

but usually remains at about 10 cm., at least such is my experience, nor have I usually found this slight remaining thickening any special bar to a subsequent long and efficient cardiac life. Some tension in the circulation remains, it is true, probably due to changes in the arterial walls, but moderate tension only tends to restore the waning balance of renal excretion.

Let us suppose, however, that the cardiac complication has reached a more extreme degree before the case has come under observation, and that the left cardiac area measures 15 or 16 cm. from the midline. We are now face to face with altogether different conditions, in most cases including more or less dilatation of the left ventricle, perhaps with some leakage of the mitrals; in short, degenerative changes have begun in the cardiac muscle. The physical forces of the heart have now become reduced below par, and we no longer find evidences of exalted circulatory power. The urine falls off in volume, the patient no longer rises at night to urinate, the pulse grows weaker, though the arteries be hard.

The indications now are clear to improve the tone and nutrition of the heart, to relieve it of as much of its labor as possible. With the view of relieving the strain upon the cardiac muscle, in addition to rigid dietary measures, the small vessels should be dilated by means of the iodids and nitrites. A moderate dose of digitalis, say ten drops of the tincture, morning and evening, tends to improve cardiac nutrition and tone, the latter being much assisted by the use of strychnin. Absolute quietude should be enjoined for from four to six weeks, until the heart has regained its tone, or at least is in a measure equal to its work, after which quiescence is likely to be rather harmful than otherwise. However, before permitting the patient to get about again unrestrained, a course of cardiac gymnastics, after the method of Schott, coupled with, or followed by, the Nauheim baths, is often of the greatest benefit. The extremely hypertrophied hearts, under present consideration, can never be reduced to near normal dimensions, attended, as they usually are, by more or less dilatation, consequent to cardiac degeneration; nevertheless, the degree of cardiac power and tone that can be restored in well-managed cases is often remarkable. Not long since such cases were considered absolutely hopeless, even of temporary improvement. I have succeeded, however, in a fair proportion of such cases, in securing to the patient a few years of comparatively comfortable life.

When once dropsy sets in and becomes established, as a rule, the beginning of the end is reached. Confinement to bed is now imperative, coupled with cardiac tonics and stimulants, such as digitalis, strophanthus, etc., in full doses. There is no hope of re-establishing the renal function unless some power can be restored to the circulatory forces. Too often we are obliged to fall back upon diaphoretics in order to assist the kidneys in elimination, but the fight from this on is always a losing one.

The present discussion does not permit of sufficient time to enter into the many additional measures to be employed in the management of interstitial nephritis; perhaps a future occasion may present itself to consider these. I have purposely directed the present discussion along what may be considered, in part at least, unusual though important lines, viz., the cardiac complications of the disease. In closing, I would state as my strongest convictions, based on careful observation, that, as a general fact, he who most skillfully manages the cardiac complications of interstitial nephritis in all its stages will best succeed in prolonging the lives of his patients.

[For discussion see page 248.]

HOSPITAL AND WARD CLINICAL LABORATORIES.*

C. N. B. CAMAC, M.D.

NEW YORK.

When I was given the opportunity some months ago by the chairman of this Section to present a paper before the Association, I was and am still interested in the subject expressed in the title of this paper—"Hospital and Ward Clinical Laboratories." I hesitated, however, in bringing such a subject before you, as I felt that a report upon work done along medical lines would form a more appropriate paper. I submitted this question of the propriety of the subject to your chairman, and upon receiving his approval and encouragement felt reassured.

I feel, nevertheless, that a subject touching the administration of a hospital, as this does, must be discussed by those who have experience in hospital management. The points, therefore, set forth in this paper represent the immediate needs of the visiting physician and teacher; these points, however, must be placed before those who are competent to speak for the administrative side of the hospital. I trust that I have made it clear at the outset that I am speaking from the standpoint of the clinician.

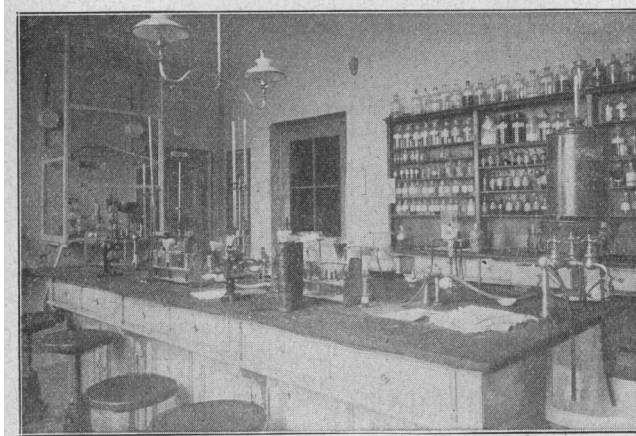
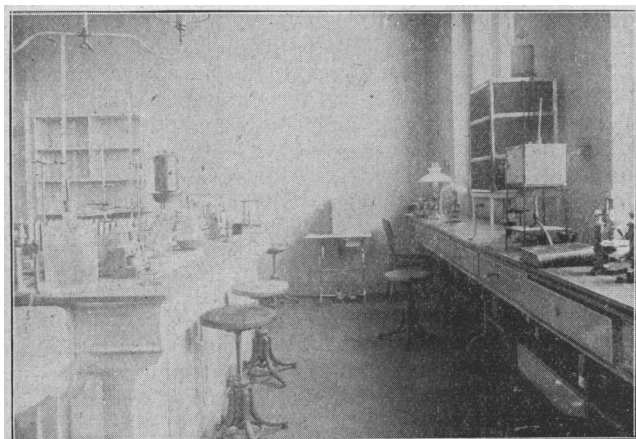
As one reads the reports upon the epoch-making contributions to medical science, one is impressed by the exalted estimation which ushers in many, but not all, of these; then how the voices of critics disparage these estimates, which perhaps may have been the creation of other critics, and then how the contribution settles down into its right place to be a great or a small part of the whole. As each new branch of scientific medicine has come into existence the same enthusiasm has flustered and shouted about its birth, claiming for it all manner of honor and usefulness.

Histology, embryology, bacteriology, the systematic study of pathology, etc.—and the same is true of the subdivisions of these subjects—each in turn at its inception was declared to be the future revolutionizer of medicine. Each has settled into its proper place to be a part of the whole structure, each stone of which depends upon its fellow for support; or to select a simile more familiar to our thinking, it would seem to follow the division of labor or the specializing of functions, each cell, each part, doing its share and yet working in conjunction with every other part. When Laennec, and, later, Louis, introduced the system of physical diagnosis, the most exorbitant claims were made for it. The stethoscope, at first the oracle of all the secrets of the chest, later became the retreat of the bluebottle fly, and then again the recognized instrument, with its limitations, of the clinician. So with the clinical thermometer, the hypodermic needle, the fluoroscope, the radiograph, etc.; so also with the findings of the clinical laboratory.

Rarely in our science is it that any one finding is the open sesame to the secrets of disease. Excepting, perhaps, the finding of the tubercle bacillus, the malarial parasite and a few others, no observation in medicine alone tells the whole story. Because an observation represents but a fraction of the whole truth, many clinicians have been impatient with the methods which enable us to obtain that fraction. Because the methods which enable us to detect an anemia do not also detect the cause of the anemia, the methods are said to be faulty; because the tubercle bacillus is sometimes not detected when pul-

*Presented to the Section on Practice of Medicine, at the Fifty-first Annual Meeting of the American Medical Association, held at Atlantic City, N. J., June 5-8, 1900.

monary tuberculosis exists, the search, some clinicians would say, need only be made if the clinician wishes to leave no stone unturned. Because the serum diagnosis of typhoid fever is not to be detected until the fifth day, and sometimes not till much later, is this fraction of the truth to be discarded? May there not be here some new truth, the full significance of which we have not as yet appreciated? Because, by the aid of a clinical thermometer, a definite ratio between pulse, respiration and temperature can be determined, we do not abandon it when, as in scarlet fever or pneumonia, we find this ratio disturbed; on the contrary, we interpret the finding with new significance as an additional aid to diagnosis. We do not omit auscultation when percussion seems to tell us the whole story. So, though our physical examination may appear to suffice, our microscopic and bacteriological examinations must, too, be taken in conjunction



Prof. V. Jaksch's Clinical Laboratory, Prague.
Microscopical Laboratory.

with these findings, a consensus of opinion taken, and our diagnosis made accordingly. Each observation goes to make up the whole—the clinical thermometer, the stethoscope, the blood examination, each employed in turn, no one complete in itself, but the complement of the others. There is, therefore, no claim for the clinical laboratory beyond that it contributes essential facts, which, taken together with other clinical findings, enable the physician and surgeon to arrive at the truth or nearer the truth.

If one takes a broad view of the development of medical knowledge it will be seen that now is the full time for the birth of this new child of science—the ward clinical laboratory.

HISTORICAL OUTLINE OF LABORATORIES.

The time has passed in which learned men were content with mere logical conclusions, high-sounding names and mysterious pursuits. The alchemist's articles of faith were:

1. There exists a preparation, solid in form and red in color, called the *philosopher's stone*, the *grand elixir*—*majus magisterium*—the *red tincture*, which, when it is placed in very small doses on melted liquid silver, mercury, lead, or some other common metal, causes a transmutation of the same into gold.

2. The same preparation, used in very small doses as a medicine, cures all diseases, rejuvenates the old and prolongs life—wherefore it is called the *panacea of life*—also because it contains the essence of gold—*aurum potabile*.

3. There is another preparation, of a white color, called the stone of the second degree, the *little tincture*—*minus magisterium*—the *white tincture*, which is equal to the first in half a degree of perfection and changes the common metals to silver.

This creed, the *ignis fatuus* of the alchemist, leading him blindly through the world of facts, was replaced, alas! by that other, the *Philosopher's Stone*, the *Vital Force*, the *Pneuma*, and finally by the torch of truth, flooding with light the dark places. This torch of truth is the determination of the human mind to see and therefore to know; to see, not through the oft-befogged medium of logic, but through the clear atmosphere of experiment. When the human mind determined this—and it has not been long that it has thus determined so—the real scientist, he who would know the truth, had his birth. Superstition gave place to unrestrained investigation; the magician became the scientist; the alchemist became the chemist. With the purpose of experimenting in the human mind the necessity for workshops became evident. From Stahl and Lavoisier, from Steele and Berzelius, from Gay Lussac, giving inspiration, and Liebig, the mind turns to those who worked more in medical lines, to Harvey, Descartes and Haller, who can not be given greater place as founders of the laboratory than the great chemists before mentioned, for with them it was that the spirit of investigation and experiment gave life to the whole movement. Hand in hand with the establishment of chemical laboratories but more encumbered by superstition, came the anatomical theaters; farther along the line of time the clinic, and then in the early part of our present century the physiologic laboratory—the first of which we find at Breslau in 1825 (Purkinje), Vierordt, Tübingen, 1864-5—which, as Dr. Welch says, and which might well be said of all laboratories, is productive of a knowledge, "the best corrective of pseudo-scientific, irrational theories and practice, in medicine." Then followed the development of the first pathologic laboratory in Berlin, by Virchow, in 1856.

In the opening of the William Pepper clinical laboratory at Philadelphia, 1896, Dr. Welch quotes Virchow as having said: "In the seventeenth century, anatomical theaters; in the eighteenth, clinics; in the first half of the nineteenth century, physiological institutes; so now the time has come to call into existence pathological institutes and to make them as accessible as possible to all." Since then has not the clinical laboratory reached its limit of usefulness, and now, is not this the time when all this vast amount of work, clinical, anatomic, physiologic and pathologic, shall be applied to the bedside? Is not this the time for the practical application of all these researches?

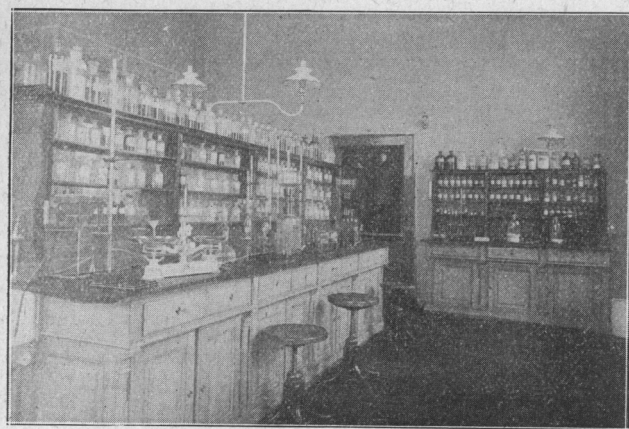
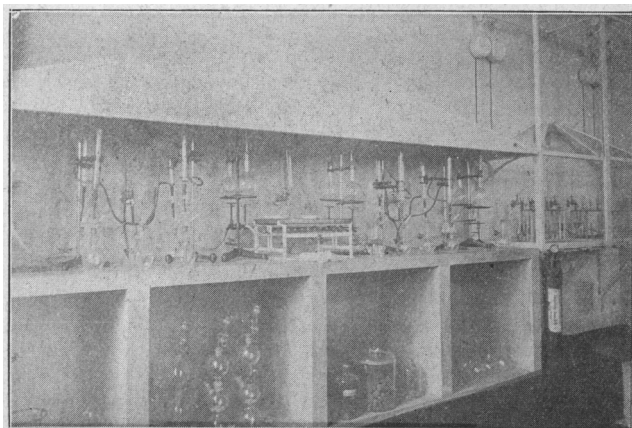
I am quite aware that the idea of practical is as distasteful to a certain class of scientists as is the word "wine" to the temperance lecturer—alcohol may be

rubbed in from without, must not be taken internally; such scientists remind one of Carlyle's description, in his "French Revolution," of Madame Momoro, whom the French convention of 1793 enthroned at Notre Dame as the Goddess of Reason. Carlyle says of her, she made one of the best goddesses, but her teeth were defective. This kind of science is a beautiful thing, but it lacks the practical bent, it lacks teeth, without which it can not feed upon that which gives force to the whole.

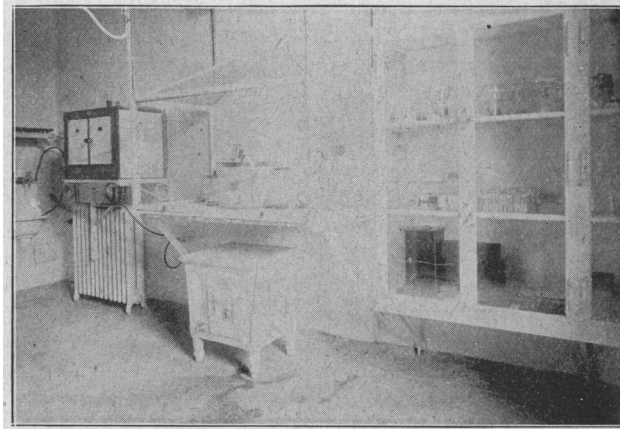
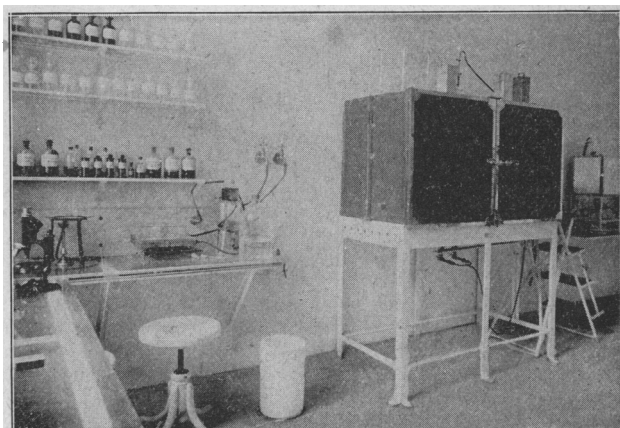
Shall we go back to those dark days, when it was merely a quest for the solution of a mystery, the finding of the majus magisterium, or have we the larger purpose of applying this solution, of interpreting this discovery? Shall our knowledge be an ornament or an instrument? If the spirit of quest for truth quickened the work of Bernard and his confrères, Gréhaut, Du Montpallier,

DIFFERENCE BETWEEN PATHOLOGIC, CLINICAL AND HOSPITAL WARD LABORATORIES.

By thus recording conditions in detail, information upon disease as a whole may be obtained by bringing together these records. The subject of this paper, it will therefore be observed, is not the clinical laboratory, but the hospital and ward clinical laboratory. The former is a recognized factor in medicine to-day. In Berlin, Prague, Vienna, Munich, Leipsic, Paris, London, Philadelphia, Boston, Baltimore, New York and in many other cities are to be found well-equipped clinical laboratories, all having sprung into life in the short space of about 20 years. Among the first of these was that of Von Ziemssen, in Munich (1895), and that of Curchman, in Leipsic (1892). Not so numerous are the hospital clinical laboratories. There would at first sight



Prof. V. Jaksch's Clinical Laboratory, Prague.
Chemical Laboratory.



Prof. V. Jaksch's Clinical Laboratory, Prague.
Bacteriological Laboratory.

Malassez and d'Arsonval, in their ill-equipped shops, the application of these truths should quicken our work to-day.

The subject, therefore, of our investigation as clinicians is not disease in the abstract, but the sick man and woman and the sick child. It is not the study of the principle underlying the staining peculiarities of the tubercle bacillus, but the availability of this method in the detection of tuberculosis in this and that form of the disease. It is not, therefore, the sputum, for example, alone that we examine; it is this in conjunction with the physical finding, the temperature chart, the degree of emaciation, etc., to be made only in the sick-room by the patient's side. Our workshop is therefore the sick-room, the hospital ward, the dispensary.

seem to be a difference without a distinction between these terms. There is, however, this clear distinction: the clinical laboratory, now of some years' standing, is the offspring of the anatomic, chemical, pathologic and physiologic laboratory, and the hospital clinical laboratory is the child of the clinical laboratory—each separate from the other, yet dependent on, and a direct outcome from, the other. It may be looked on as a process of simplification. Large problems worked out in the chemical, anatomic, physiologic and pathologic laboratories have been reduced to simple methods, applicable to the detection of disease *per vitam*. The clinical laboratory has taken up these and still further simplified the methods until the hospital or ward clinical laboratory may apply them at the bedside. The hos-

pital clinical laboratory is the workshop where the methods planned and perfected in the other laboratories are applied and given a practical test. To make this difference more clear, I show photographs of the elaborately equipped clinical laboratories of Profs. Von Jaksch, Ewald and Leyden, so as to compare them with the simple ward laboratories.

OBJECTIONS TO LABORATORIES.

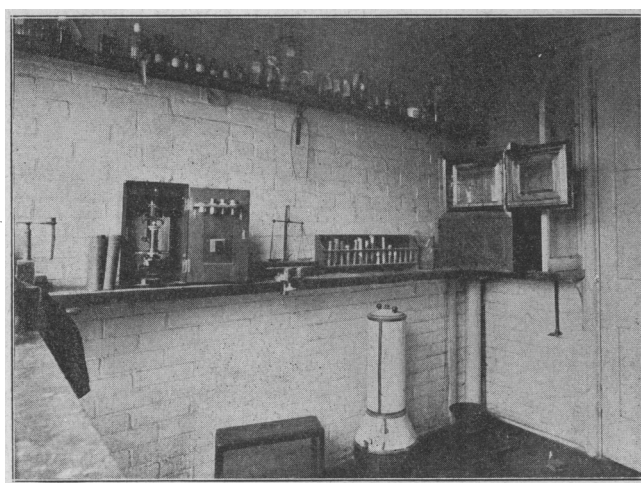
But, it will be urged, do we need hospital or ward clinical laboratories? Are they not the adjuncts of wealthy medical schools and hospitals only? Are they not a scientific luxury? Can it be said that the facilities afforded by such laboratories are luxuries? If the patient who escapes operation for supposed appendicitis because a moment before the operation the blood was found to contain malarial parasites; if the patient lying in sup-

ing four heads: 1. They are not necessary because diagnosis can be made quite as satisfactorily without these tests. "Scientific luxuries" would, I think, express the opinion of those who raise this objection. 2. They require space. 3. They are expensive. 4. The hospital interne is busy enough without putting this extra work upon him.

The first of these objections, that they are "scientific luxuries," has been already dealt with. It is well, however, to repeat that these methods are taken in connection with all the bedside methods known to clinicians, and no claim of an "all-sufficient" is made for them. The physical examination of the chest is not to be abandoned because the tubercle bacilli are found in the sputum. It is important to impress this, for visiting physicians have complained, and not without ground, that



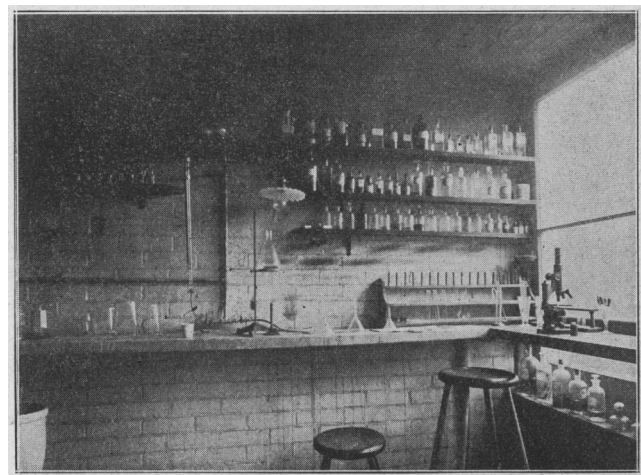
Professor Leyden's Clinical Laboratory, Charité, Berlin.



Toronto General Hospital, Clinical Laboratory—east side.



Professor Ewald's Clinical Laboratory. Augusta Spital, Berlin.



Toronto General Hospital, Clinical Laboratory—west side.

posed typhoid has a needle inserted into the liver, where an amebic abscess is found; if these patients do not benefit by such laboratories, they may be termed luxuries. They are essential, however, if only to spare the typhoid ulcer the unlimited diet of quinin. I select these cases from those actually occurring in hospitals where facilities for clinical microscopic examination were not supplied and where such procedure is not considered a refinement.

There are, however, those who will still object, and from information obtained in conversation and otherwise, the objections would seem to fall under the follow-

the internes consider these laboratory examinations all-sufficient, and grow lax in making their physical examination, and less acute in their observations. This is a misuse and abuse which does not in any way diminish the value of each observation. Let it be clearly understood that there is no claim of all-sufficient in this work. The very spirit of the movement in favor of ward laboratories is that the microscopic work should be brought in greater proximity to the patient, and the finding be thus taken in connection with and considered a part of other clinical findings.

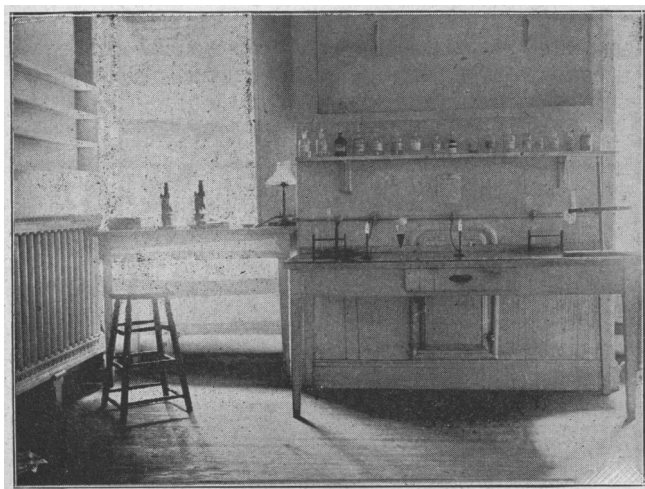
The second objection is that they require space. The

clinical laboratory, with its complicated chemical apparatus, spectroscope and polariscope, nitrogen-estimating apparatus, etc., does require space. But the distinction between the clinical laboratory and the hospital and ward clinical laboratory already pointed out, must be borne in mind. Only the perfected and simplified methods and apparatus have place in the hospital and ward clinical laboratory. This apparatus and these methods are of such simple nature that they can be transported to the bedside. It does not, therefore, require much space to accommodate them. With the hearty co-operation of the authorities, the writer established such ward laboratories at Johns Hopkins Hospital in 1896, and at Bellevue Hospital in 1899. The area required for this ward laboratory is about 6x6 to 10x10 feet, a window being the only essential. Indeed, a window and

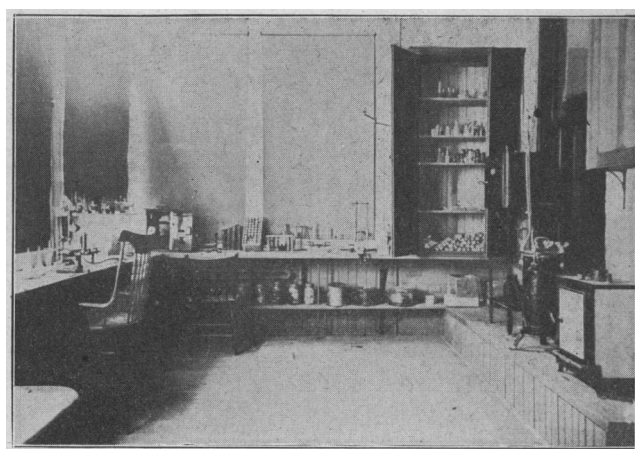
just learned from Dr. Beverly Robinson that such ward laboratories are shortly to be established at St. Luke's Hospital, New York City. I also learn that the Royal Infirmary at Edinburgh, and St. George's Hospital, London, have similar ward laboratories. In the clinics of Profs. Leyden, Senator, Naunyn and Gerhardt, in Europe, these ward laboratories are in use for the minor examinations.

We may, therefore, eliminate the objection of "too much space required." It is understood that there are in addition to these the largely equipped laboratories for more extensive work, but these latter are part of the teaching institutions connected with the hospital. The small laboratory just described is a distinct feature of the ward and its administration.

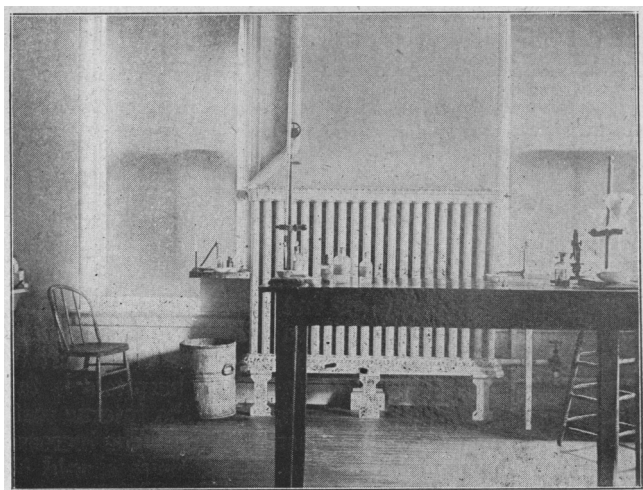
That such laboratories are expensive, constitutes the



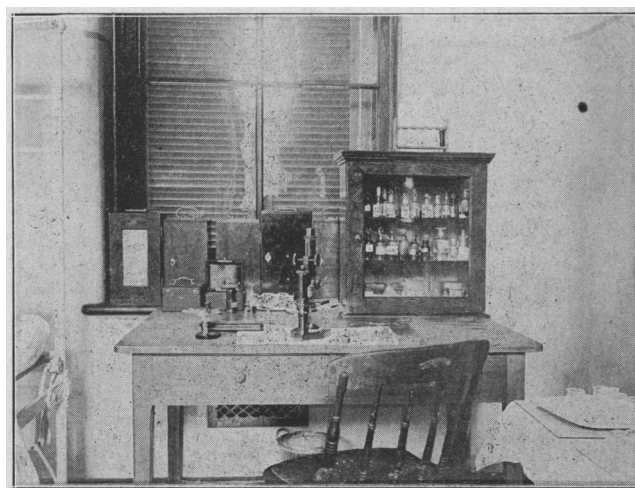
Johns Hopkins Hospital, Baltimore.
Hospital Clinical Laboratory. For More Extensive Tests, Etc.
Room, 12x12 ft. (about.)



Victoria Hospital for Sick Children, Toronto, Canada. Clinical
Laboratory—South End.



Johns Hopkins Hospital, Baltimore.
Special Research Room.



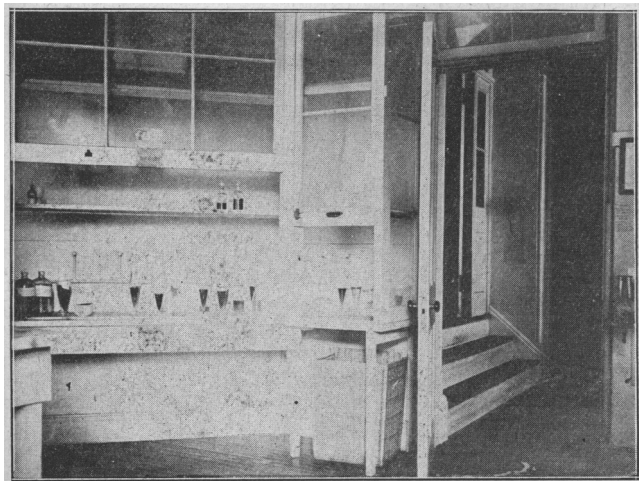
Johns Hopkins Hospital, Baltimore.
Ward Laboratory. Bed on left. Cabinet for Reagents and Apparatus on right.

table are the only essentials in the matter of space. While running water and gas are helpful adjuncts, the ordinary water-bottle and spirit-lamp are all that is necessary. Probably no part of a hospital is more modest in its demands than the ward laboratory.

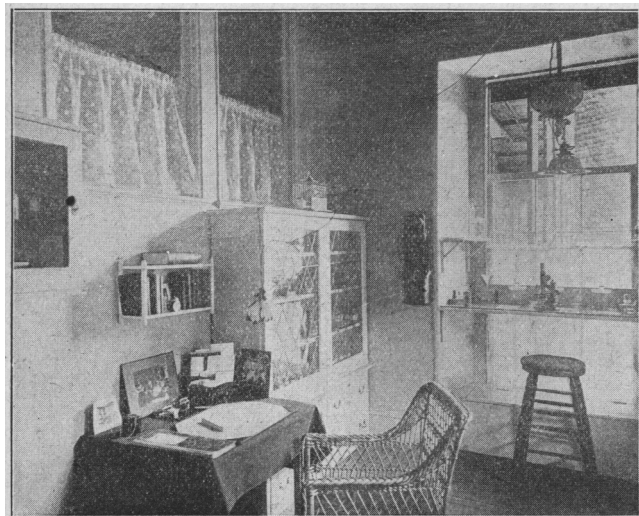
I should like to take this occasion to express my appreciation of the encouragement given in the establishment of such ward laboratories by Drs. Osler and Hurd, at the Johns Hopkins Hospital, and by Drs. W. G. Thompson and C. L. Dana at Bellevue Hospital. I have

third objection. I have carefully gone over the bills connected with the establishment of the laboratories above mentioned, and find that \$300 will fully equip such a laboratory. Included in this are two large items—a microscope with an oil-immersion lens and a cabinet in which apparatus is to be kept. These two together would come to \$125 or \$150. While considerable modification can be made in cost of the case, the microscope is a necessary expense, the price of which varies but little. Most hospitals, however, have gotten as far as a

microscope, at least, so that we will find that already provided. Glass-top tables, with green felting beneath, have proved most satisfactory in both Johns Hopkins and Bellevue. This is not very expensive—\$9 to \$10 for a table 5x3 feet. This allows of the table being washed off freely, keeping the appearance of the laboratory clean. It is surprising what an influence this simple provision has on those working in the laboratory to keep it clean. Such is the effect of this that it has done away with what was a very serious objection, namely, the presence of a dirty laboratory directly in the ward. The same cleanliness observed in the operating-room and ward must be observed in the ward laboratory. A rather



Johns Hopkins Hospital, Baltimore.
Hood for Urine Specimens. Laboratory Established in 1897.



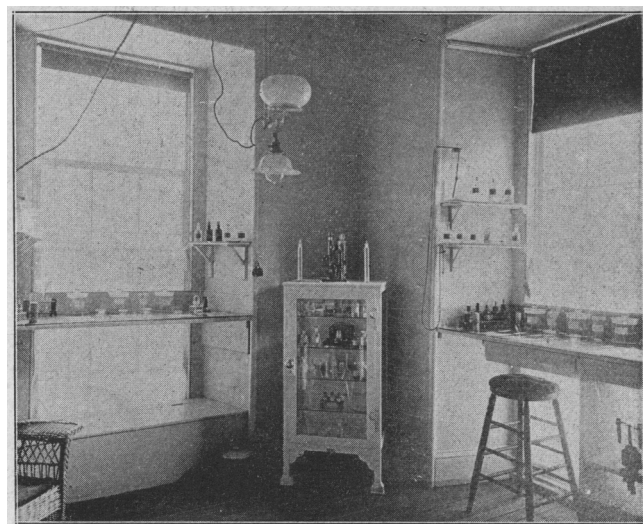
Bellevue Hospital, New York City.
Ward Laboratory. On left—Table for Record-making, Bookcase for Clinical Books, Medicine Case. On right—Glass-top Table for Blood Work, Etc.

feeble, but in appearance forcible, objection has been raised by some authorities that patients may drink some of the poisonous reagents. This is overcome by having these reagents locked away in the case, as are the drugs.

A wretched difficulty, which one is almost ashamed to mention, but which nevertheless exists, is the appropriation of apparatus by members of the interne staff. This matter scarcely comes within the province of this paper beyond mentioning it and calling attention to the proper authorities for its correction, namely, the examining board, in ascertaining more correctly the character of applicants for the position of internship.

The maintenance of the laboratory can well be accomplished on \$50 a year. Dr. Fritcher informs me that at Johns Hopkins Hospital the cost of maintenance is \$75 a year. Dr. Cabot kindly informs me that \$30 is all that is required for the maintenance of his laboratory at the Massachusetts General Hospital, Boston. It has, I hope, been satisfactorily shown that the laboratory is a necessity; that it requires little space, and that it is moderate in expense both to establish and maintain.

The fourth objection, that the clinical tests occupy too much time, is a serious one, and requires much more discussion than can be given here. The hospital interne to-day is much in the same position as the medical student of a few years back, who was allowed to graduate in three years. New subjects, histology, bacteriology, pathologic histology, hygiene, experimental physiology, etc., were added to his requirements, but the length of the curriculum was not increased commensurately with this increase; consequently his medical course was a feast of reason, a large proportion of which he was gulping down and never digesting. The



Bellevue Hospital, New York City.
Ward Laboratory (another view of above). On left—Glass-top Table and Shelves for Blood Work, Etc. Center—Cabinet for Reagents and Apparatus. (spring-lock door.) On right—Glass-top Table and Shelves for Urine, Sputum Work, Etc.
Established January, 1900.

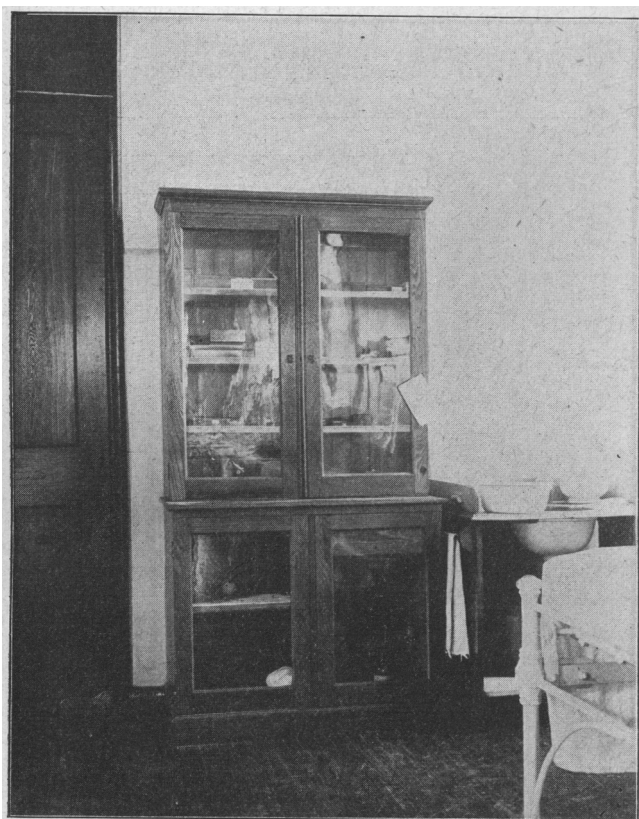
uncomplaining, enthusiastic, conscientious interne does not realize until nearly the end of his internship that a large part of his time has been spent in history taking. Blood work takes time, and if attempted it is slurred. This is because the work of to-day in hospitals is far greater than that of ten years ago, but the interne staff has not been increased commensurately with the increase of work. The remedy for this is that there should be in large hospitals a bacteriologist interne, and a clinical microscopist and a chemical interne. This position in small hospitals could be combined in one interne. But it is a fact beyond dispute that the senior and junior internes, and the interne in charge of a ward, can not possibly be responsible for the bacteriologic and micro-clinical work and keep their records up at the same time. The hospital interne is a very responsible officer, not only from a humane point of view, but from a scientific viewpoint as well. He is the observer constantly on hand; from his observations, carefully noted, we should be able to read the story of the disease. Unless his work be so ordered that the visiting physician can insist upon

such records, his notes are nothing more than fiction. The observations and records should be in the hands of the senior, junior and ward internes, the bacteriologic and microclinical work being done and recorded with equal care by one or two internes, whose sole duty is this work.

ADVANTAGES OF SUCH LABORATORIES AND WORK.

It has often been contended that good work will be done in spite of poor surroundings. This must be admitted even in those branches of human pursuit depending most on inspiration. The master mind makes its own way. Handel and Beethoven on the expressionless spinnet composed music which the improved instruments of to-day show must have existed in the minds only of these great musicians; while the commonplace mind of Nero must needs have Rome aflame for inspiration which failed to appear in even so terrible a spectacle. This is indeed true, but where there is one Harvey and

its infancy when its field of vision is that seen through the microscope—when through generations the eye has become accustomed to observe this new world, may not new objects become discernible? Should not, therefore, the spirit of constant observation be inculcated and every object of well-known significance be noted? This brings us to the third advantage of such laboratory work—accurate taking of records. "A book," says an editorial in the *Journal of Science*, "at best is but a useful adjunct in science." It is, however, the heritage of one generation to another, and it is the starting-point for the next observer. The German mind, content to concentrate itself upon one small but essential part of the structure of science, until it be well formed and set in place, is a greater contributor to the edifice than he who throws ever so strong a light upon that portion already built. The well-taken record is the material from which the stones for further construction must be selected.



Johns Hopkins Hospital, Baltimore.
Ward Instrument Cabinet.

one Bernard there are a hundred commonplace minds which, if given some encouragement, will develop into valuable observers. The laboratory, then, increases our army of workers one hundred fold. Need we look further for an explanation for the vast strides made since laboratories have become recognized parts of medical schools. Another advantage of such laboratories is the accuracy of diagnosis and the directness of treatment. This is beyond dispute and may be dismissed with the mere mention. The only opposition, however, to this statement is that negative results so often accompany the microscopic examination. While this is true, yet when the negative finding is not in itself an aid as excluding some suspected condition, the constant observation leads not infrequently to the finding of objects not at first discerned, and which in themselves constitute diagnostic aids. The development of the eye is yet in



Bellevue Hospital, New York City.
Cabinet for Reagents and Apparatus in Bellevue Ward Laboratory.
Established January, 1900.

What better place than the bedside laboratory for obtaining the material for such construction? Knowledge is not acquired, as Ambrose Paré says, "by sitting in a chair and thinking, but by years of hard, practical labor." And we may add, as he indeed added, by making careful records. A few practical clinical books have been placed in the ward clinical laboratory, and we have prepared record sheets containing a complete list of all objects to be seen in the various subjects of clinical, microscopic, bacteriologic and chemical observation, whether they have a known significance or not. The object of such records is that we may later draw conclusions coupling these observations with the other bedside findings.

Is such record-taking confined to the bedside—to the ward—may it not with advantage be extended to the dispensaries? Dr. Cabot, in the Massachusetts General

Hospital, has already done this, and his photographs, which he has kindly sent me, show such a workshop in the outpatient department during the busy hours of the

Clinical Laboratory Examination.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

BLOOD.	SIZE.	Normal ($\mu=1.2500$ of an inch) μ		
	SHAPE.	Normal Microcytes Poikilocytes Ortunate		
Red Blood Corpuscles	COLOR.	Normal. Pale Yellow. Colorless. Shadow Corpuscle Vacuolated (Aross defic. in Haemogi)		
	NUCLEATED.	Normoblasts Megakaryoblasts		
Haemoglobin	NUMBER	per cubic millimeter normal 5,000,000	Gower's Thomazias	
	MALARIAL PARASITE.	Hyaline Amoeboid body Non Amoeboid	Intracellular Extracellular	grown full grown Flagellating Flagellating Flagellating
White Blood Corpuscles.	Segmenting			
	Crescents			
Plates.	Round bodies			
	Haemoglobinometer	Gower's Haemoglobinometer Specific Gravity Method Von Fleischel's Haemoglobinometer Oliver's Haemoglobinometer Color Index		
Fibrin.	per cubic millimeter	6,000 to 10,000 normal.	Gower's Daland's Thoma Zeiss Oliver's	
	Small mononuclear lymphocyte	Normal 15-28 per cent.		
Blood Dust.	Large	6-8		
	Transitional	2-4		
Coagulation time.	Polynuclear	Neutrophil 75-80 Eosinophil 2-3		
	Myelocyte			
Coagulation time.	Eosinophilic myelocyte			
	Mastzell			
Coagulation time.	Gross test			
	Wright's Coagulometer tubes.	Normal, 2-3 min.		

Clinical Laboratory Examination.

No. 1.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

	5 min.	15 min.	30 min.	Remark.
Sero Diagnosis of Typhoid.				
Dilution 1 in 20				
" 1 in 30				
" 1 in 40				
" 1 in 50				
" 1 in 60				
" 1 in 70				

Clinical Laboratory Examination.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

SPUTUM.	Quantity			
	Color			
Sediment	Quantity			
	Appearance			
Pus	Color			
	Quantity			
Alveolar Cells	Polynuclear			
	Neutrophils			
Elastic Tissue	Eosinophiles			
	Myelin degeneration			
Tubercle Bacilli	Heart-failure cells			
	Dust cells			
Charcot-Leyden Crystals				
	Cerebrum Spirals			
Diplococci				

System of Records to be Employed in Bellevue Hospital, New York City. (Cornell Division.)

dispensary. While the writer was in charge of the heart and lung clinic of Bellevue Hospital, no case of suspected pulmonary tuberculosis or malaria had a diag-

nosis made until the sputum in the one case, and the blood in the other, were examined. As no facilities for microscopic work were obtainable in the dispensary, it was necessary to take the patient for this purpose across the street to the Loomis Laboratory, and in eight months, with one assistant, 129 cases were so examined.

Clinical Laboratory Examination.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

SECRETIONS
ASPIRATED
FLUIDS
and
FÆCES.

Source of Material for Exam.

Pus			
Streptococci			
Staphylococci			
Gonococci			
Diphtheria bacilli			
Tubercle			
Typhoid			
Amoeba coli			
Mucous			
Intestinal Parasites			
Albamen			
Specific gravity			

Clinical Laboratory Examination.

No. 1.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

Gastric
Contents
and Vomitus

Quantity received			
Amount of Filtrate			
" Precipitate			
Odor			
Color			
Appearance			
Reaction			
Free Hydrochloric Acid			
Lactic Acid			
Total acidity.			
Microscopic Poisons			

Clinical Laboratory Examination.

No. 1.

Name, _____ Date, _____

Address, _____

Examination for Dr. _____

Urine

Graves.

Voided			
Obtained			
Amount in 24 hours			
Color			
Sediment			
Quantity			
Quality			
Specific gravity			
Reaction			
Albumen			
Nitric Acid			
Boiling			
Esbach's Albumometer			
Quantitative			
Sugar			
Fehling's			
Phenylhydrazin			
Quantitative			
Chemical			
Chlorides			
Phosphates			
Uric Acid			
Bile			
Indican			
Acetone			
Diacetic Acid			
Dialzo reaction			

Microscopic.

Cylindroids			
Casein			
Hyaline			
Granular			
Epithelium			
Blood			
Pus			
Phosphates			
Uric Acid			
Bacteriology of			

System of Records to be Employed in Bellevue Hospital, New York City. (Cornell Division.)

Among the cases thus examined were estivo-autumnal malaria, having its origin in New York City; Hodgkins' disease, which was subsequently followed to autopsy; lymphatic leukemia, splenomedullary leukemia, Addison's disease, also followed to autopsy; empyema, abscess of the lungs, pneumoconiosis, in which steel fil-

ings formed the dust element and gave rise to a fibroid phthisis; tubercular leprosy in a youth 16 years old, from whom the lepra bacillus was readily obtained; these, besides many cases of malaria of the ordinary type, and anemias formed the interesting findings. May we not from such records detect the beginning of disease while yet not sufficiently advanced to incapacitate the patient? May not diseases called rare, because seldom under systematic observation, be thus found frequently enough? Have we not examples of this in the leukemias, malaria, Addison's disease and others? Is it unreasonable to conclude that, with facilities for such work and adequate assistance, valuable records could be obtained from the outpatient department? The last advantage which is to be noted in these laboratories is, perhaps, when combined with that of the records, of vast importance. I refer to the following of cases to autopsy. The pathologist is independent of the clinician, but the clinician reads the answer to all his questions in his observations and notes at the autopsy table only. The break in the chain between the clinician and the pathologist has existed only since the pathologist became a specialist. The busy practicing physician who is a hospital visitant has not the time to follow to autopsy his cases. He should,

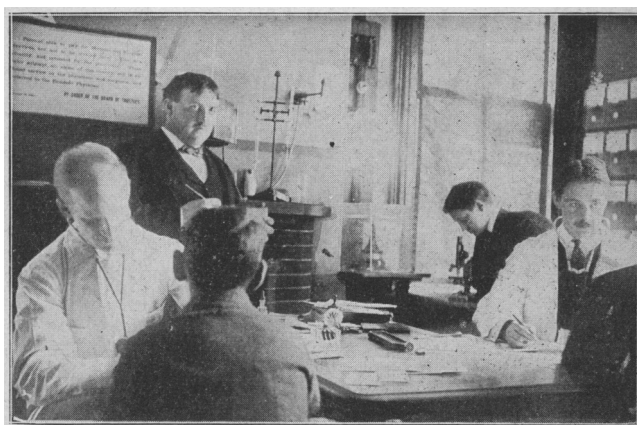


Johns Hopkins Hospital, Baltimore.
Record Room.

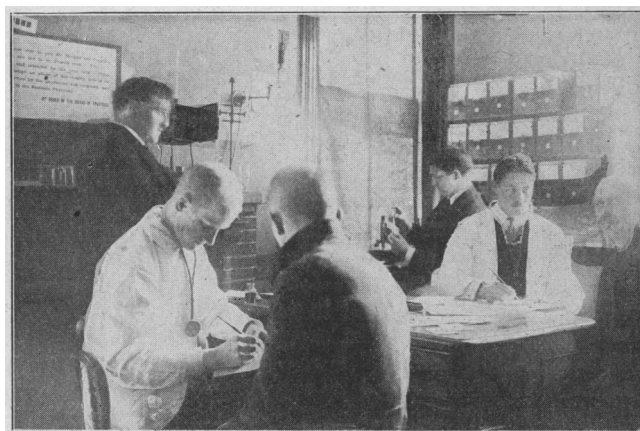
have the benefit of well-taken records and the diseased viscera should be preserved and shown to him. The link connecting these important departments, clinical and pathological, seems to be the department of clinical pathology. The officer in charge of this work should have access to the wards and the autopsy room. He and his assistants should watch the cases throughout, interpreting the findings at the bedside, by those in the autopsy room. As one attempts to estimate the value of such a system, well carried out, can doubt arise that the time is ripe for a ward clinical laboratory? Is not the clinician falling behind the pathologist in this matter of laboratories? Is he not depending too much upon the report of the pathologist, examining at a distance an isolated bit of tissue? Does the geologist, content with the small bit of stone, chipped from the rock, separate himself from exposed strata? Are the flora and fauna to be studied in artificial surroundings only? Are not the ward and the sick-room the laboratory of the clinical pathologist?

The purpose of this paper, however, will have been lost if the impression is given that here is a new specialty. On the contrary, this is an essential part of the clinician's work, and the purpose is to bring to the bedside

the laboratory, which has threatened to become, like the pathologic laboratory, separated from the bedside. It was the undisputed right of the pathologist to shut himself away in his laboratory, but it is equally the undisputed obligation of the clinician to carry on his work at the bedside. The points, therefore, which, may I hope, have been brought forward in this paper, are: 1. That the time has come for a ward clinical laboratory; that such should be established and maintained; that the requirements in space and expense of establishment and maintenance are of such modest proportions as to be within the reach of the smallest hospital. 2. That these workshops, being in the neighborhood of the patients, must be kept scrupulously clean. 3. That two internes, a bacteriologist and a microscopist who is also a chemist,



Massachusetts General Hospital, Boston.
Clinical Apparatus and Record Boxes in the center and right.



Massachusetts General Hospital, Boston.
Out-patient Laboratory. Examination and Record-taking in progress.

should, upon proper examination, be appointed in larger hospitals to have charge of these laboratories. The duty of these internes should be to make examinations pertaining to the work for which they are trained; to keep careful records of these findings during the stay of the patient in the ward, and if the patient come to autopsy to take brief records of the findings. 4. That the obtaining of the autopsy and the bringing of the history of the case to the autopsy be a part of the duty of these internes. 5. That a similar laboratory, with a specially appointed physician, be established in the out-patient department.

I wish to repeat that all these suggestions are from the standpoint of the clinician and teacher, and the discussion by and the approval of those versed in hospital management is necessary.