructor in Pediatrics
[1] Frances H. Parsons ..... Instructor in Pediatrics
[1] Dorothy M. Worthington .... Instructor in Pediatrics
[1] Norris G. Orchard ..... Instructor in Pediatrics
W. K. Bradford ..... Instructor in Pediatrics
[1] F. W. Bush ..... Assistant in Pediatrics
J. Merrel Parker ..... Assistant in Pediatrics
Haddow M. Keith ..... Assistant in Pediatrics

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $15,470.

[1] Part-time.

UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF SURGERY

BY

JOHN J. MORTON, JR., M.D.

PROFESSOR OF SURGERY

INTRODUCTION

The teaching of any of the clinical branches of medicine is a much more difficult task than that of the preclinical sciences. This is at once apparent when it is recognized that the Department of Surgery is responsible for the instruction in general surgery, orthopedics, genito-urinary surgery, otorhinolaryngology, ophthalmology, neurological surgery, plastic and dental surgery; as well as anesthesia, surgical anatomy, surgical pathology, etc. The problem is furthermore complicated by the fact that both undergraduate and graduate teaching must be carried on at the same time. Also the teaching is practically continuous over at least two years of the student's course and additional demands due to the human factor cause inroads on the time of the teaching staff.

The Department of Surgery as organized in the University of Rochester School of Medicine and Dentistry comprises all of the branches of operative surgery except gynecology. The staff consists of both full-time and part-time men, who carry on all the routine work of the Strong Memorial and Municipal hospitals as well as the instruction of students and doctors. The professor and associate professors are on a full-time basis. On their shoulders falls the brunt of the organization and correlation of the teaching and research, and there must be no outside entangling interests. This might be accomplished equally well by limiting their sphere of activities to the hospital and school. All other members of the staff are on a part-time relationship and receive financial support only until their standing in the community is secure.

It is obviously impossible to cover the whole field of surgery in undergraduate teaching. The practical application of the basic sciences to the clinic is of the first importance. The attempt should be made, also, to instil the fundamental principles of history taking and of thorough examination. The essential procedures necessary for thorough examination must be practised over a considerable period before proficiency is acquired. No amount of theory can replace this constant repetition which should be checked up by a more experienced individual. The medical student when he is graduated is far from being ready or able to carry on a medical practise. It is the business of the medical school and the hospital to correct this deficiency in the training of the doctor as thoroughly and as effectively as possible in the minimum of time. This constitutes the second great field of medical school teaching, i.e., postgraduate instruction. There should properly be at least a third field for the medical school in its relation to the community. The resources of the school should be available to the practitioners of the community for assistance in furthering their problems or in extending their education in certain fields. If postgraduate courses have been carefully mapped out and organized, a great deal may be accomplished in a concentrated time for outside practitioners. This last type of teaching has been much more extensively worked out in some of the large foreign clinics.

UNDERGRADUATE TEACHING

Although it is still an open question as to how soon the medical student should be introduced to the clinic, it has been decided that an occasional contact might be beneficial even in the first year. An experiment is being tried by the Anatomy Department in collaboration with all the clinical branches to show the students some of the practical applications of anatomy to the clinic. More emphasis is put on the importance of the knowledge of anatomy than on the clinical features. For instance, whenever there is a patient in the surgical clinic who illustrates some striking anatomical lesson, a clinic for the first-year class is announced on the bulletin board and as many as wish may attend. Patients showing peripheral nerve lesions, poliomyelitis, injuries to arteries, etc., make excellent demonstrations on the importance of nerve distribution, muscle positions and

actions, and collateral circulation. Sufficient time has not as yet elapsed to indicate the value of these exercises but judging from the attendance, the students think them worth while. If the experiment proves successful a definite elective course may be offered at a regular stated time when the school clinic gets large enough to furnish adequate material. There is no reason why similar courses could not be undertaken in connection with the other courses of the first two years.

The first real clinical teaching is scheduled for the last part of the second year when the students are offered a course in physical diagnosis. Contrary to the accepted tradition in other medical schools, this course is not to be taught by the Department of Medicine alone, but all the clinical departments are to participate. It is planned to make this course the foundation stone upon which the work of the next two years is built. The Department of Surgery will take part in this course by having the ophthalmologists teach the students how to examine the eye, including the eye grounds; the proper methods of examining the ear, the nasal and oral passages, and the larynx will be presented by the otorhinolaryngologists; the dental surgeons will indicate the normal and abnormal conditions of the teeth; the orthopedic surgeons will demonstrate examinations of the spine, joints, feet, and general posture; the genito-urinary surgeons will teach how to examine the genitals and urinary passages; the general surgeon will cover various other regions which should not be neglected in any complete physical examination. It is hoped that by the cooperation of all the clinical departments the student will have the background to carry out the complete "work-up" of a patient when he goes into the clinic. It is the aim to make him familiar with the normal appearance of the various parts of the body. This instruction will not be given with the idea of making the student disregard the specialties, but rather to furnish him with essential fundamental methods of approach towards the problems of diagnosis by thoroughness. Part of these methods may be taught on the students themselves until a greater degree of facility is acquired. It is desirable that each student should possess as part of his personal equipment an otoscope, an ophthalmoscope, etc., as well as a stethoscope.

The students will be admitted to the divisions (wards) of the hospital for their work during the third year and will take their places in the dispensary for the fourth year. This plan follows the scheme already adopted at the School of Medicine of Yale University and seems to have decided advantages over the reversed order as practised in most other schools. Under this plan as the patients enter they are assigned in rotation to the students. The latter act as clinical clerks. They are not pressed for time as in the dispensary, and consequently learn more careful history taking and do more complete examinations. The divisions are equipped with all the necessary apparatus and the student will be required to examine and record his observations on the eye grounds, ears, etc., as completely as possible on every patient whose condition will admit it. In this way during his third year the medical student will be repeatedly putting into practise the instruction given in his course in physical diagnosis. He will examine as a routine a good many normal fundi, for instance; and will undoubtedly see a number of variations from the normal and a few pathological fundi as well.

It is planned at present to divide the third and fourth years into semesters. Each semester, one half of each class will be assigned to medicine and pediatrics, and the other half to surgery and obstetrics. Each clinical department will announce the number of clerkships available, depending on the size of the service. No effort will be made to force the student to accept service in rotation with every department, the freedom of selection of his clinical pathway being entirely at his own discretion. It is believed that some students may elect to get the major part of their clerkship training in only two of the clinical departments although they will be required ultimately to show their proficiency in all four. This procedure will also serve as a stimulus to the departments concerned, to provide so attractive a service that it will be desired. When once a clerkship in a department has been elected, the student will be held as an integral part of the clinical organization. He will follow out the duties as already outlined in the previous paragraph. In the surgical clinic he will follow his patients to the operating rooms where he will take part in the operation under careful scrutiny and supervision. He will be allowed to give a certain number of anesthesias under the eye of the qualified anesthetist. The student will also take part in all the procedures necessary for a diagnosis, such as special blood chemistry, fluoroscopic examinations, basal metabolism determination, etc. He will be responsible for working up and reporting the bacteriology and pathology on his own case.

There will be daily rounds given alternately by the two services so that the student may attend both if he wishes. Surgery will offer four rounds a week to the third-year class, two rounds in general surgery, one in genito-urinary surgery, and one in orthopedics. Occasional rounds in otorhinolaryngology and ophthalmology will be given when interesting material is available. Special stress will be given to methods of approach and to surgical diagnosis. An attempt will be made to present to the student as great a variety of conditions as is possible. Too many men are being graduated who have learned all their medicine by the study of one disease.

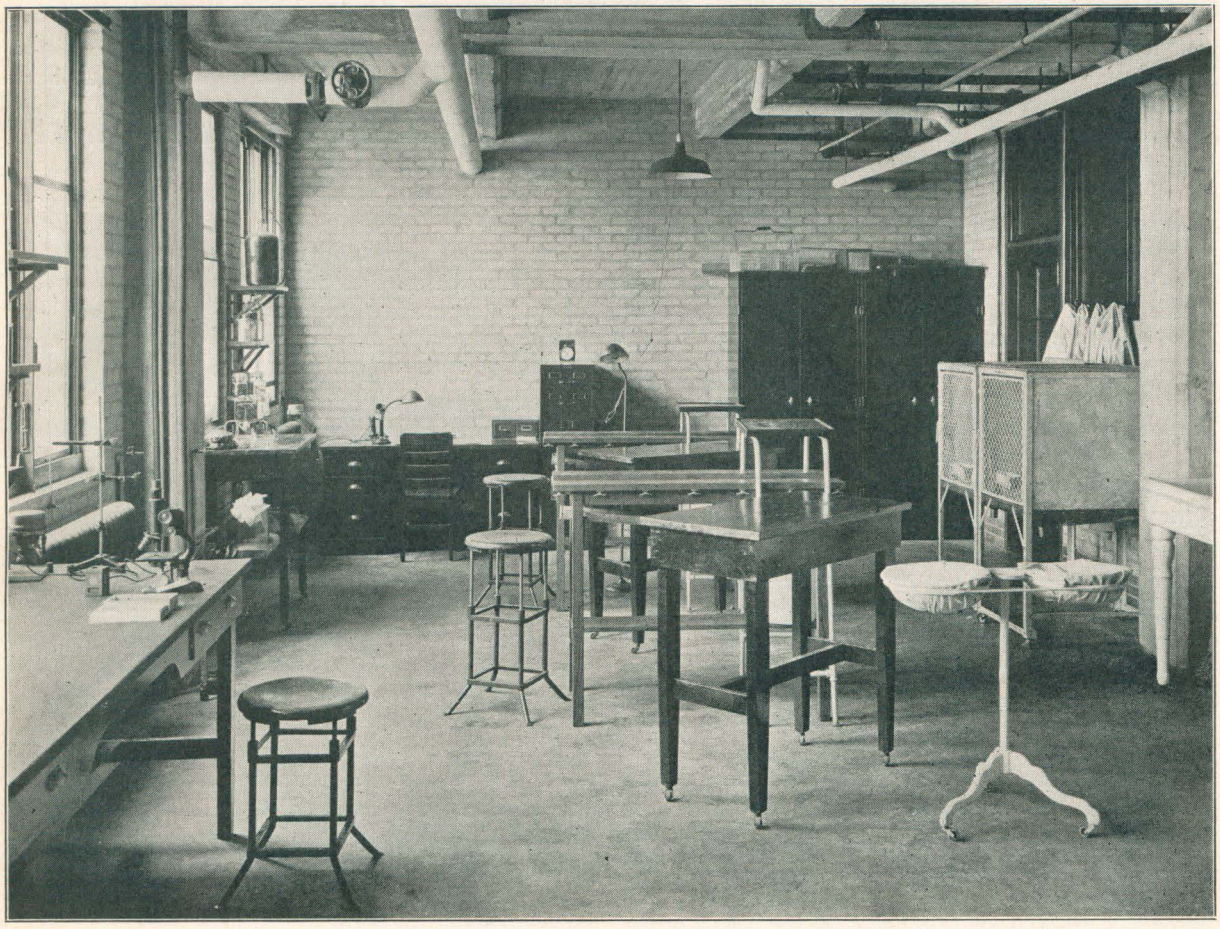


FIG. 1.—EXPERIMENTAL SURGICAL LABORATORY

Very little encouragement will be given to attendance at operative clinics, as it is believed to be generally a waste of time for the undergraduate; and a loud spoken demonstration by the operator is very poor training for the graduate team, as it distracts from the operation itself, which should be their main attention.

There will be a surgical amphitheater clinic once a week (not operative) so arranged that both third- and fourth-year classes may attend. No definite schedule can be followed but patients will be shown to illustrate every phase of surgical diagnosis and therapy according as they are available. In this way the surgical clinic will cover all the specialties intermingled with the general surgical conditions. As far as possible, the clinics will be given without repetition of a subject already presented until the two-year cycle has been completed.

A clinic on the principles of therapeutics is offered once a week as a joint endeavor of the clinical group. This clinic is open to both third- and fourth-year students and represents an attempt to show the student the rationale of various forms of therapy. Such subjects as diet, chemotherapy, drug therapy, various forms of radiation therapy, and the application of physical agents will be presented.

Lectures will be given whenever it is believed that a subject can best be introduced or clarified by this method. Controversial subjects will be covered in this manner or by seminars, because there is no other way for the medical student to get the knowledge of the differences of opinion unless he is active in reading the current literature. This latter course is out of the question unless the reading is directed.

Surgical anatomy will be offered as an elective course. An effort will be made to focus the attention on the importance of anatomy from the clinical standpoint. Various regions which are of vital interest for accurate diagnosis and treatment will be emphasized. Surgical pathology will also be given as an elective. There will be a set course which will follow definite anatomical

regions, and a loan collection of slides will be given out for study. Fresh material will be used whenever possible. Color photography is being developed to preserve as nearly as possible the original appearance of preserved specimens. At present there is no other way to do this except by the elaborate moulage method which requires a full-time artist. It is realized that this course is of much more importance to the future surgeon than to the medical man, and if only a few men should elect the course it might profitably be combined with the graduate instruction given the resident staff at the weekly history meeting.

The underlying principles of surgery such as antisepsis, the technique of handling tissues, sutures, wound healing, etc., will be taught as a required course for all who elect surgery. This course will be given in the surgical laboratory and will be a series of exercises in operative surgery on fresh material from the slaughter house and on laboratory animals. The well known method of conducting this instruction as practised by Dr. Harvey Cushing in Dr. Halsted's clinic and later at Harvard Medical School will be followed.

Instruction in minor surgery, bandaging, fractures, and the application of various types of apparatus will be given at stated intervals during the third and fourth years.

In the fourth year the students will be accepted as assistants in the out-patient clinics. They will meet patients on the appointment system much as they would in office practise. Complete histories and examinations will be possible and repeated visits will be made to the same student, who will thus check up the results of his diagnosis and treatment. Interns, assistant residents, and attending men will have supervision of the clinic and give instruction as needed.

Opportunity for attending rounds and clinics will be provided. The men will rotate through the general and special clinics, and having become familiar with the normal appearances and methods of examination in their third year, will get a great deal of value instead of floundering about in uncharted seas with strange equipment.

A daily round-up of interesting patients will be made and presented to the students in a fourth year out-patient clinic. Opportunity to follow up special types of therapy is afforded by concentrating such appointments on certain days.

The most important consideration for the surgical scheme of undergraduate teaching is to have a bloc of time, unrestricted, to be filled in as appears best after trial. The whole scheme should be elastic, capable of ready readjustment, so that courses not attended can be dropped or continued in some other way; and so that teachers of merit may be encouraged, and those who have nothing to offer, eliminated.

GRADUATE TEACHING

As soon as interns are accepted, the clinic is committed to graduate teaching. Even if no conscious effort is made there is no escape from the teaching by example. It is more important that the graduate in medicine be properly trained than the undergraduate, because the former will soon be in active contact with the public and almost the last chance for correction gone.

The resident system offers a chance to develop surgeons who will have some interests in medicine other than the operative side. By this system, more experienced men give help and guidance to the younger men as they come into the clinic. The progress to resident surgeon is upward in a pyramid, selection being based on ability, leadership, and scientific interest. The success of the resident system depends on the amount of cooperation and esprit de corps throughout the whole service.

The surgical internship consists at present in a straight one-year service, not graded. The intern has under his care all types of surgical conditions. All the work necessary for a complete study of any patient is carried out by the intern with student help. This work is supervised by the resident and by assistant resident surgeons, who are in turn responsible to the upper staff. Instruction and practise in anesthesia is given under the direction of the chief anesthetist. The interns will rotate in turn through the different divisions (wards) and out-patient clinics. Interns assist at all operations on patients under their immediate care.

Instruction in technique and team-work is given at every operation, by example and demonstration. Mistakes in diagnosis and therapy are brought out in the weekly history meeting where interesting cases discharged during the previous week are commented upon. The surgical pathology of the preceding week is demonstrated. The "pathology of the living" is a most important part of the training of a surgeon and should be emphasized over and over again. Reports from the literature are presented by different members of the staff in the form of a seminar discussion. Questions of medical ethics and the psychology of the sick are talked over as they arise. The proper handling of patients and their friends can only be learned by watching how other men do it successfully. Other opportunities for learning are available by attendance at clinics, rounds, and medical meetings, and especially by the clinical-pathological conference which takes place once a week at a stated time. If the intern shows an inclination for research, free time and opportunity will be provided.

Surgical internships are open to graduates from any Class A medical school. Selection is made from as many different schools as possible in order to bring in new ideas from outside. A graded step-up system with

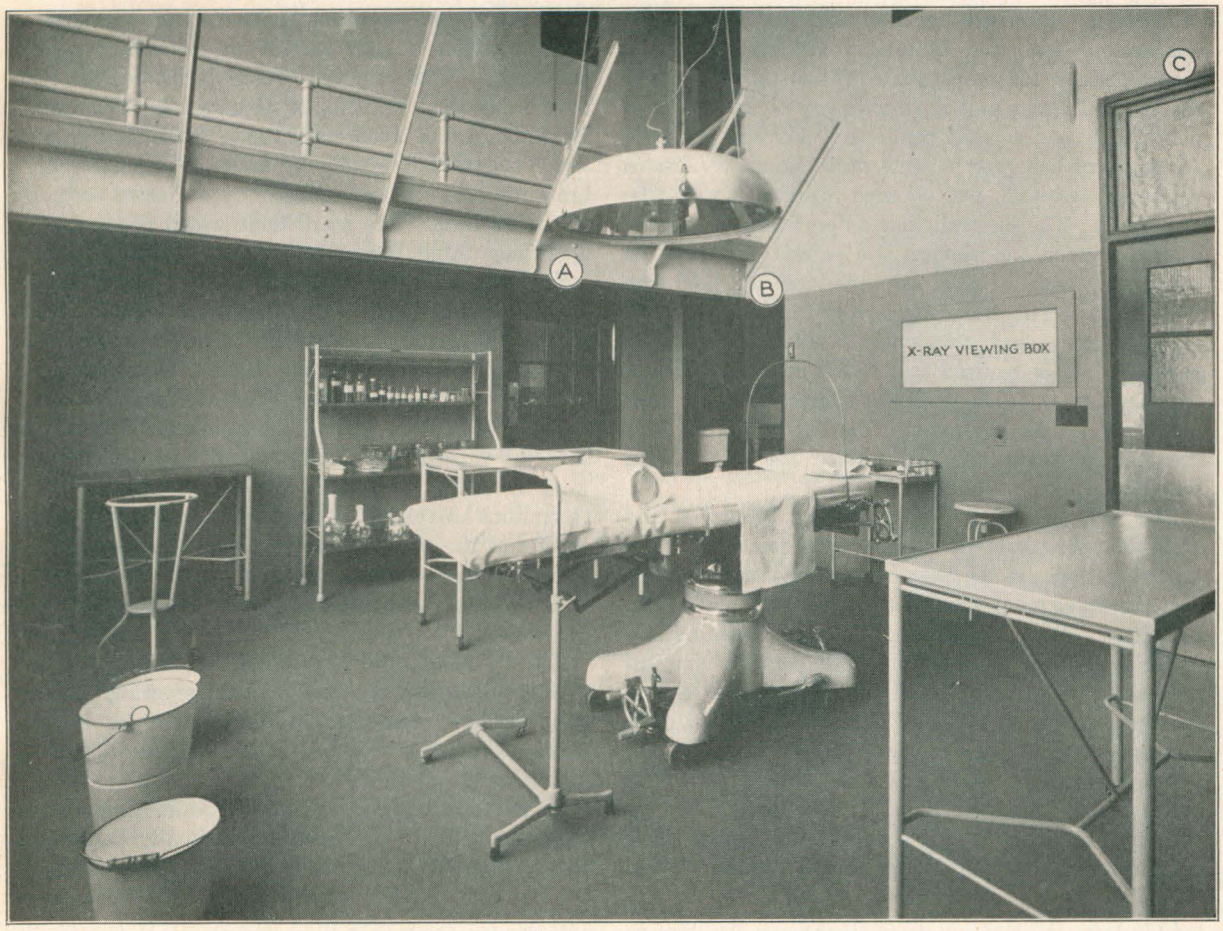


FIG. 2.—TYPICAL OPERATING ROOM UNIT

new men coming on every three months is contemplated.

Assistant residents are chosen from the interns and from outside sources. In addition to the clinical work, encouragement is given for original clinical or experimental research. The various surgical specialties will be covered in successive stages as well as the general clinic. The experimental laboratory is put under the charge of an assistant resident who has no contact with the clinic. He spends a year in reading, thought, and experimentation, without distraction. Surgical pathology is also under his charge but the technical part of the work is handled in the pathological laboratory. This affords an ideal consultation arrangement with the pathologists and much mutual benefit results from it. Assistant residents become members of the teaching staff and their special sphere is in teaching clinical medicine, and clinical procedures.

The resident surgeon is responsible for the smooth running of the clinic. He takes an active part in the organization and arrangement of schedules. He is first assistant at the majority of the operations and is given as much operative work as his ability warrants. He saves the upper staff as much as possible in all sorts of contacts with outside people. His duty is to correct mistakes in the machine and to see that the very sick patients are given every possible attention. He is rated as an instructor and conducts rounds for students and takes part in the regular teaching schedule.

POSTGRADUATE TEACHING

Short courses for postgraduates will be arranged as soon as the hospital gets well established. Courses will be worked out especially in the field of the surgical specialties. The work will be both practical and theoretical. This development will be one of the future; until it can be handled in an efficient manner, it will not be attempted.

ORGANIZATION

To carry out the plans for teaching as already outlined, it is necessary to have a good clinic with an abundance

of material. Provision has been made for this and the relationship with the Municipal Hospital makes it possible to care for patients in every walk of life. From the surgical standpoint it is necessary to have a good many beds, and a rapid turn-over. For this reason a convalescent home for patients with chronic conditions would be desirable, but no such hospital is available at present. The surgical clinic differs from the medical in this respect, for whereas one patient will serve to teach many medical men, the same does not hold true for surgery. The condition is corrected by one individual or group and is no longer available for teaching purposes. It is realized that there must be a larger organization to teach graduate surgery if more beds are in use, or else the patients will not be studied with the care desirable and the service becomes a mad scramble.

The type of division in the Strong Memorial and Municipal Hospitals has already been described. The special features are the blocs of four beds, the examination (intern's) room with all equipment for a complete examination and the darkened stall for examinations requiring electric illumination. All sorts of surgical conditions are received into the division without separation into groups so that the student and intern must necessarily see and care for every kind of patient.

The surgical service will be self-contained as far as is reasonably possible. Clinical laboratories for the ordinary examinations have no special features requiring comment. They are in close proximity to the divisions. A laboratory for more special examinations is also maintained. In this the students will be required to carry out all such examinations under supervision of the technician in charge. Chemical examinations for the researches of the members of the staff may be conducted by the technicians or the individual himself. The surgical pathology is handled by the assistant resident in charge of the experimental laboratory. He indicates the parts of the specimen which he wishes preserved for the museum, photographed, or cut for sections. The results of his examination are dictated and filed in the museum and on the surgical history. The actual technical work is done by the Department of Pathology. A room for frozen section work is equipped in the operating room suite. All the material is kept in a museum open to every department. The routine bacteriology will be carried out as far as possible by the surgical service. A room has been set aside in the Department of Bacteriology for this purpose. Media will be supplied by the Bacteriology Department and cooperation will be offered in running down and determining any unusual finding.

The experimental animal laboratory is equipped with all the material necessary for any kind of operation. It is considered essential that the instruments be as good as in the general operating rooms because the surgical staff is getting a good part of its instruction in this laboratory. The operating room furniture has been made in the carpenter shop of the hospital. The operating tables are of wood made up to a standard pattern which is used throughout the school. The instrument table measures 38 inches high, by 38 inches long, by 20 inches wide. The small table which goes over the operating table stands 45 inches from the floor and measures 15 by 18 inches, clearing the operating table by seven inches. Two animal operating units are shown in Figure 1. Instrument cabinets, filing cabinets, anesthetist's stools, solution basins, sterilizers, and scrub-up sinks are installed. A small portable X-ray machine should be part of the equipment in order to save the time of the Radiographic Department. The work is under the direction of an assistant resident. Operations are scheduled just as in the general operating room and the technique used is just as carefully considered. Surgical dressings and basins are sterilized in the central sterilizing room which performs this task for the whole hospital.

The Physiotherapy Department consists of a gymnasium with a very simple outfit such as swinging rings, chest weights, stall bars, etc.; a room for baking, massage, muscle training, and diathermy, and a hydrotherapy room.

An essential part of any surgical outfit which is now being provided is a high intensity carbon-arc lamp such as that designed by Dr. R. P. Schwartz. This lamp is not limited to the ultra-violet range alone, as most lamps are, but furnishes rays from almost every part of the sun's spectrum. It is an absolute necessity for the proper treatment of surgical tuberculosis and many of the chronic types of infection which do not respond to other forms of treatment.

The general operating suite consists of a large room and two small rooms for general surgery; a central instrument and supply room; a cystoscopic room; a room for the fluoroscopic reduction of fractures and the removal of foreign bodies under radiographic control; and two rooms for eye, ear, nose, and throat operating. There is also a waiting-room for patients between operations; and a recovery room for serious post-operative cases (Fig. 7, page 7). Every operating room is designed to be a complete unit so that anything necessary for the operation can be reached with the minimum of steps.

The operating room opens directly at A (Fig. 2) into the sterilizing room, where there are instrument and basin sterilizers, hot and cold distilled water (Castle sterilizers). There is also a utility sink which is so placed that the operating room can be observed through the door. The steam is carried off by a suction fan installed above the sterilizing room. At B there is a

"scrub-up" room where all preparations for the operation are carried out. The time for "scrub-up" is regulated by graduated sand-glasses placed on the wall over the sinks. There is a plaster trap provided in the utility sink just visible at the far side of the room. All solutions for the preoperative preparation are put in this room, thus keeping the operating floor dry. There is no door between the scrub room and the operating room so that close observation is possible. The original design allows the operated patient to be taken out through the scrub-up room so that the incoming patient can be anesthetized without loss of time in Room C. The entrance to the central instrument and supply room is through a door directly opposite to the sterilizing room door at A. There is no carrying of patients or supplies across a corridor and through swinging doors because, the anesthesia room, the scrub-up room, the instrument room, and the sterilizing room are all directly connected with the operating room.

There is no reason for students or visitors to be on the operating floor without invitation, because an overhead glassed-in observation balcony has been provided on two sides of the room with separate entrances, and there is also an entrance to the larger operating room through a passageway. There is a possibility for the development of three types of observation—an overhead, glassed in balcony on two sides of the room in one case; a similar arrangement on one side with the chance to use a movable stand on the other; and a larger room with no overhead balconies, adaptable to movable stands alone. No amphitheater has been provided as operations before large audiences are not considered of value. Groups of students up to twenty-five can be easily accommodated in the room, which has been especially designed for instruction in operative surgery. There is a built-in illuminated X-ray viewing box which can be observed from any point in the balcony or operating room. The boxes are built in flush with the wall so that radiographs can be easily observed from anywhere in the room or balconies. The lighting is by a Scialytic lamp in this room; another general operating room is provided with "Daylight" lights; and the third general operating room is not equipped as yet but will be ready for any other type of lighting which proves worthy. The walls of the operating room are not tiled, but painted in a light green shading to a darker green below and matching the green tile of the floor.

Cases which will illustrate certain types of procedure will be selected for demonstration in this operating room. There is a central splint room with a work bench for adjustment of apparatus. This is located in the surgical suite and all apparatus from the clinic is returned to this room after it has been used. On the ground floor of the hospital there is a machine shop, a leather room, and a plaster room for the pouring of casts and the fitting of apparatus.

The cystoscopic room has a table provided for taking roentgenograms. The fracture room, adjacent, is to have an oil-immersed unit for the fluoroscopic reduction of fractures. There is a small dark room for the immediate development of films alongside the cystoscopic room. Visiting doctors' rooms, intern and staff locker rooms and shower baths have no special features. There is a small room adjacent to the staff locker room, in which a dictaphone is placed so that operations may be dictated just after their completion.

The major portion of the last year has been taken up with the organization and development of the clinic. All members of the department have put their energy into building up the clinical machine so that there will be plenty of material for teaching purposes. In spite of this constant demand on their time a number of researches have been undertaken and are being carried through whenever time is available. For example, Dr. Morton is working on various problems of experimental cancer research. Dr. S. J. Stabins is working with him on certain factors involved in osteogenesis. Dr. Stabins is also engaged in a research on intestinal obstruction. Dr. Scott is pursuing his investigations further into the relations of the adrenals to resistance. He is also studying the distribution and availability of calcium in cases of obstructive jaundice; and is carrying on a combined clinical and experimental study of cholecystography in certain border-line cases. Dr. R. P. Schwartz has designed a machine for graphic recording and the study of gait. He is now attempting to establish and interpret the curves for the normal gait at various age periods, after which the method will be applied to the study of certain limps. As soon as the Schwartz carbon-arc lamps are installed, he w ll carry out further investigations on the biological and clinical effects of radiation from these lamps. Dr. T. B. Jones has collaborated with Dr. Harry Smith in the study of the blood in dehepatectomized dogs. A number of studies of unusual clinical cases are being followed out.

STAFF

John J. Morton.....Professor of Surgery
[1] Edward W. Mulligan....Lecturer in General Surgery
[1] Albert C. Snell.....Lecturer in Ophthalmology
[1] Ralph R. Fitch.....Lecturer in Orthopedic Surgery
[1] Howard L. Prince.....Consultant in General Surgery
[1] E. W. Ingersoll...Consultant in Otorhinolaryngology
[1] W. R. J. Wallace.....Consultant in Dental Surgery
W. J. M. Scott, Assistant Professor of General Surgery
R. Plato Schwartz.....Assistant Professor of Surgery
[1] David M. Davis
Assistant Professor of Urological Surgery

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[1] Clarence V. Costello ..... Instructor in Surgery
[1] Warren Wooden ..... Instructor in Surgery
[1] Carl T. Harris ..... Instructor in Orthopedic Surgery
[1] Raymond W. Hawkins
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[1] Elroy J. Avery ..... Instructor in Otorhinolaryngology
[1] Eldred W. Kennedy ..... Instructor in Ophthalmology
[1] Audley Stewart ..... Instructor in Surgery
T. Banford Jones ..... Instructor in Surgery
[1] C. S. Hornbeck ..... Instructor in Otorhinolaryngology
[1] John F. Gipner ..... Instructor in Ophthalmology
[1] Allen L. Parlow ..... Assistant in Urological Surgery
Dorsey Brannan ..... Assistant in Surgery
George C. McKinstry ..... Assistant in Surgery
Samuel J. Stabins ..... Assistant in Surgery

BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $27,940.

[1] Part-time.

UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

BY

KARL MILLER WILSON, M.D.

PROFESSOR OF OBSTETRICS AND GYNECOLOGY

In the Strong Memorial Hospital the Department of Obstetrics and Gynecology occupies a single division of thirty beds on the fourth floor, wing C (Fig. 6, page 6). The subdivision of this into four-bed units permits the adequate separation of obstetrical and gynecological patients, while three single-bed rooms are provided for purposes of isolation when necessary. Connected with the main division by a short corridor are the quarters for the new-born, the nursery (Fig. 1), the wash-room, and the utility room. An isolation nursery is also

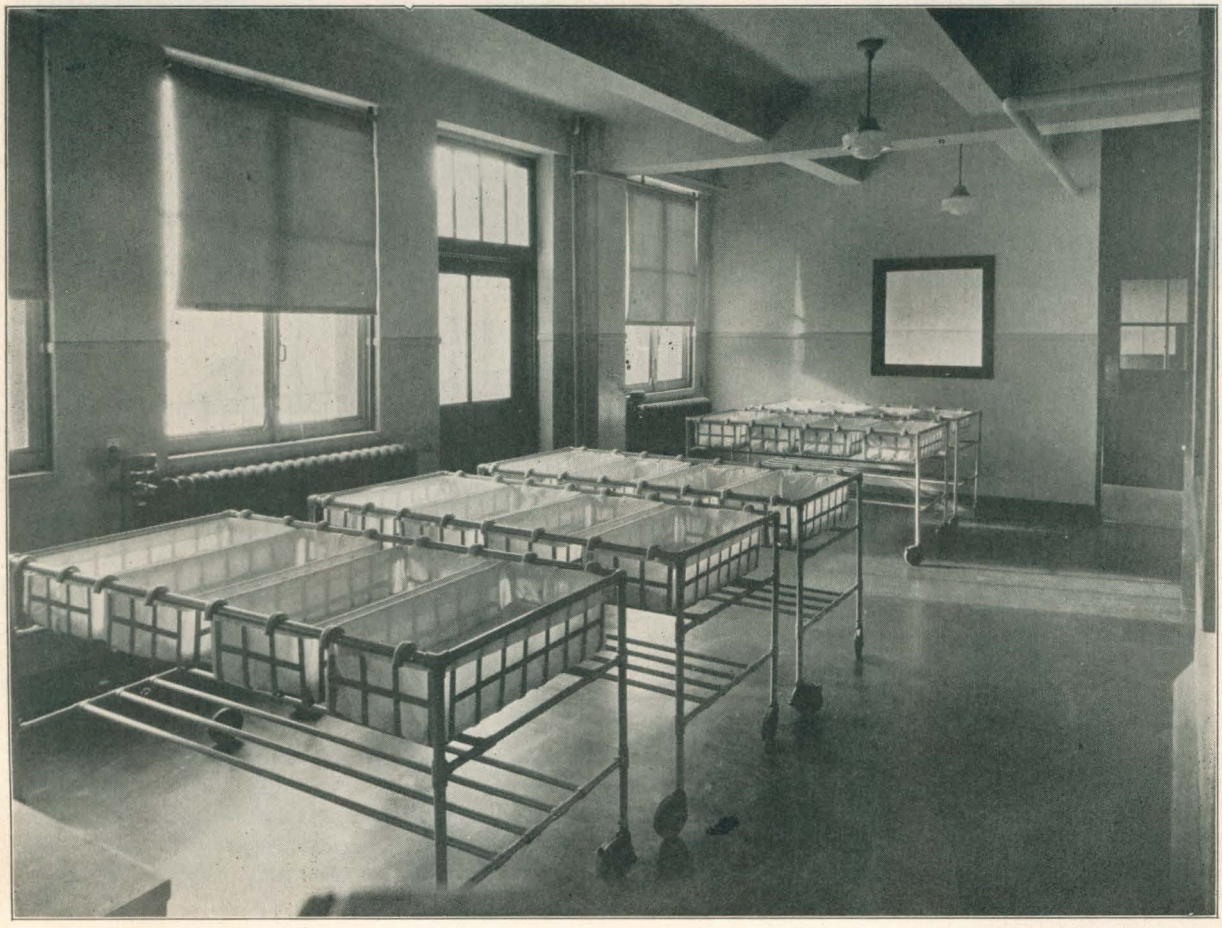

FIG. 1.—OBSTETRICAL NURSERY

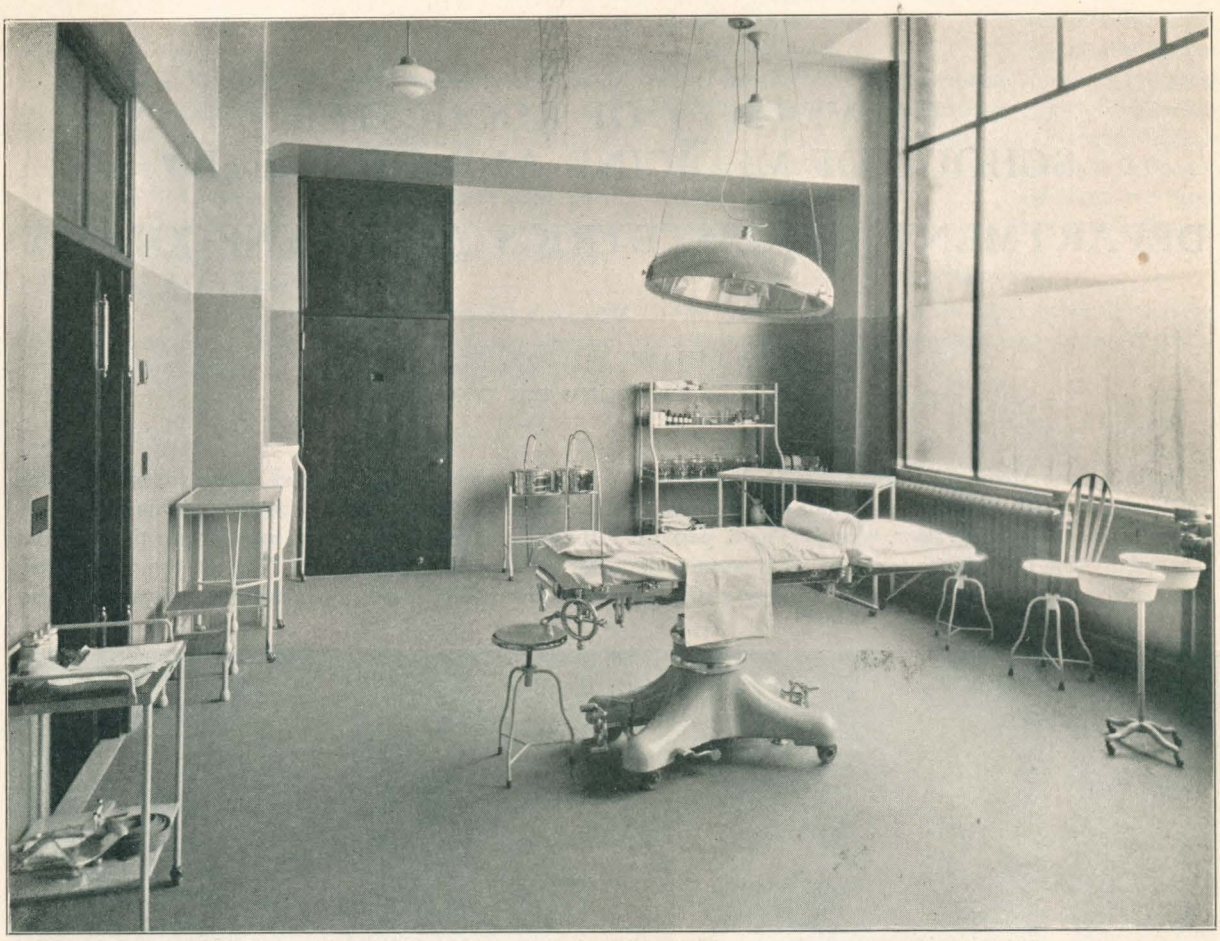

FIG. 2.—OPERATING ROOM

provided and a small room is especially prepared for caring for premature infants.

In wing F, adjoining the patients' division, are located the laboratories, teaching rooms, and offices of the department. A large students' and interns' laboratory is provided to take care of the necessary routine clinical laboratory procedures. In addition there are three smaller laboratories designed primarily for the individual research worker. The teaching rooms are so planned that they can be used for small groups of students or can be thrown together to accommodate an entire class. In common with the other clinical departments special laboratory quarters are provided in the departments of pathology, bacteriology, and biochemistry for staff members or for special workers interested in research along these particular lines.

The operating and delivery rooms (Figs. 2 and 3) are on the fifth floor (Fig. 7, page 7) and are adjacent to the surgical operating rooms. There is a single operating room and three delivery rooms "en suite" with the necessary first-stage, sterilizing, and other accessory rooms.

In addition to the thirty-bed division in the Strong Memorial Hospital, two similar divisions in the adjacent Rochester Municipal Hospital are available for the use of this department when the demand arises. These are located on the same floor level with the operating rooms and delivery rooms. Laboratory facilities for students and interns are also provided for the routine laboratory work in connection with care of these patients; a teaching room suitable for small groups is also found here.

The location of the operating rooms and delivery rooms on the same floor-level with the anatomical laboratories favors a close relationship between these two departments. This arrangement greatly facilitates the study of questions concerning the physiology of reproduction, embryology, and other similar problems common to the two departments and in which members of both departments are interested.

The out-patient department occupies quarters in the general out-patient department of the hospital where patients are seen by appointment. This is open from 9:00 A.M. to 5:00 P.M. It is so arranged that students in small groups can take an intimate part in the study and care of patients who present themselves. As yet no provision has been made for the care of obstetrical patients in their homes. This can be arranged, however, through the cooperation of the City Health Bureau when this type of service is needed for the instruction of students.

Instruction of students has not yet begun in this department and will not be undertaken until the autumn of 1927. It is the plan of the head of the department that a considerable amount of the didactic teaching which characterizes the usual medical school curriculum will be eliminated and that the students may be brought into closer contact with the patients than is ordinarily the case in this branch of medicine. Clinical clerkships will be an important feature in the plan of instruction.

Quarters have been provided in the hospital staff house to permit six students to live in residence during the period of their active obstetrical duty.

With the ample laboratory facilities which have been provided, it is also the hope that an occasional student may be stimulated to approach some of the simpler problems which have to deal with the physiology and pathology of the female generative tract.

Since the opening of the hospital several lines of research have been undertaken by the head of the department and members of the staff. They are as follows:

1. A study of certain histological changes in the vaginal mucosa in relation to the estrous and menstrual cycles.

2. An experimental study of the relation of syphilis to pregnancy.

3. Studies in kidney function in relation to the toxemias of pregnancy.

4. The relationship of the corpus luteum to uterine

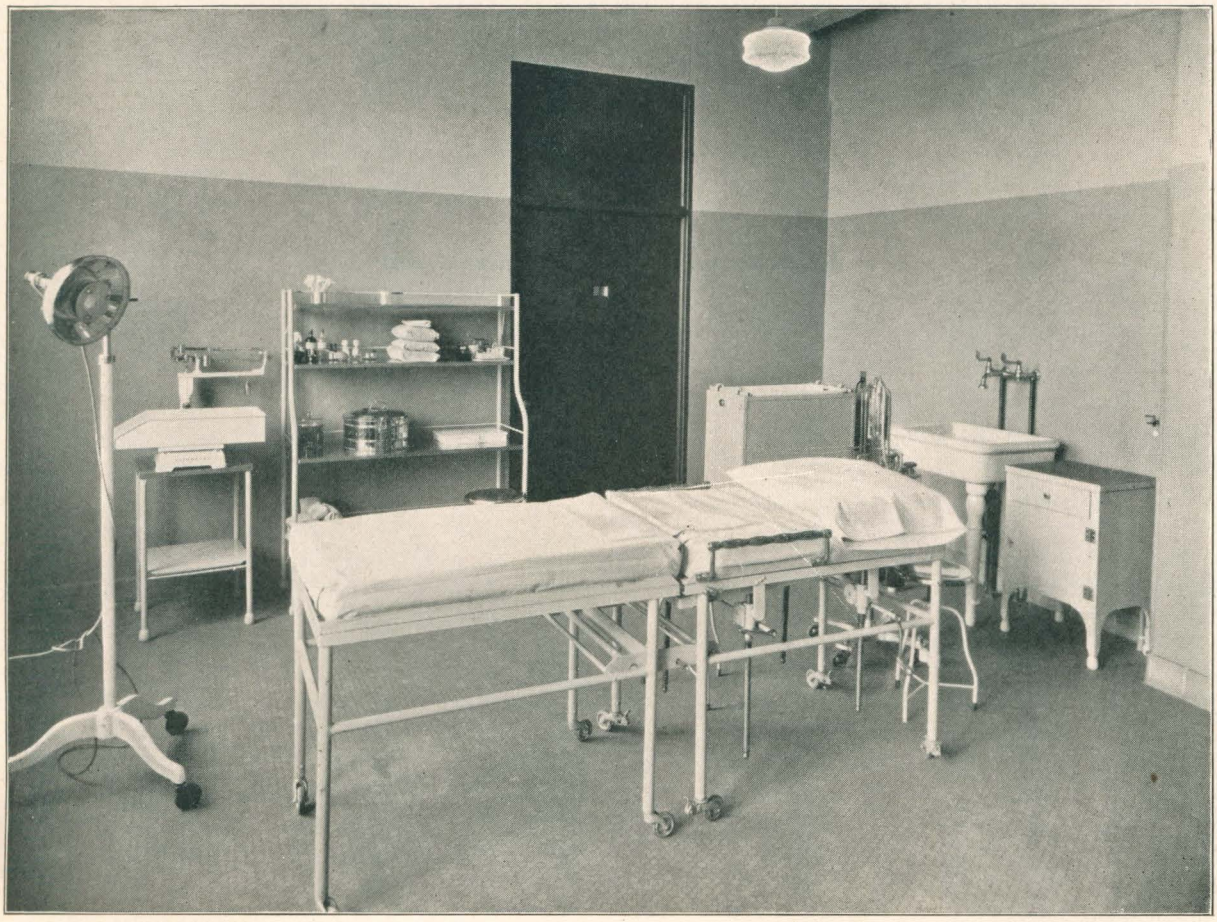

FIG. 3.—DELIVERY ROOM

pregnancy (in conjunction with the Department of Anatomy).

5. The effects of radium on the normal tissues and organs of the pelvis of female dogs (in conjunction with the Department of Radiology).

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BUDGET

The gross total yearly budget including salaries, wages, equipment, and supplies amounts to $16,840.

[1] Part-time.

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