

could only keep the policeman off his feet, the housemaid off her knees, the miner off his elbows, the aviator out of the air, the boys away from football; if all children in goitrous districts were given a little iodine, there would be less need for the surgeon. But we do not yet live in the Isle of Utopia, and however much the need of the physician may be lessened through the agency of preventive medicine, by eliminating disease as typhoid has been largely eliminated, and yellow fever, and as malaria can and will be, and many nutritional disorders, and perhaps goitre, the surgeon will continue to be needed, and I cannot see but that he must become a better and better physician.

When physicians acquire a more intimate knowledge of surgery, fewer people in need of operative procedures will be turned over to the surgeon too late, after delays caused by an inordinate number of unnecessary laboratory procedures. When surgeons are required to have a thorough grounding in general Medicine before practising their handiwork, fewer unnecessary operations will be done, and many of the evils which exist in their professional relationship with physicians will be eliminated.

All of which was said as well and more briefly by Lanfranc: "No one can be a good physician who has no idea of surgical operations, and a surgeon is nothing if ignorant of medicine. In a word, one must be familiar with both departments of Medicine."

New England Hospital Association.

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(Continued from page 607.)

"PRINCIPLES TO FOLLOW IN BUILDING CHILDREN'S WARDS AND WARDS FOR CONTAGIOUS DISEASES."

BY DR. D. L. RICHARDSON, PROVIDENCE CITY HOSPITAL, PROVIDENCE, R. I.

It is very appropriate that the construction of wards for children and contagious diseases be discussed together. In 1913 in a paper read before the A. M. A. at Atlantic City, the author pointed out that the same principles in the construction and management of contagious hospitals apply equally well to children's hospitals, and subsequent experience had confirmed that belief.

I need not emphasize to you how frequently infectious diseases break out in children's hospitals. I am not aware of any published statistics upon the subject, but many superintendents have stated that some of their wards have been under quarantine at least half of the time. This may be a high estimate, but even if wards are

closed because of contagious disease during only a third of the time, it results in great economic loss and usefulness of the hospital—to say nothing of the notoriety such outbreaks sometimes occasion.

The manner in which ward space is divided bears an important relation to the spread of infectious diseases, once introduced. But it is not the only consideration, not even the most important. Too much attention has been paid to construction and too little to the careful examination of every new patient, to careful supervision once the patient is admitted, and the utilization of strict cleanliness, medical asepsis, by nurses and doctors. The purpose which divisions of the ward serve, is to keep patients apart, for the danger of atmospheric infection has been conclusively shown to be of very little importance. It is assumed, therefore, that it is not necessary to discuss aerial infection as bearing upon the construction of children's hospitals of whatever kind. That it may take place at very short range, as when beds are very close together or a patient coughs in the doctor's or nurse's face, is possible. Even under such conditions contact still is the most important factor in transmission. Whatever the means employed for separating patients from physical contact, they operate also to interrupt possibilities of air infection. This statement is for the benefit of those who still cling to this favorite misconception.

To fully appreciate the proper type of construction it is necessary to briefly consider how infection enters a hospital and how it spreads after once admitted.

Ask almost any hospital superintendent how contagious diseases are introduced into hospital wards and he will invariably say, by visitors. While it will not be denied that this factor is entirely a reasonable assumption, particularly when children are allowed as visitors, it operates in a very small percentage of instances as the cause of hospital outbreaks. The real factors are the patients themselves. It cannot be too strongly emphasized that exact diagnosis of infectious diseases is impossible. There is such a large number of cases which cannot be recognized clinically. Of all patients admitted to a hospital, medical cases suffering from acute disease are the greatest menace. A child is admitted with a diagnosis of broncho-pneumonia, which is no diagnosis at all, may be suffering from measles even in the absence of a rash. Another child may be admitted for tonsillitis and really be suffering from either scarlet fever or diphtheria. Oftentimes children with a cough, treated as a bronchitis, are suffering from whooping cough. Rashes are overlooked or wrongly interpreted.

These things are pointed out to show the difficulties of the situation. In addition to mistakes in diagnosis, children may be admitted during the incubation period of some infectious disease, which not infrequently gives rise to an out-

break. And lastly, of all hospital admissions a certain percentage of patients are infectious disease carriers. For practical purposes every outbreak arises from one of these three sources,—unrecognized cases, patients in the incubation period, or acting as carriers. While visitors and packages may, theoretically, be a possible avenue of infection they can be ignored, and the investigation of the source of any outbreak should be devoted to a careful examination and supervision of all patients in the ward where the outbreak occurs.

The first important hospital rule should be, that every new patient be seen promptly by a competent diagnostician and the examination not left to an interne. In small hospitals it may not be possible to get a physician to see every patient on admission, but the patient should be treated in a separate room until the admitting physician has seen him. Every children's hospital should delegate to some resident or visiting physician the responsibility of admitting all new patients, of designating the ward or room where they shall be treated, and be called at once to see every patient who develops a rash, unexplained temperature, sore throat or other suspicious sign, as an important method of minimizing the danger of outbreaks of contagious disease.

Realizing that even the best diagnostician is liable to error, it is essential to so construct and conduct the wards that even if infection is introduced it will be limited to the least possible extent.

The spread of infectious diseases within the hospital is accomplished by actual contact between patients and indirect contact by nurses' and doctors' hands, nursing utensils, dishes, etc.

To separate the patients from physical contact three means may be employed: Putting the beds some distance apart, the interposition of a partial partition between patients, the cubicle system, and the construction of separate rooms each to contain few patients. In older hospitals which are provided with large open wards, beds may be spaced at a distance of five or six feet, or better by the construction of cubicles. Space may be conserved by the latter method, for the beds may be placed much nearer together, and yet the danger of the children coming into actual contact is slight because of the partial partition. In the construction of new hospitals, separate rooms should be constructed with enough glass in the walls to provide for easy observation and contentment of the patients by permitting them to see other patients in adjoining rooms. The installation of a large amount of glass in corridor or inter-room walls is a mistake because it is so expensive to clean and makes privacy impossible. Particularly in contagious wards one never knows what diseases to expect nor what ages will be affected, and construction should be so planned that all wards may be used for any disease or for either children or adults. Physi-

cal separation of the patients is accomplished by one of these three methods. If it is desired to keep from actual contact, direct or indirect, patients in the same room, some kind of a card should be hung on the bed to indicate this to the nurse.

Children can thus be grouped singly, or in larger groups, those who are suffering from the same disease being confined to one group, or for the purpose of dividing them in small units between which there is no contact, direct or indirect. The importance of dividing wards for children or contagious diseases into rooms to contain one, two, or three, or at most six patients, cannot be over-emphasized. The partitions separate the patients into small groups and they can be easily confined to their own rooms, which is almost impossible in a large ward even if the beds are well spaced. After the lights are out at night or even in the day it is impossible to keep them from getting out of bed and sometimes coming into contact with each other.

However, if every patient had a single room throughout hospital residence, infection might be carried from one room to another by indirect contact by nurses, doctors, utensils, etc. It is absolutely necessary to practice strict cleanliness between different groups of patients, particularly when they are in the acute process of the disease. Once infection is introduced into a ward or room containing twenty or thirty or more patients it spreads to nearly all susceptible children. If, however, the units or rooms are small, infection will be confined to those in the same room or unit and will not spread to other rooms if strict cleanliness be employed.

The ward construction to be described applies equally well to wards for general diseases of children or for one kind of infectious disease. It is of great advantage to construct all wards along similar lines so that the hospital capacity will be elastic.

Each ward or floor should be composed of small rooms for new patients, larger rooms for convalescents and the necessary utility rooms located between the two. The rooms for new patients should be designed to contain one or two beds, rarely three, and should constitute about 50 per cent. of the ward capacity. All new patients should remain in detention for one week, during which time a more accurate diagnosis can be made to determine whether the patient is suffering from a contagious disease when in a general hospital, or from other infectious disease than the one treated in that ward if in a contagious hospital. The convalescent rooms, which should accommodate one-half the patients, should not contain over five or six beds each. A child might be under observation for a week in a detention room yet after transfer to a convalescent room develop measles or chicken-pox or some other disease with a long incubation period. If there are at most five other patients in the convalescent room part of them are like-

ly to be immune and the outbreak will be confined to one or two patients. This presupposes that patients in different convalescent rooms on the same floor are not allowed to mingle, that nurses' and doctors' hands be washed between rooms, and all utensils sterilized each time used.

The division of the ward floor into small rooms will be almost useless unless every room is provided with a lavatory where the nurse or doctor, after handling patients in the room, can scrub their hands in running water which can be turned on by foot or forearm valves. It is also essential that the kitchen be provided with a utensil sterilizer where all dishes can be boiled before washing, and the utility room with another sterilizer in which bed pans and urinals can be boiled after emptying. There should also be a clothes chute into which all linen, infected or otherwise, can be dropped piece by piece as occasion arises. The underlying idea is to consider all rooms occupied by patients infected or potentially infected, while the ward corridor and utility rooms remain uninfected. In the control of infection in a contagious hospital this principle is essential to maintain, and, what is more, it simplifies and makes consistent the whole technique.

The materials used for wall and floor construction are quite unimportant, for infection from them is very remote. It is advisable to use such materials as can be easily cleaned with soap and water. I am sure that excellent results can be obtained in even the temporary wood-constructed hospital if the rooms are small and provided there are lavatories, if there are sterilizers for utensils and the ward managed by a trained personnel.

Isolation wards where a variety of diseases can be treated should preferably be made up of rooms or cubicles, each containing one bed. For some purposes two or even three beds are allowable in the same room.

In every children's hospital of any size there should be an isolation ward composed of single rooms, to which all suspicious cases can be sent for observation, and where even infectious diseases can be treated if they cannot be sent elsewhere. The technique should be rigidly enforced. When you once have such a ward you will realize how indispensable it is.

By adopting this type of construction and strict cleanliness in the nursing care of patients, when a child develops measles, for instance, it is not necessary to close the whole ward. It is only necessary to isolate for observation those patients in the same room who have never had measles. In over twelve years no ward has ever been closed at the Providence City Hospital because of the occurrence of an outbreak of some infectious disease. Patients have been admitted to other rooms in the ward just as if nothing had occurred.

The nursing care as carried out in a contagious hospital is very rigid, but it can be modified for general hospitals for children.

It is not to be expected that cross-infections can be eliminated altogether from children's hospitals, but they can be lessened and the hospitals be conducted so that a whole ward need not be quarantined when a contagious disease appears in one of the rooms. The work can go on as usual after the case is disposed of and the "contacts" put under observation.

The cross-infection rate at the Providence City Hospital, a hospital for contagious diseases only, has been as follows:

| | |
|------|------|
| 1910 | 2% |
| 1911 | 2% |
| 1912 | 6.3% |
| 1913 | 1.7% |
| 1914 | 1% |
| 1915 | 4.6% |
| 1916 | 1.8% |
| 1917 | 0.8% |
| 1918 | 1.9% |
| 1919 | 0.5% |
| 1920 | 1.4% |
| 1921 | 1.9% |

During this period the diseases treated are as follows:

| | |
|--|-------|
| Chaneroids | 21 |
| Chicken-pox | 163 |
| Diphtheria | 3,560 |
| Diphtheria with other infectious diseases. | 131 |
| Diphtheria carrier | 254 |
| Erysipelas | 112 |
| Gonorrhea, female | 45 |
| Gonorrhea, male | 125 |
| Gonorrhea, ophthalmial | 19 |
| Gonorrhea, other forms | 29 |
| Gonorrhea, vaginal | 66 |
| Impetigo | 29 |
| Influenza | 459 |
| Influenza with other infectious diseases. | 12 |
| Influenza with pneumonia | 88 |
| Laryngitis, negative cultures | 63 |
| Measles | 1,106 |
| Measles with laryngeal diphtheria | 41 |
| Measles with other infectious diseases | 98 |
| Meningitis, cerebrospinal epidemic | 48 |
| Mumps | 81 |
| Mumps with other infectious diseases | 4 |
| No diagnosis | 84 |
| No disease | 208 |
| Noma | 5 |
| Other diseases | 994 |
| Pneumonia, all forms | 58 |
| Poliomyelitis, acute | 64 |
| Poliomyelitis with other infectious diseases | 3 |
| Rubella | 148 |
| Rubella with other infectious diseases | 6 |
| Scabies | 35 |
| Scarlet fever | 2,752 |
| Scarlet fever with diphtheria | 57 |

| | |
|---|--------|
| Scarlet fever with other infectious diseases | 135 |
| Septic sore throat..... | 14 |
| Syphilis, active and latent..... | 43 |
| Syphilis, cerebrospinal | 128 |
| Syphilis, congenital | 41 |
| Syphilis, organic | 10 |
| Syphilis, other forms | 1,855 |
| Tonsillitis | 539 |
| Trachoma | 12 |
| Tuberculosis, pulmonary | 1,906 |
| Tuberculosis, meningitis | 28 |
| Tuberculosis, other forms | 40 |
| Typhoid fever | 9 |
| Typhus fever | 4 |
| Variola | 31 |
| Vincent's infection | 28 |
| Whooping-cough | 391 |
| Whooping-cough with other infectious diseases | 17 |
| Total..... | 16,199 |

I venture to suggest, in the absence of exact statistics, that these rates, indicating the per cent. of patients contracting a second disease, compare favorably with the cross-infection rates of any hospital or wards used for children suffering from general diseases.

DR. HOWLAND: Dr. Richardson's paper is open for discussion.

MR. STEVENS: I should like to ask Dr. Richardson one or two things. In his three or four-bed convalescent ward, and in his two-bed admitting ward, would he advocate a screen, either permanent or temporary, between the beds, or would he space the beds some distance apart? Would he in the cubicle, or rather the admitting single rooms, advocate the placing of water-closets in the room, or adjoining the room?

DR. RICHARDSON: Relative to the screen, I don't think it matters so much, when you have only two or three beds in a room, if you use those small rooms for admitting new patients. The danger of contact, if the beds are well spaced, say four or five feet apart, is slight, because the patients are too ill to come in contact with each other. The question of convalescence is another question. The question of having water-closets in the room or in a room adjoining the isolation room is purely a matter of expense. In a hospital for contagious diseases, 80% of the patients are under ten years of age, and by using the bed-pans now generally used in hospitals, which can be used on the bed or on the chair, we don't find any great difficulty in having the patients use them, supplying on that floor a certain number of water-closets, toilets, to which adults can go. But when you begin to put a toilet into every room, or even between every two rooms, you are adding not only to original expense, but to the expense of upkeep, and while it is perfectly all right, and a very good idea, it is just a matter of how much money you can spend.

DR. WASHBURN: Do I understand that Dr. Richardson would be willing to put toilets in patients' rooms under any circumstances?

DR. RICHARDSON: I didn't have in mind that particular question. I suppose it would be perfectly possible. I am told that in European hospitals they have them in the open ward; I think that perhaps this country might not submit to that.

DR. HOWLAND: I think Mr. Stevens had in mind a closet between rooms, so that there would be no direct contact with the room except by a door or curtain. Have you seen such installation in contagious hospitals? **A.** Yes, a toilet for each individual room.

DR. HERSEY: I should like to ask, if where there is a cubicle installed in the ward, and those wards are used for contagious cases, whether it is necessary to arrange further for a curtain across the end of the cubicles in case contagious cases should develop in the cubicles?

DR. RICHARDSON: The chief difficulty we have with cross-infection is with chicken-pox and measles. These are the only two diseases that we exclude from any of our open wards. It is necessary to exclude measles from the beginning of symptoms until about 48 hours after the beginning of the rash. There is very little danger after three or four days from the beginning of the eruption of chicken-pox. We interpret this rule about admitting infectious diseases rather liberally. We have tuberculosis, syphilis, cerebrospinal meningitis, and a great variety. In other words, we admit any kind of infectious disease. We use the open ward for babies with any disease except chicken-pox and measles.

DR. HERSEY: One more question: how about acute infections, the ordinary cold; in cases of that sort, with the possibility of the infection going through the hospital, would you be any more likely to prevent it by using curtains?

DR. RICHARDSON: I am very much opposed to curtains. Partitions are all right to help control children. There is no danger as far as infection through the air is concerned, unless the beds are very close. If you hang up those things, you rely on them, and won't wash your hands. The important things are to sterilize your instruments; keep the patients apart; insist on nurses and doctors washing their hands every time they pass from one group to another; sterilize dishes and utensils.

DR. BROWN: How do you explain the wide variation of cross-infection in 1912 and other years?

DR. RICHARDSON: That was a year when we were jammed full of measles, and we had more cases than we could take care of. A hospital for contagious diseases can take so many patients

and take care of them properly; when you overcrowd the hospital, you do more damage than good. A hospital superintendent should refuse to take more patients than can be well cared for; it only spreads the epidemic. In an epidemic, all he can do is to take the sickest cases, and only such number as he can take care of comfortably.

DR. HOWLAND: Tomorrow afternoon, when we visit the hospitals, if anyone is interested in the subject of isolation wards, the Boston City Hospital has just built two, one in the South Department and one in the general wards particularly for the reception of children. You will see many interesting and ingenious things there, especially the means for sterilizing, ward apparatus, steam closets, and fumigating closets for sterilizing. It seemed to me very practical and very simple.

If there is no further discussion of Dr. Richardson's paper, we will proceed with the question-box.

QUESTION-BOX.

X-RAY DEPARTMENTS.

Question: What is the most equitable way of managing an x-ray department in a small hospital where it is impossible to employ a physician for that service as full-time paid officer? What is the salary of a roentgenologist? Does he have a technician? and what are the arrangements? What is the best way to compensate doctors for reading x-ray plates?

DR. PETERS: At the Rhode Island Hospital, we have had, until within a few months, a man who gave his full time, on salary, to the work of the hospital. Recently that man has been given permission to devote his afternoon hours to his private work. He gives the hospital four or five hours in the morning to the interpretation of plates as taken by the technician. So far as I know, it has been satisfactory. This man has given his readings promptly, and his presence hasn't been missed in the afternoon, because of the arrangement and the system of having his plates there, and a dictaphone into which he could talk if the stenographer was not there. I think the work has been done satisfactorily. I have no opinion in regard to the work in small hospitals, based on experience, but I do know some small places where they employ men to go at intervals to do all the work, or to interpret the plates taken by a trained technician.

DR. DREW: Our roentgenologist is not on a salary. He receives 80% of the fees from paying patients, but he does not receive any compensation for reading plates for non-paying patients. This man feels at times that he isn't paid enough, because we insist on making only one charge for an x-ray plate of one part: that is, if we take a series of stomach plates, and they don't come out right, and the x-ray man wants to repeat them, we make only one charge, because we feel

that we ought to stand our own failures. I have had a pretty strong feeling that the x-ray man ought to be on a salary, and that there ought not to be any division of fees between the hospital and any expert connected with the hospital.

MISS BARNABY, Henry Heyward Hospital: For the past two years, we have had a Harvard Medical student who gave his time entirely to x-ray work. In the winter he came Saturdays and Sundays. One of our nurses was trained under him and under Dr. Jennings of Fitchburg, consulting roentgenologist. Then Dr. Jennings came to the hospital once or twice a week and read the plates, which are then typewritten and sent out to the doctors who send in the patients. Now the student has graduated, and we are having a regularly trained technician come in permanently, while the former student is going to give us one day a week. He has settled in Boston.

Q. Do you pay the consultant?

MISS BARNABY: He has been paid on a 50% basis.

DR. BROWN, Burlington, Vermont: Our x-ray department is highly developed for a small hospital. We pay our x-ray man 75% of all money collected for x-ray plates, and he pays his own technician. He does our laboratory work, blood work, and urine tests. The free x-ray work he does for nothing. The department has grown so, and has come to be so necessary a part of the hospital, that I think his income last year was over \$10,000; that is, for his share of the receipts. The department has grown very rapidly. It is a very necessary part of a modern hospital, and some of it, I think, might be developed in almost every hospital. Out of that money, we have paid for all of our apparatus in recent years, with some little money to the good. The department is practically self-supporting. That doesn't include overhead expenses, or bookkeeping, but it includes the cost of supplies, apparatus, and what services are required. The x-ray man, as I have already said, pays his own technician. So, on the whole, on that basis, it has been a very good thing for us, as well as a good thing for the public and for the x-ray man, who has found it worth while to devote his entire time to it. That includes all routine laboratory work.

WOMAN: Our x-ray department has been self-supporting. We have a man who does our x-ray work, and he has 40% of all charges collected by the hospital, and 25% for each extra plate. He does the fluoroscope work. The doctor who interprets the plates makes no charge.

LABORATORY CHARGES.

Question: Should pay patients be charged for blood counts and for examination of urine?

Should there be a flat laboratory charge for all patients who pay? What should the laboratory charge be, and for what?

DR. STETSON: We have recently taken this matter up. It was first taken up by the staff, and the staff held that there was no reason why a laboratory fee should not be charged, the same as a fee for the operating-room and a maternity fee, and, after considerable discussion, it was finally recommended to the trustees that a flat rate of \$5.00 be charged all patients who have any laboratory work done, with this exception, that an initial complete urinary examination and an initial white count on admission, for purposes of diagnosis, should not be charged for; that that should be done as a matter of routine. For any examination of urine, blood, stomach contents, and other laboratory work, including all laboratory service, a \$5.00 fee was recommended, and the trustees have accepted that recommendation.

Q. Does that apply to ward patients?

DR. STETSON: To everybody. The laboratory worker doesn't know who is on a free bed. If it is a free bed patient, it is charged off.

DR. HOWLAND: I think it is desirable, if there is to be a laboratory charge, that it should not be strung out into various items. Patients are irritated by a bill with many items in it. It is much more satisfactory, if you are going to have a laboratory charge, to make it an inclusive one, regardless of what you do, much or little.

DR. STETSON: All the staff, with one exception, were entirely agreed as to the charge. The feeling was that if a fee was charged for each separate service, patients might many times be deprived of necessary or desirable laboratory examinations, because the physician would feel that he did not want to run up the expense, and that better results would be obtained, and the physicians would be encouraged to use the laboratory, if a flat rate were made; and it has worked out in just that way.

DR. PETERS: Mr. Chairman, it would be interesting if those here who do make charges for laboratory work would indicate it by rising.

Response showed: Open ward patients charged, 10 hospitals; private ward patients charged, 21 hospitals; no charge for laboratory work, 20 hospitals.

ACCIDENT CASES.

Question: What can be done to collect from insurance companies on accident cases? Insurance companies sometimes pay the family, and the hospital doesn't get anything.

DR. HOWLAND: I assume that that question comes from outside Massachusetts, because here we have the Workmen's Compensation Act.

DR. SMITH: We have an industrial accident law that protects the physician and the hospital. Our Industrial Accident Commission sees that the hospital is paid and that the individual doctor is paid, even if the patient is in the hospital. We have no business relations with the insurance company.

(Woman from Waltham Hospital explains that the question refers to automobile accident cases).

MR. BORDEN: In automobile cases, where the insurance company pays the damages, the hospitals have no claim whatever against the insurance company. The insurance company assumes liability and pays damage to the person who is injured. The amount is supposed to be sufficient to include the cost of medical and hospital treatment. Fundamentally, the person to whom the hospital should look for payment is the person to whom damages are paid as the result of the accident.

WOMAN: I have been in a hospital where there were a great many automobile accident cases — six, eight, or ten such cases in the hospital at one time. We asked if there was insurance. We found the companies were very willing to see that the hospital was compensated. We never had any difficulty if the patient was insured. We never lost any money on an insurance accident case.

WOMAN: We sometimes have just such accident cases, when we are urged by the insurance company to do everything possible to save the patient's life. Then later they sometimes say that they are not liable, and the hospital has difficulty in collecting from the patient. In one special case, there was a small child who was insured. The family questioned the amount of the expense, and in that case, of course, the expense was going on before it was decided who should pay it.

DR. HOWLAND: I think Mr. Borden, who is a lawyer, very clearly covered this question, speaking from a legal point of view. We have no claim on the insurance company. The insurance company is responsible to the injured person. If there is anything to be collected by the hospital, it is from the patient. The insurance company will work with us sometimes, but we have no claim on them.

REFRIGERATING PLANTS.

Question: Who has a refrigerating plant he will recommend for a hospital of 125 beds? What is the cost of installation? and what is the expense of upkeep? Is it difficult to run? or can it be taken care of by the engineer, in addition to his other duties?

DR. HOWLAND: Miss Barnaby, you have a hospital of about 125 beds; do you have a refrigerating plant?

MISS BARNABY: Our hospital has really only 100 beds. I don't know whether our plant is large enough for a hospital of that size or not. I can't tell the cost of the installation, because it was included in the new building. Our engineer with his assistant does take care of it. We have had it running about two months. It is called the Johns-Manville machine. It is supposed to be a self-contained machine, with nothing to do but keep the motor running.

Another speaker (man) says the apparatus costs about \$7,000.

DR. RICHARDSON: We have just installed one at the City Hospital. It is too early to know whether it is going to be satisfactory or not. Most all of the wholesale beef houses and all the business men who are using refrigerating plants swear by this concern. For space we have one room about 12 by 13 feet; we have four other compartments, which all together contain about 12 by 20 feet, divided up into sections; and then we have a freezing compartment that will freeze about 1500 pounds of ice a day, and a morgue box which will accommodate three bodies. The cost of installation was \$9,000. The cost of upkeep is not yet known, probably not over \$40 or \$50 a month. Our engineer looks after it.

MR. STEVENS: I have put in a number of refrigerating plants, — 200 put in by the Erie Company. One thing I try to avoid in putting in refrigerating systems in a hospital is the use of ammonia, by using other things. I have had very good success with sulpho-dioxide in refrigerating systems in self-contained systems. I use ammonia where the plant is large enough to be entirely outside of the building.

DR. RICHARDSON: We considered that matter of using ammonia. A number of people said they had had no trouble, and other people said they had had trouble. The supply pipe of liquid ammonia has a pressure of 150 pounds; we run that out of doors. The return pipe has a pressure of something like 25 or 30 pounds; that would be a slight leak, if any. The other is out of doors, so the danger is not great.

DR. FAXON: At the Phillips House, we have a Johns-Manville installation. It has been very satisfactory. It needs very little care, apparently, from the engineer. It produces perfectly satisfactory refrigeration. We also have a machine of a similar type which was put in to take care of refrigerating the ice-box in the kitchen for the General Hospital, which has also been very satisfactory.

One word of caution that I would like to suggest is, in the installation of such things in a modern fire-proof building construction, put your ice machine outside of the general frame of your main building. If you put it in the basement of the building, it will cause a little vibration to be carried up through the steel beams for

several floors. That can be avoided if you know about it.

I don't know the cost of installation.

VACATIONS.

Question: How long a vacation does the superintendent allow staff nurses? social service workers? If a nurse is to leave at the end of the year, would the hospital be expected to pay her for a vacation?

MISS SELBY, Pawtucket: We give the staff nurses one month's vacation, and I should feel that if a nurse had put in a year's work, she was entitled to her month of pay, even if she were not coming back. Our social service worker has a month.

MR. BORDEN: I quite agree that a month is a fair time for either a nurse or a social service worker, because I think the work is very engrossing, and it is in the interests of the hospital to give them that vacation. But I don't understand why a nurse who is going to leave the hospital should be paid for that month's vacation. Most people don't get a month, and the only reason why a hospital gives that length of time is that the nurse should be thoroughly recuperated. I should hesitate to give that vacation, if a nurse told me she was going to leave.

DR. HOWLAND: I think sometimes a great deal of agony is saved if you make the vacation four weeks, instead of a month; it saves quite a lot of trouble and wearing out of the calendar.

SALARIES.

Question: What salary is paid a graduate nurse in charge of the operating-room?

MISS HALL, Peter Bent Brigham Hospital: We pay \$100 a month to the supervisor of the operating-room at the Peter Bent Brigham. We have been paying that for several years. A survey made of 1115 hospitals, two or three years ago, brought out the fact that representative hospitals were paying \$100 to \$125 for operating-room supervisors. That was in hospitals of from 200 to 300 or 350 beds.

DR. HOWLAND: What do some of the smaller hospitals pay the nurse in charge of the operating room?

MR. BORDEN: Our operating-room nurse, who has three rooms, gets \$125 a month and maintenance. The nurse who has charge of the operating department of two rooms gets \$90. We expect to raise it to \$100. Our hospital doubled its capacity last year.

MISS WEST, Beverly: We pay our operating-room nurse \$85. It will be increased.

MISS BOOKER, Corey Hill Hospital: We have two nurses in operating-room. The senior has \$85; the other \$80.

RAW FOOD AND PER CAPITA COSTS.

Question: For a basis of comparison, What are the per capita costs for raw food in various hospitals? What are the total per capita costs in various hospitals for care of patients?

MR. BORDEN: At the Fall River Union Hospital, the cost per capita for uncooked food per day was \$0.36, and \$3.73 a day per capita for care of patients.

DR. FAXON: The food cost at the Massachusetts General is \$0.44 a day, and care of patients \$5.08 per day,—that is, for the General Hospital.

MISS BARNABY: With a daily average of 40 patients, the uncooked food costs \$0.50 per day per capita, and the cost for the care of patients is \$5.75 per day. We employ graduate nurses only, with attendants.

MISS SELBY: Our per capita cost for uncooked food is \$0.595 a day; the daily average cost of the patients is \$4.95.

INTERNES.

Question: How many internes, if any, should a hospital of from 50 to 75 beds have? If more than one, should their work be divided? Regarding payment of internes, do any of the hospitals represented here give an allowance to internes? If so, how much?

MISS WEST: We have averaged 50 patients, and have had one interne. He took care of the ward patients. We paid him \$50 a month. This year we are to have two internes, neither of whom will receive any salary. Their working arrangement has not yet been decided. They serve for twelve months. This year we expect to have more patients.

DR. BROWN: The American College of Surgeons allows one interne for each twenty-five patients. We give our internes \$50 when they leave, to pay their car fare out of town.

DR. RICHARDSON: Our internes have \$25 a month for the first three months; the second three months we pay \$50. They come for six months' service.

MRS. SHEPARD, Mary Hitchcock Hospital: We have a hospital of 70 beds. When we can get them—we haven't been able to for the last two or three years—we have two graduates. They act as junior and senior, junior the first six months, and senior the last three months. We have a pretty active operating-room service, three or four a day; in the last six months they assist at the operations. We do not pay them.

Meeting adjourned at 4:30 p. m.

(Dr. Richardson's Tables.)

PROVIDENCE CITY HOSPITAL.

Cross-Infection Rate.

| | |
|-----------|------|
| 1910..... | 2 % |
| 1911..... | 2 % |
| 1912..... | 63 % |
| 1913..... | 17 % |
| 1914..... | 1 % |
| 1915..... | 4.6% |
| 1916..... | 1.8% |
| 1917..... | .8% |
| 1918..... | 1.9% |
| 1919..... | .5% |
| 1920..... | 1.4% |

DISEASES TREATED FROM 1910-1920.

| | |
|---|--------|
| Chicken-pox | 140 |
| Diphtheria | 3481 |
| Erysipelas | 100 |
| Gonorrhea | 210 |
| Influenza | 557 |
| Measles | 1132 |
| Meningitis | 68 |
| Mumps | 66 |
| Nurses, taken sick while attending patients | 185 |
| Other diseases | 3270 |
| Pneumonia | 44 |
| Poliomyelitis | 87 |
| Rubella | 151 |
| Scarlet fever | 2744 |
| Tonsillitis | 482 |
| Tuberculosis, children | 31 |
| Typhoid fever | 9 |
| Typhus fever | 4 |
| Variola | 32 |
| Whooping cough | 383 |
| Total | 13,176 |

(To be continued.)

Original Articles.

A SPECIFIC SORE THROAT WHICH PASSED AS AN ORDINARY PHARYNGITIS AND TONSILLITIS, TREATMENT ADMINISTERED FOR SAME, WITH NO RELIEF.

BY DAVID B. MEDALIA, M.D., BOSTON.

It is my desire to publish this interesting case, to bring out the importance of a Wassermann in obstinate sore throats which do not clear up under ordinary treatments, especially persisting for a long time.

This patient, a man of forty-five, applied for examination and treatment of a very sore throat. He could not swallow except with great difficulty, whether warm or cold fluids; it pained him even to talk. History: Denies