Notes on some German universities : Berlin / by Walter K. Sibley.

NOTES

ON SOME

GERMAN UNIVERSITIES.

BERLIN

BY

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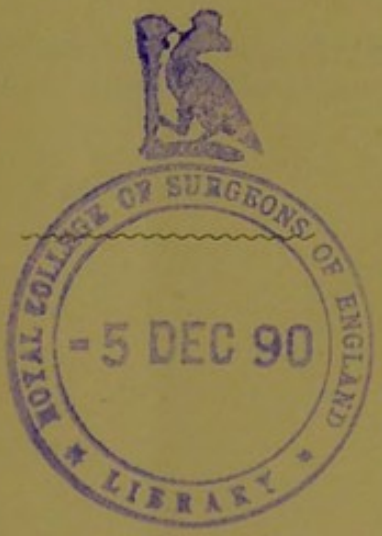

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CONTENTS.

THE UNIVERSITY OF BERLIN.

THE Royal Friedrich-Wilhelm's University was opened in 1809; the building, which is situated at the east end of Unter den Linden, was formerly the palace of Prince Henry, brother of Frederich II, and was built in 1754. It can now accommodate 5,000 students. Space will not permit a detailed description of the building beyond mentioning that it contains numerous lecture theatres, a zoological museum, especially notable for its collection of birds, and a mineralogical museum, which, after the British Museum, is stated to be the most complete in Europe.

The hospitals of Berlin are numerous, and may be divided into two sets: those where lectures are given, that is, the clinics or medical schools; and those where there is no regular teaching. Of the former, the most important is the Charité, which comprises clinics of medicine, surgery, nervous diseases, midwifery and gynæcology, children's diseases, syphilis, skin, eye, etc. In addition to the Charité are the University Surgical Clinic, the Royal University Clinic for Women, the University Medical Policlinic (out-patients), and the University Policlinic for Throat and Ear. The most important of the other hospitals are Friedrichshain (620 beds), Moabit (900 beds), Dalldorf Asylum (1,200 beds), and Augusta (190 beds). There are also libraries from which students can take out books, on obtaining a card from the University. The principal one, the "Königliches Bibliothek," is situated opposite the University building. The whole of this is open daily, with the exception of Sundays and public holidays, from 9 to 3, the large reading room attached to it being open from 9 to 7.

In the same neighbourhood is the journal room where all foreign periodicals of note are taken in. In addition to these there is the Königliche-Universitäts Bibliothek, in the Dorotheenstrasse, which has a reading-room attached. From this library books can be taken home and kept for a month. In the same street is the Bibliothek der Medicinischen Gesellschaft. This belongs to members of the Medical Society, and is, therefore, comparatively private. There is also a library of hygienic literature, and in the Friedrichstrasse is one for the use of military surgeons.

It will be convenient to begin the description of the organisation of the medical faculty in Berlin with the Institute of Hygiene. This building is situated in the Klosterstrasse; the Hygienic Laboratory, which was opened in 1885, is housed in the building which was formerly the academy for civil engineers, and occupies the first and second floors, with the exception of some rooms in which animals are kept for experimental purposes. The laboratories consist of two distinct parts, those for chemistry and those for bacteriology. On the first floor to the right of the staircase is the lecture theatre, with 119 seats. It is provided with a digestorium,

and various arrangements for the suspension of diagrams and plates. In connection with it is a preparation room for the lectures, and behind this three rooms with collections of apparatus, charts, and instruments for lecture purposes.

The chemical department, which is also on the first floor, consists of the private laboratory of Dr. Proskauer, one of the assistants; behind this is a dark room for the optical and spectroscopical examination of substances for analysis. Then follows the larger chemical laboratory, with places for twenty-five workers, in which are carried on the examinations of air, soil, water, and various articles of diet. Each worker's place is provided with a water-jet aspiration apparatus, consisting of a combination of tubes dilating or compressing air by the aspirating power of a water jet. On the walls are sterilising and digestive chambers; under these apparatus is a large water bath with several openings, in which vessels containing the substances to be analysed are kept at a temperature of 100° C. The steam from this passing through a cooling medium is condensed, and supplies the distilled water for general use. Under the water cistern is a drying chamber. For heating to higher temperatures a sand bath is used, which also contains a drying chamber.

On the first floor is also the library of the institute.

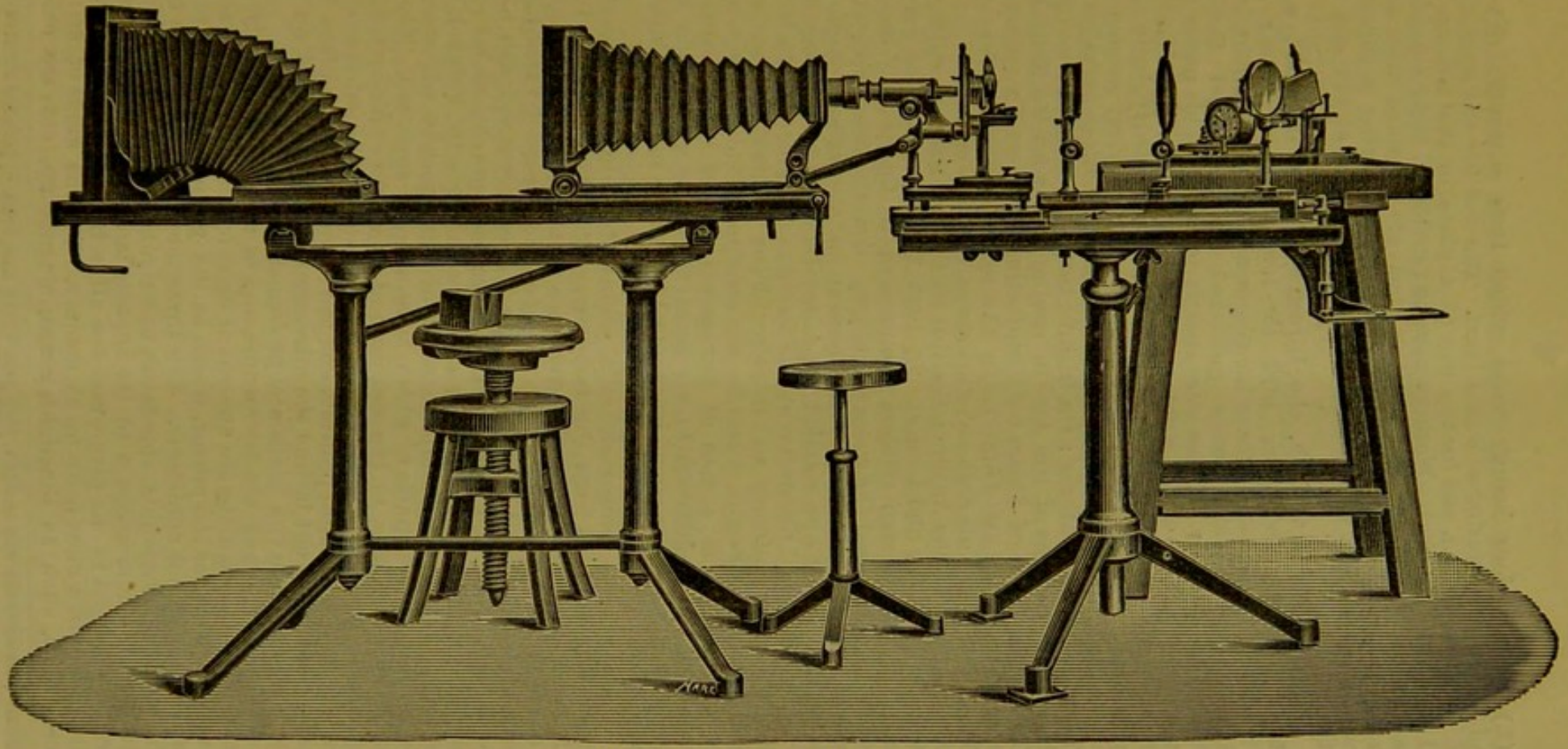
On the second floor is the bacteriological department, with two rooms which form the director's private laboratory. In the same section are the rooms of Dr. C. Fränkel, the first assistant, together with his laboratory, and also the large laboratory corresponding to that for chemistry beneath. In the large bacteriological laboratory, which can accommodate fourteen workers, the important work is done, and from time to time courses of instruction are given in it. In a cross building are four smaller laboratories, in which other investigations are carried on. Adjoining these is the laboratory for students. Another building forms a courtyard, which contains a small auditorium.

The fittings are much the same in the various laboratories. They consist of microscope tables, which are placed in the windows, each serving for two workers. In the middle of the room stand tables on which is placed the requisite apparatus for bacteriological work, as for cooking, making of nutrient gelatine, cultivations, etc. Sterilising apparatus, incubators, drying chambers of various construction, together with digestors, steam sterilising apparatus, and incubators for the cultivation of micro-organisms, are also provided. There is also an apparatus, which is provided with a gas flame day and night, for the constant maintenance of a given temperature within one or two degrees. An ingenious arrangement of metal springs, which naturally expand with heat, is attached to the gas burner, so that if by any accident the flame should go out, within a few seconds the springs contract, and by this mechanism the gas cock is turned off, and all escape prevented.

In connection with the bacteriological department is a photographic studio, in which the photographic appearances of various cultures, with their characteristic development, are preserved.

Medical men are admitted to the practice courses as well as to the other important work as far as space allows. The chemical and bacteriological departments go hand in hand. and the greater part of the work done—as, for instance, the examination of drinking water—is carried on in both departments at the same time. The laboratory is open on weekdays from 9 to 5, and on Saturdays from 9 to 2.

The arrangements for work in these laboratories are as follows



ZEISS'S MICROPHOTOGRAPHIC APPARATUS.

(1.) A daily four hours' course, which lasts a month. (2.) A place for work during a whole term. The fee for the course is 65½ marks (£3 5s.), and for the use of a place in the laboratory 115½ marks (£5 15s.). Workers have to provide all their reagents and small pieces for manipulation, but are provided with the main collection of bottles and glasses upon paying a deposit, which is returned, with deductions for breakages, at the end of the course.

Professor Robert Koch, the Director of the Institute, was born in 1843, and from 1872 to 1880 was a coroner at Wallstein in Bamst. There he commenced his bacteriological investigations, which were published in Ferdinand Cohn's biological memoirs. These were shortly followed by his paper on the Investigation of the Etiology of Wound Infections. In 1880 he was called to Berlin as a member of the Royal Hygienic Department. The following papers appeared in the first volume of the *Mittheilungen:* Investigation of Pathogenic Micro-organisms; The Etiology of Anthrax; On Disinfection; Investigation on Disinfection by Means of Hot Air (in conjunction with Wolffhügel); The Convenience of Steam for Disinfecting Purposes (in conjunction with Gaffky and Löffler). In the second volume appeared: The Etiology of Tuberculosis; Experimental Study on the Artificial Attenuation of the Anthrax Bacillus by Cultivation (in conjunction with Gaffky and Löffler). In 1883 Koch was sent as principal of the German Cholera Commission to Egypt and India, when he discovered the comma bacillus. Besides these important works he has published many papers in the various medical journals. In 1882 he startled the scientific world by the literally "epoch-making" discovery of the bacillus of tubercle. In 1885 he was made Professor and Director of the Hygienic Laboratory and Museum in Berlin, where he has continued his investigations ever since. He is a man of few words and of quiet retiring manners, and in addition to his great ability as a scientific investigator, he shows much mechanical ingenuity in the invention of apparatus for bacteriological research.

A considerable proportion of the work done in the hygienic laboratory proceeds from the assistants. The chief of these, Dr. C. Fränkel[1] is the author of a complete textbook of bacteriology (*Grundriss der Bakterienkunde*) and of numerous special treatises on the various branches of that science. More recently, much has been done by Dr. R. Pfeiffer on the micro-photography of micro-organisms. This gentleman, in conjunction with Dr. Fränkel, is bringing out a very complete atlas of photography of micro-organisms, several parts of which have already appeared. Some of the special points in the structure of the micro-photographic apparatus of Drs. Fränkel and Pfeiffer are that the microscope can lie in a horizontal position, and the camera with the plate is placed not over, but behind the microscope, and so is placed on a second support in the horizontal prolongation of the same.

Placed in front of the microscope, and in the same plane, is a contrivance to regulate the amount of light for the object, and act as a substitute for the mirror, which in the prone position of the instrument is not applicable. The three most important parts of the micro-photographic apparatus, namely, the illumination contrivance, the microscope with its appurtenances, and the camera are all arranged in one plane, and are all in immediate connection and placed in a most convenient manner. Various kinds of artificial light, such as limelight, lamps, magnesium, etc., are em-

[1] Since this account was written, this gentleman has been appointed Professor at Königsberg.

ployed, but for very high powers and stained preparations sunlight is far superior.

The practical bacteriological course for medical men is given about four times a year, and each course lasts a month, the work being daily from 9 to 5. The courses, which are under the direction of the chief assistants, are attended by medical men from all over the world, about twenty taking part in each course; at a recent one there were nineteen attending, seven nations being represented. Upon commencing in the morning the assistant gives a short lecture for twenty minutes or half an hour on the work for the day, describing the methods of procedure, together with important points in the life-history, methods of cultivation, and staining of one or more micro-organisms. He also gives demonstrations on the apparatus required to be used, after which each one works through the proposed methods individually, the demonstrators remaining nearly the whole day to give assistance to those in need of it.

It is quite out of place in a short paper like this to describe or even mention all the micro-organisms examined or preparations put up, therefore a few points of particular interest only will be mentioned. The series may be started with the non-pathogenic organisms, such as examples from the moulds; yeasts, the white, black, and rose; from the cocci, the prodigiosus; the yellow and orange sarcinæ; and from the bacilli, the subtilis or hay bacillus. Having prepared potatoes and gelatine in the recognised ways, cultures were made of all. Passing from these to the micro-organisms of milk—namely, the lactic acid bacillus, oïdium lactis, and the bacilli of blue milk, we were then shown the organisms in the atmosphere, and the methods of isolating and cultivating them; next those found in the dust of floors and roads, noticing especially the root-forming bacillus, at the same time learning how to make a pure culture of one form from a mixture containing many species; passing then to the bacilli of water, especially noticing the fluorescens, and the red and violet bacilli. Having studied for a few days the ordinary forms of micro-organisms, and learnt the various methods of cultivating them in gelatine placed in test tubes, either as streak or stab cultures, and also rolled round the sides of test tubes; also in gelatine on large square glass plates and on microscopic slides, and again in shallow pots or jars; in broth as a drop hanging to the under side of a cover slip placed on an excavated slide, the edges of concavity being surrounded with vaseline, and so rendered airtight; also on potato and bread; and the various methods for preparing and staining all of them for microscopical examination, we passed at once to the parasitic organisms, the greater number of which accompany specific diseases. The first of these we examined was anthrax; we proved how this bacillus grows at the ordinary room temperature, but never in acid mediums. It does not spore in the animal body, nor under a temperature of 16° C. or over 37° C.; it does not spore in gelatine, but on potato, or when grown in broth. When grown on gelatine it liquefies that substance very rapidly; growing artificially, it forms long interlacing filaments. When inoculated, it causes splenic fever and rapid death in guinea-pigs, mice, and man; so also in amphibia, as frogs, when these are kept warm. Finally it was demonstrated that animals fed on the bacilli without spores received no harm.

We then learnt the various and more complicated methods of staining, as those of Gram, Weigert, and Ziehl, and studied the bacillus of tuberculosis discovered by Koch in 1882, being shown

how much greater propensity this bacillus has of retaining the colouring matter of the aniline dyes than any other known bacillus and so retaining the colour after subjection to dilute acids, etc. We also found out how difficult this bacillus is to cultivate, as it grows only on agar-agar when glycerine is added and on serum, and only between the temperatures of 30° and 42° C., and then very slowly. The characteristic point about the method of growth of tubercle on agar-agar is that it grows and extends over the fluid at the bottom of the test tube and then up the glass on the opposite side, thus differing from any other known bacillus culture; spore formation of this bacillus has never been actually demonstrated. Leaving these we worked through the bacilli of septicæmia in mice, which in appearance much resemble those of tuberculosis, being found both in the connective tissues and in the white blood corpuscles, and those of chicken cholera, common to all domesticated birds, also mice and rabbits, guinea-pigs being apparently insusceptible.

After these organisms we studied that which to the mind of a medical man is now of great interest and importance, namely, the various processes for disinfection, both thermal and chemical, proving by experiment that many bacilli (anthrax and subtilis) are not destroyed by being raised to a dry heat of 110° C., or by being frozen, but that they are readily destroyed by being subjected to a moist heat. Thus a damp chamber of 100° C. is much more potent than a dry one of 150° C. in its destructive powers, and normal steam at 100° acts much better than steam under pressure at 130°. For chemical means carbolic acid 5 per cent. (1 in 20) and sublimate 0 1 per cent. (1 in 1,000) were used.

Again, it was shown that most organisms die when boiled in water for a few seconds, for instance, typhoid bacilli, and that heating in a moist chamber is a much more powerful destructive agent for these than a dry heat. Filtration, except through Pasteur's filter, does not prevent germs from passing through, and is therefore inefficacious. These various methods were tried, the bacillus and spores of B. subtilis being very serviceable; thus threads, dried after being soaked in a broth solution containing the spores, were subjected to moist and dry heat for a varying number of seconds and minutes and then placed in gelatine, and observations made as to which afterwards grew and which did not; and in the same way they were tested with chemical agents.

In staining for the spores of some bacilli (anthrax and subtilis) we appreciated how much more slower these are in giving up the colouring matter than the bacilli themselves, and also how much harder to stain. Thus the preparation on a cover glass or otherwise must be left in the colouring medium (carbolic acid fuchsin being especially serviceable) for an hour or two, and at the same time subjected to heat. After this procedure the colour is readily removed from the bacilli by alcohol, but remains in the spores; the specimen can then be doubly stained by methyl blue, and then we have the bacilli blue and the spores red. Attention was next given to the bacilli of malignant œdema, which are found by injecting a small quantity of garden soil into an animal, the beast rapidly succumbing with general œdema of its tissues, especially in the neighbourhood of the wound; the bacilli are not, however, found in the blood, nor can they be grown in the presence of oxygen, but when all oxygen is excluded they grow in gelatine, producing liquefaction of that substance with evolution of very foul bubbles of gas. After noticing briefly the bacilli of septicæmia of rabbits, which is very similar to chicken cholera, we investigated some of the organisms in connection with certain

diseases of the air passages, as micrococcus tetragenes, which is found in diseased lungs and in many healthy people's mouths, and for man is not pathogenic, being often present on the walls of cavities in phthisis; it is, however, very fatal to mice, guinea-pigs, and rabbits, and is found in their blood. They occur like the sarcinæ in fours, but here only in one plane, and each group is encapsuled; they grow at the room temperature on the potato. When artificially cultivated the capsule disappears, so that the capsule is only found in specimens taken from an animal's body. Then we studied the common micrococci of pus from wounds, staphyloccus aureus and albus, streptococcus erysipelatis, and finally the bacilli of green pus.

Staphylococcus occurs in groups, growing at the room temperature on gelatine, agar-agar, serum, or potato. After inoculation into an animal, it is found sparingly in the blood vessels, abundantly in the kidney; if the endothelium from a valve of the heart be removed and the animal then inoculated with a pure culture, ulcerative endocarditis is produced. The spores of this coccus, when dried on thread, continue capable of growth after two years. This coccus is, moreover, found everywhere, in the mouth, vagina, and uterus in healthy subjects, and in all abscesses; it liquefies gelatine.

Streptococcus, occurring in threads is always present in pus, grows very slowly at the room temperature, and does not liquefy gelatine. In pus it lies free and not in the corpuscles. Streptococcus erysipelatis is practically indistinguishable from the above, and is found principally in the margin of a patch of inflammation lying in the lymph vessels, which are often full of these micrococci.

The bacillus of green pus is not pathogenic, is active, and grows rapidly in gelatine, which it liquefies. In pus usually all three of these organisms are found, but sometimes only one is present; which is the most important is not yet known. In pus about the peritoneum and in internal parts, probably streptococcus plays the most important part. Leaving these, we passed on to study the bacillus of glanders, pathogenic in horses, asses, man, guinea-pigs, and field mice (not in other mice), producing generally catarrh of the mucous membranes and nodules in the lungs very like tubercle; the bacilli also closely resemble tubercle bacilli. It does not grow at the room temperature, but on agar-agar or potato in the incubator. In guinea-pigs, three to five weeks after inoculation, nodules, especially in the spleen and liver, are found, together with a general enlargement of the glands. The bacilli are only found in certain stages, occurring in the tissues in groups; after about eight generations of artificial culture, the virulence disappears.

The moulds are mostly non-pathogenic; when, however, some are grown artificially in an incubator, and the spores separated and injected into the blood vessels of a rabbit, it rapidly dies, and small patches of the fungus are found in the liver and kidneys. These fungi, when removed, will not grow at the ordinary room temperature, but rapidly in the incubator, and especially well on moistened bread which has been sterilised. The pathogenic moulds are aspergillus flavus and fumigatus, and mucor corymbifer and rhizopodiformis.

With regard to the intestinal bacilli, that of Emmerich may be taken first; in appearance it is very like that of typhoid, but is not active, and is found in the fæces of some cholera cases. It grows on gelatine, producing a brownish yellow colour around but forms much thicker processes than those of typhoid; it grow

also in potato. When inoculated into an animal in large quantities and deep into the tissues, the beast dies, and the bacilli are found in the organs after death.

Then the cholera or comma bacilli were studied. These are readily destroyed by drying; thus if a drop of broth containing them on a cover glass be dried in the air, they are found all dead in about three hours. Two other bacilli, namely those of Finkler and Deneke, are very similar to the cholera bacilli; these also are very active, and slowly liquefy gelatine when grown in it, the gelatine appearing filled with holes or gas bubbles. The bacilli of typhoid fever are found abundantly in the spleen, lymphatic glands, and intestines of patients dying from the disease. These, like Emmerich's bacillus, are very active, and no spore formation has been demonstrated. Growing on gelatine they do not liquefy it, and have a very characteristic appearance when grown on potato, the surface of the latter appearing covered with a moist pale-brown down. If injected into the veins of animals, in some cases the same appearances are found in the intestine and spleen.

Lastly, we studied the bacilli of pneumonia, commencing with that of Friedländer, which is small and very like tetragenes, possessing a capsule, but this only when grown in the animal body, and not in cultures. It grows at the room and blood temperatures, on agar-agar, potato, or gelatine, forming white colonies. In older cultures it produces a brown coloration of the gelatine, especially when sugar is added, and, later still, the formation of gas bubbles; spores are not found. This bacillus is not always found in pneumonia, and sometimes it is detected in healthy lungs. Then there is the bacillus of Fränkel, which microscopically resembles the former, but grows only at the blood temperature, and only for a few days in artificial soil, and then dies. Spores are often found which, if injected subcutaneously into an animal, cause death in two days. This bacillus is, however, not always to be found in pneumonia, and often both this and Friedländer's are associated in that disease. Fränkel's occurs also in healthy mouths, but not in every individual. Thus the saliva of some people, if injected into a rabbit, causes death, and Fränkel's bacillus abounds on *post-mortem* examination. A bacillus we must not forget to mention for its interesting physical properties is B. phosphorescens, which occurrs in decomposing meat and fish, also in sea water, the phosphorescence of which it causes; in appearance it is something like the hay bacillus, but is very active. It grows on gelatine, which it liquefies when the weather is warm.

The Physiological Institute, a red-brick building situated at the corner of the Neuen Wilhelmstrasse and the Dorotheenstrasse, contains four departments: (1) Microscopic and Biological, under Professor Fritsch; (2) Chemical, under Professor Kossel; (3) Special Physiological, under Professor Gad; (4) Physical and Physiological, under the director, Professor du Bois Reymond. The building contains two lecture theatres, one seating 250 persons which is used by the director, and one with accommodation for 65 students which is used by his assistants. On the ground floor are the director's private workroom and laboratory, and the physical department with a laboratory for six workers and a private workroom; there is a special instrument room for physico-physiological apparatus. On the first floor is the microscopical department with twenty places, a large aquarium for sea animals, a microscopical gallery, and an injection room, together with the zoological and comparative anatomy collections. On this floor there

is also a special photographical department under the direction of Professor Fritsch. On the same floor is the chemical department under Professor Kossel, with a laboratory fitted for thirty workers, which every summer term is used by seventy or eighty students; moreover, a weighing room and a spectroscopic room. The vivisection department, with six places, is on the ground floor, and is provided with a demonstrator's table and a gallery. The animals are kept in the cellars. In the summer the frogs are kept in a large basin in the garden. In the cellars are also two bacteriological chambers, together with heating apparatus. The lectures and courses are very numerous. Professor du Bois Reymond lectures twice a week in summer on the first part of physiology, and in winter on the second part of physiology, with experiments four days a week. Professor Fritsch teaches histology comparative anatomy and microscopic work, Professor Kossel medical chemistry with experiments, and Professor Gad gives special courses on respiration, speech, and experimental work. Several special courses are also held by the other assistants.

Professor du Bois Reymond was born in Berlin in 1816, and was a pupil and assistant of Johannes Muller. In 1843 he published his work *On the So-called Frog's Current and the Electrical Fishes*, with a dissertation entitled, "Quæ apud veteres de piscibus electricis, extant argumenta?" In 1858 he succeeded Muller in the Chair of Physiology. In 1848 appeared the first volume of his chief work, *Experiments on Animal Electricity*. A number of further essays on electro-physiology followed. As Secretary to the Academy of Science, since 1867, he has had to deliver a number of lectures which has been recently published by Seit and Co., of Leipzig. From 1859 to 1877 he edited the *Archives of Anatomy and Physiology*, in conjunction with Reichart. Since 1877 he has been sole editor of the *Archives of Physiology*. In spite of his age, du Bois Reymond is still a most energetic worker, and in addition to his distinction as a physiologist, he is a leader of philosophical thought in Germany. As a representative of natural science, du Bois Reymond is considered to base his philosophical theories upon definite knowledge; in reality, however, they appear to rest on an absence of definite knowledge, that is, on agnosticism. "Ignoramus" is his invariable answer to all fundamental problems, and he often carries this profession of present ignorance still further by adding "Ignorabimus." Since his famous paper at the Naturforscherversammlung of 1872, he has employed himself in marking out the boundaries of our knowledge in various directions, putting up a *Welträthsel* whenever in his opinion the limit was reached. From one *Welthräthsel* he has advanced within a few years to seven, so that at last, with Haeckel one looks on with concern, wondering where he is going to stop. At the same time it would be interesting to know from what place, within the boundaries, the knowledge comes which has enabled the Professor thus to formulate his "Ignorabimus." A good feature of du Bois Reymond's system is its usefulness to the practical scientific student. Lange says somewhere, in speaking of modified materialism, that it may serve as a *Maxime der wissenschaftlichen Detailforschung*, words which exactly describe the possibility of usefulness of all philosophical agnosticism. As the physicist would never have got on if he had puzzled his head too much about the metaphysical meanings of force, matter, attraction, etc., so all along the line of scientific inquiry there are certain disturbing elements both under the stars and beyond them which must necessarily be excluded when special progress is to be made.

The Royal Charité Hospital of Berlin was founded in 1727, with 500 beds; in 1785 it contained 864 beds. In that year a new building, now called the Old Charité, was added; later still a lunatic asylum, and in 1834 a second building, the New Charité, was completed, which is now used for nerve cases, syphilis, and sick convicts. In 1836 was added an isolated small-pox department, which in 1854 was converted into a lying-in hospital. In 1856 followed the pathological institute, and in 1865 a spacious barrack for the surgical department, in 1877 the midwifery building, and in 1878 an additional surgical division. Since that time there have been added a washhouse, a gynæcological pavilion, and four isolated pavilions for diseases of children; one each for scarlet fever, measles, and diphtheria; and one for the doctors and nurses and any obscure or doubtful cases.

The old buildings are on the corridor system, with large painted wards, heated by means of earthen stoves, and ventilated through window lattice valves, Börnschen ventilation stoves, and suction through flues by means of gas burners, together with extraction shafts in the roof. The new part has all the modern hygienic arrangements, and is warmed by hot water, steam, and hot air, and has in conjunction with these central ventilation contrivances.

The Charité has now 1,800 beds, the average number occupied being over 1,600 daily. The number of cases treated annually in the wards is 20 000, with 570,000 days in hospital. The expenses amount to 1,263,500 marks (£63,175) yearly. The money paid by the patients is—for adults, 1s. 9d. daily; for children, 1s. 3d.; for lunatics from Berlin, 3s.; from outside 4s. daily. The Poor-law administration of Berlin has at its disposal the right of occupying beds on 100,000 days yearly, into which pauper or non-paying patients are sent.

The hospital, with its numerous departments, forms a small village, and only the most important of them can be mentioned in passing. There are three medical clinics. The first was founded in 1810, and has now about 155 beds; patients are seen from 11 to 12. Professor Leyden, the present head of the clinic, was appointed in 1885. He was originally a military surgeon; then he became professor and director of the medical clinic in Konigsberg; on the foundation of the University in Strassburg in 1872 he was appointed to the corresponding post there. In 1876 he succeeded Traube in Berlin. His best known publications are those on *Grey Degeneration of the Posterior Column of the Spinal Cord*, and on *Diseases of the Spinal Cord*. In 1879 he started the *Zeitschrift für klinische Medicin*, in conjunction with v. Frerichs.

The second medical clinic, which is under Professor Gerhardt, was originally established for diseases of the chest. The third, which has 84 beds, is under Professor Senator; the clinic is held on three days weekly, the Professor also holding a poliklinik (out-patients) on the other three days in the Dorotheenstrasse.

The surgical clinic, founded in 1816 especially for the training of military surgeons, now has 305 beds. It is under Professor Bardeleben, who attends daily from 9.30 to 11. The professor, who was born in 1819, was at one time assistant to Naegele at Heidelberg, and was called to Berlin in 1868. His most important work is the well known *Text Book of Operative Surgery*.

In addition to these there are clinics for lunacy and diseases of the nervous system under Professor Westphal; that for midwifery and diseases of women, under Professor Gusserow; for diseases of children, under Professor Henoch; for syphilis, under Professor Lewin; for skin diseases, under Professor Schweninger; for dis-

eases of the eye, under Professor Burchardt, etc. In addition to these, several polikliniks are held by the same professors.

Professor Gerhardt's clinic in the Charité Hospital comprises 180 beds, of which 110 are for male and 70 for female patients. All the bad or acute cases are placed together in two wards, which have nurses in attendance day and night. The more chronic cases, on the other hand, are placed together in wards which have no night nurses, and so these patients are not disturbed by the others. The taking in of patients is arranged so that all those cases which are considered by the receiving physician as acute or specially interesting are admitted into the clinical wards, while the rest are sent into a neighbouring division, some under Professor Frantzel and some under Professor Senator. Professor Gerhardt has four assistants; to two or these are entrusted the chemical, microscopical, and bacteriological examinations for the clinic; while the other two have charge of the patients, one looking after the men, and the other the women. One of these assistants is always a military surgeon (*Stabsarzt*, ranking as a captain). These two assistants have under them young military surgeons, the house-physicians, who look after the case-taking and have control of the prescribing and diet, etc.

The history and description of every case is entered in a case-book; the temperature is recorded at least twice a day; the respiration and pulse curves are marked on a printed chart. There is also a urine chart for every case, on which are entered daily the quantity, specific gravity, etc. For heart cases there is a form on which the pulse curve is represented. Every patient is weighed at least once a week; this is considered by Gerhardt as important in chronic, as the temperature is for acute, cases.

Great stress is laid on the dieting of patients, and cases of prolonged fever are no longer treated on the low diet principle. Thus, in enteric fever, abundant nourishment, and especially meat and mashed potato, is given, so that the severer scorbutic conditions which were once so common as complications of such cases are no longer seen. The mortality is now from 10 to 12 per cent. Professor Gerhardt's clinic is held daily during term time at 8 A.M. One or two patients are made the subject of demonstration. Owing to the large numbers attending the courses they are held in the lecture theatre, and not in the wards. Only once a fortnight does the Professor take the class (some 300 in number) into the wards, and then once more shows the recently demonstrated cases and describes the further progress of the disease. The course pursued is always the same. The Professor first gets as full a history as possible; then the case is examined. He then leads up to the diagnosis, and discusses the particular case and the disease itself in detail, ending up with the treatment. Special care is taken to choose for demonstration cases in which something definite can be shown, as a rash, an abnormal reaction of the urine, a pulse curve, or some special physical sign.

Great importance is attached to the chemical examination of the urine, of the contents of the stomach, and other subjects, and especially to bacteriological examinations, more particular for tubercle bacilli. The gonococcus is always looked on as very valuable as a help to the definite diagnosis of many somewhat obscure cases, especially those complicated with intractable rheumatic affections.

Typhoid is treated with cold baths, from one to six daily, as soon as the temperature exceeds 39° C. (102.2° F.); much attention is also paid to the position of the patient, with a view of pre-

venting, as far as possible, the tendency to pulmonary œdema, the patient being placed first on one side and then on the other. Nourishing diet is given, and alcohol is freely used. The bathing is stopped as soon as hæmorrhage from the intestine, or peritonitis, or thrombosis of the veins of the legs, etc., occurs. Simple gastric ulcer is treated principally by meat diet, carbohydrates (potato, sugar, etc.) and fats being avoided; the stomach is also washed out daily, or every other day.

Cases of pleurisy, with effusion, are kept in bed as long as any fluid is left. Gerhardt believes that the reason why we meet with so many badly-cured cases of pleurisy is because the patients are permitted to get up too soon. Cases of nephritis, in all its forms, are also kept strictly to bed. In both pleurisy and nephritis diaphoretic remedies are employed; in the former pilocarpin, and in the latter hot baths. Pneumonia, as soon as symptoms of failure or depression of the heart appear, is treated with strong alcoholic and other stimulants. Perityphlitis and peritonitis are treated with large doses of opium, together with ice or cold compresses on the abdomen; purgatives are prohibited as dangerous. If necessary an enema is administered. Cases of pulmonary tuberculosis, Gerhardt says, generally do badly in hospital, and he always recommends them to leave as soon as possible.

The assistants also give special courses of instruction on percussion and auscultation, laryngoscopy, etc., besides chemical and microscopical examinations, electricity, etc.

Professor Gerhardt was born at Speyer in 1833. In 1861 he became professor at Jena, and in 1872 was called to a similar position at Würzburg, where he remained until he became professor at Berlin in 1885. His principal publications are *Laryngeal Croup* (Tübingen, 1859), *The Position of the Diaphragm* (1860), *Textbook of Auscultation and Percussion* (1876), and *Textbook of Children's Diseases* (1880). He also contributed largely to the *Archives of Clinical Medicine.*

The clinic is provided with two laboratories—a microscopical and a clinical one—the former fitted up with two and the latter with four places, and both have a very complete set of new apparatus.

The Pathological Institute of Professor Virchow is situated in the grounds of the Charité Hospital. It was mainly constructed under the Professor's directions, and was opened in 1856. It is built in a central block with two end wings, and consists of a basement, ground floor, and two stories.

In the basement are the huts and stalls for the animals used for experiments, with rooms for washing and dressing the corpses. On the ground floor in the left wing are the directors' rooms, together with the laboratory, the research laboratory, curator's room, and third assistant's room. In the middle part of the building are the first assistant's rooms, the second workroom in which the specimens are prepared, and a small *post-mortem* room; and in the right wing are the rooms for clinical necropsies and surgical operations on the dead body, and a room for putting up skeletons, etc. On the first floor, in the left wing, are the chemical laboratories; in the centre is the larger lecture room with seats for 140, and a room for microscopical work; in the right wing there is a larger room in which the demonstrations and histological courses are held. On the second floor is the museum, with the collection of pathological specimens collected and arranged by Virchow himself. This is not open for the ordinary students but only for very special work, and then only with spe-

cial permission from the director. Since the addition of the pathological specimens from the old anatomical museum, the collection now contains more than 20,000 specimens. Virchow's famous anthropological collection of skulls is also here, awaiting appropriate place in the new museum. Attached to the institute is a small bacteriological laboratory, in itself one of the most perfectly arranged departments, consisting of four workrooms each for two men. These are fitted up with cupboards, gas, and water, a room for sterilisation and boiling of gelatine, etc., also a room for the thermostatic chambers, two photographic rooms, a store room, and a room for rats, mice, guinea-pigs, etc. This department is for men engaged in pathological work in the research laboratory who require to do any bacteriological work in connection with their pathological subjects, and not for pure bacteriological investigations. Attached to this department are the photographic rooms, both the Professor and his assistants being great adepts at photography.

The demonstrations on macroscopic and microscopic anatomy are given on Wednesdays and Saturdays from 8 to 11. The material used is taken from the necropsies of the previous days. The Professor discourses upon the preparations one by one, generally upon a few points at great length rather than upon a large number of smaller questions; illustrating his remarks with excellent drawings upon the black board, and giving a short description of the specimens as he proceeds. Each specimen is in turn then passed round, and his assistants prepare sections for the microscope, which are cut with a hand razor and double knife, and usually mounted unstained. Sections under the microscope follow the specimen itself round the tables at which the class sit. The tables are arranged in an irregular spiral, the microscopes travelling on lines which are sunk into the tables like a railway. From the arrangement of the tables the rails are continuous—that is, the microscopes started by the Professor at one end run the whole way round the class without being raised from the table, and thus follow one another in regular order as started.

On the other days the Professor gives regular courses of lectures on general and special pathology, illustrating them with specimens from the museum. Every Monday the Professor has a *post-mortem* course, in which he goes through all the steps in making necropsies. This is held in a special room with only limited accommodation, and so only a few students can attend at a time. In addition to these courses superintended by the Professor himself, there are various others given by the assistants. Thus, four times weekly, from 8 to 10 in the morning, Dr. O. Israel, the second assistant, takes the histological course. In this fresh tissues are examined according to Virchow's method—that is, sections are cut with a razor and double knife, and are examined, as a rule, without stains or reagents, except physiological salt solution, acetic acid, glycerine, iodine solution, sulphuric acid, and caustic soda. Each student prepares and mounts his own specimens. The necropsies are made by the assistants, of whom there are four, these being assisted by clerks. All the organs are kept from each necropsy until Virchow has seen them; he inspects them twice weekly —namely, on Tuesday and Friday afternoons. He then selects the important parts for the demonstrations, and after the course he picks out specimens to be preserved in the museum. The necropsies commence daily at 11 and are continued till 2 or 3 in the afternoon, the physician or surgeon of the case fixing the time when the necropsy is to be made.

The pathological laboratory proper or research laboratory is a

large room on the ground floor with places for 80 workers. In this the more advanced work is pursued, and usually by representatives of a great variety of nationalities. From a practical working point of view it is not well arranged, the light being defective and there is no arrangement for artificial light. During the winter months, therefore, the hours for work are short, and on dark days practically no microscopic work can be done. The other facilities for original work by advanced students, however, are immense, there being a superfluity of material. The superintendent of the chemical department is Professor Salkowski, who, besides delivering a regular course of lectures, gives daily instruction in physiological and pathological chemistry. There are four assistants—Drs. Jürgeus, O. Israel, R. Langerhans, and Hansemann. Dr. Jürgeus is Curator, Dr. Israel has written a manual of practical morbid anatomy, and the others have from time to time contributed various articles to Virchow's *Archives*.

Of Virchow's former pupils, the most famous are Professors von Recklinghausen (Strassburg), the late Professor Cohnheim, Professor Orth (Göttingen), Professor Ponfick (Breslau), and Professor Grawitz (Greifswald). Of these, Cohnheim started a school of his own, while von Recklinghausen has largely followed the lines of his master.

Professor Rudolph Virchow was born in the year 1821. He studied in the Friedrich Wilhelms Institute at Berlin, and then became Assistant Physician, and, in 1846, Prosector of the Charité Hospital. In 1849 he was appointed Professor of Pathology at at Würzburg; in 1856 he was recalled to Berlin, and in 1873 he was elected a member of the Akademie der Wissenschaften. In 1846 he founded with B. Reinhardt the well-known *Archiv für pathologische Anatomie und Physiologie*. Shortly afterwards he published, in conjunction with Leubuscher, a weekly journal, *Die medicinische Reform*. In this work, which was an attempt at the unity of scientific medicine, he revealed his true scientific spirit. Since 1851, Virchow has edited, now in conjunction with Aug. Hirsch, the *Jahresbericht ueber die Fortschritte und Leistunge der Medicin*. In 1854-62 he published his Handbook of Special Pathology. His chief works are his "Lectures on Pathology," the first volume of which is on cellular pathology; the second, third, and fourth volumes on tumour formation. Virchow has also published numerous articles, not only within the province of medicine, but also on anthropology and the allied sciences. The following may be mentioned as being of special interest "Four Lectures on Life and Disease;" "Observations on the Development of the Base of the Skull;" "An Essay on the Physical Development of the Germans;" "On the National Development and Significance of the Natural Sciences;" "The Freedom of Science in the Modern State," etc.

Almost as a student Virchow saw the absurdity of the "humoral pathology," and at the age of 30 he had already expounded the axioms of his "cellular pathology." If we actually realise what this means at a time when the structure of even the simplest tissue was but imperfectly known, we may understand the greatness of his mind. With a simple razor and a few chemical reagents, he analysed all the normal tissues, and in histology many discoveries still bear his name. At the same time he investigated all pathological structures. He thus became while still a young man the Father of modern pathology, and opened a new era of medical science. It is impossible to enumerate all Virchow's services in the many fields of medical science, but his work in hygiene and anthropology cannot be entirely passed over. He was one of

the first on the Continent to see the importance of good public sanitary conditions, and many classical essays on hygiene by his pen are to be found in his *Gesammelte Abhandlungen*. His researches in anthropology are sufficiently well known, and he may fairly be considered one of the greatest living authorities on this branch of science. There is, perhaps, no one who has so extensive a knowledge of anthropology proper as he has, and each year he travels to study the customs and habits of the inhabitants of different countries.

Ever since he commenced his scientific career, Virchow has been a keen politician. He has always defended and fought for constitutional principles, being an ardent admirer of English freedom, and was thus always a great opponent of Bismarck, who at one time had to fear the ascendency of his scientific rival. Later, with the establishment of a military government, Virchow lost all political power, but he kept true to his Liberal ideas.

Though a keen politician, Virchow did not neglect his duties as a teacher, which he performs most scrupulously. However late his public duties may have kept him out of bed, he is at his post on the following morning at the laboratory, where he remains till 5 P.M., or later, unless important business at the Reichstag or the University demands his presence. At the laboratory he welcomes every worker kindly, and after determining the subject of investigation he grants him all possible assistance in the procuring of the necessary material. He lets them work quite independently, but is always ready to examine anything that is shown to him, and criticises it with perfect sincerity. He never influences any of his workers, and admits freely into his *Archives* any matter, though it be in direct opposition to his own views. His advice he gives kindly to anyone, meeting him with a pleasant smile and shake of the hand. He is not, however, a man of many words, and, on account of all the manifold claims on his time, cannot afford to be disturbed about trifles.

Calling on him at his rooms at the Pathological Institute, one has to wait one's turn behind a screen which hides the Professor from the eye of the interviewer. This gives one a chance of examining his sanctum, which, to an outsider, appears to be a perfect chaos. Beside his desk, which is covered with papers of every description, we notice a small tray with his scanty luncheon consisting of a small bottle of beer and two sandwiches; he is a most frugal man while at work. The greater part of his room is occupied by a large number of skeletons and skulls, the floor being simply covered with the latter, through which one has almost to wade to the small table on which stand his microscope and histological instruments. We find here two very old Hartnacks, one furnished with a low and the other with a high power. These are the only microscopes he uses, and lovely lenses these old glasses encased in rusty frames are. Besides we notice a glass of water, a few glass rods, needles, scissors, and a common razor, and his five bottles of acetic acid, sulphuric acid, iodine solution, salt solution, and caustic potash. For he examines almost everything unstained and fresh, and is extremely skilful in cutting sections with his razor. He uses no microtome, and at most a piece of amyloid liver, into which he squeezes a small piece of tissue, in this way embedding it, if it be too small to cut it with the free hand. He despises even the double knife, and boasts of being able to make a section through the pons as good as any celloidin specimen. On another table we notice a beautiful modern microscope (Seibert) with all the newest improvements, oil-immersion, etc.; but this is under a glass case and serves simply for show,

being never used by the Professor. When showing him a histological specimen, it has to be taken to one of the Hartnacks and be described to him. After examining it carefully he at most may express his pleasure of seeing everything that has been described. He prefers to see an unstained specimen, except in cases of epithelial tumours, for which he allows staining.

In his dealing with men as a colleague or teacher, he is exceedingly fair, showing always his zeal for truth and unbiassed justice. At the same time he is very jealous of his own personal right, but, without any boast or pomp, being careful not to infringe on the rights of others. As he himself says, "the right of experience he places over and above any other right; and the conviction, that observation on correctly formed questions in each case must give an answer, has never tempted him to try the answer before the observation." The best characteristic of his great mind as a man may be formed in a few words quoted from his preface of the *Cellular Pathology:* "I insist on my right, and therefore I also acknowledge the right of others. This is my maxim in life, in politics, in science."

The Augusta Hospital was founded in 1866, at the instigation of the Empress Augusta, as a branch institution of the Women's Patriotic Association, and it was primarily intended for the training of nurses. The hospital, which was designed by Dr. Esse, the late director of the Charité Hospital, is built on the barrack plan, being the first of the kind erected in Germany. It contains 200 beds, including several small private wards for paying patients, together with an out-patient department. Medical and surgical cases of all kinds, except syphilis and skin diseases, are admitted; children also are received, there being a special department for cases of diphtheria. The medical staff consists of a physician and a surgeon, who give their services gratuitously. The surgeon has three assistants, and the physician two; there are also students who act as clerks and dressers. The report for 1888 states that during the year 2,152 patients were treated in the wards, of whom 1,265 were surgical. The number of major operations performed was 829, the mortality of this department being 5.52 per cent., the lowest yet attained since the foundation of the hospital. Among the deaths there were 2 from sublimate poisoning, and 2 from sepsis following operation. Fifty-two cases of diphtheria were treated with a mortality of 46.17 per cent. In the medical department 888 patients were treated, including 35 cases of enteric fever, of whom 26 are returned cured; 23 of pneumonia, 21 cured, 1 improved, and 1 carried on to the next year; 174 of phthisis, with a mortality of 16.6 per cent. Next in frequency was rheumatism, of which there were 41 cases all cured except 2, which were made out-patients. The principal remedies employed were salol, salicylic acid, benzoic acid, and their salts. Some interesting experiments have been made with regard to the tubercle bacillus. The dust from several Berlin hospitals and private dwellings has been collected and examined, and while in the dust from some hospitals bacilli were found, that collected from the Augusta Hospital was proved free from contagious power by inoculation experiments.

The surgeon to the hospital is Professor Küster. On the medical side Professor Senator has been succeeded by Professor Ewald, well known by his writings, especially his work on the digestive organs. He is also editor of the *Berliner klinische Wochenschrift.* Professor Ewald, in examining the condition of the œsophagus, attaches great importance to the sounds heard with the stethoscope

placed on the pit of the stomach. The sounds which accompany and follow the act of swallowing are normally two, viz., the first, *Spritz-geräusch* (syringe gurgle); and the second, or *Luft-geräusch* (air gurgle). The first has no diagnostic value and is often absent in cases of hysteria, etc. The second is of great significance, and when present denotes a normal contraction of the walls of the œsophagus; the absence of the sound signifies a stricture or obstruction of the middle or lower third of the œsophagus. In the operation of gastrostomy for œsophageal stricture he recommends that a very small opening should be made into the stomach with the cautery point, and a fine cannula inserted. The fistula afterwards enlarges sufficiently of itself. With regard to the gastric secretion, Ewald states that the secretion of hydrochloric acid is not a continuous act, and that there should be no free hydrochloric acid present in the stomach, unless it be reflexly excited by the presence of food in the mouth. Ewald speaks of three stages of normal digestion, as revealed by the accompanying substances found in the stomach: (1) Lactic acid; (2) hydrochloric and lactic acid, and (3) hydrochloric acid alone. This third stage should occur after one hour's digestion. Before removing the contents of the stomach, a "*Probe-frühstück*" (sample breakfast) is given, that is to say, a small definite quantity of white bread, eggs, etc., is given on an empty stomach, and, after a fixed interval, the contents are removed and examined. If, after removal, the contents of the stomach reveal the presence of an acid by reaction with phenolphthalëin, it must be determined if this be a free acid or only an acid salt. This is most readily done with one of the aniline colours, which change if a free acid be present. Thus fuchsin becomes yellow; methyl violet, blue, etc. Ewald has an elaborate set of tables of the percentages of various substances necessary to give the reactions. The best tests for free hydrochloric acid are tropæolin and Günzburg's reagent phloroglucin-vanillin. The routine examination of the contents of the stomach to determine the amount of acid present is carried out as follows: 10 cubic centimètres of stomach contents are taken and two drops of phenolphthalëin added thereto in a saucer. To this a standard 1 per cent. salt solution is added drop by drop from a graduated tube till the colour changes to red. The percentage of acid present is determined by the amount of salt solution added, the normal acidity being between 40 and 60 cubic centimètres of this graduated tube. In ulcer of the stomach a great excess of acid is usually present. Kussmaul pointed out that in carcinoma of the stomach the hydrochloric acid is deficient, and this appears to be also often the case in anæmia, Addison's disease, and most chronic affections. In most cases of carcinoma there follows, as a secondary degeneration, an atrophy of the mucous membrane, which lessens the secretion of hydrochloric acid. Lactic acid appears in the stomach during the first stage of digestion, very shortly after a meal, and before the hydrochloric acid appears; it normally disappears in about an hour. If present after this it denotes pathological changes—chronic gastritis, atrophy, etc. The most convenient test for this is Uffelmann's with perchloride of iron, which, with lactic acid, becomes yellow. Butyric and sebaic acid are not normally present in the stomach; they give a faint brown colour with Uffelmann's test.

With regard to pepsin and peptones, four are recognised—albumin, syntonin (parapeptone), propeptone, and peptone. These are analysed as well as the acids, the result often helping and sometimes settling the diagnosis according to their increase or decrease, as compared with the normal standard.

The absorptive power of the stomach is determined by giving iodide of potassium internally; this should be found in the saliva in from fifteen to twenty minutes. To ascertain the motor power of the viscus, a capsule of salol (1 gramme) is given, and the urine tested with perchloride of iron for salicylates. Another less convenient method is to give a definite quantity of oil by the mouth, and after a given interval remove the contents of the stomach and ascertain the quantity of oil still present.

Ewald also maintains that the intestines cannot long carry on the whole digestive process when the stomach is entirely disabled, but that marked changes soon arise, and he believes that pernicious anæmia is sometimes primarily of gastric origin, atrophy of the mucous membrane often following chronic catarrh.

The nursing in the Augusta Hospital is in the hands of the "*Frauen-Lazareth-Verein*" (Ladies' Nursing Association), and the nurses are all ladies of noble birth; the dresses are much the same as those used in our hospitals. The objects of this Association are (1) in war, the military administration of the nursing of wounded and sick soldiers, and their support by well-regulated private assistance; (2) in peace, the education of volunteer and paid nurses and the management of infirmaries by the collection of information as to improvements in hospital administration. The Association also keeps nursing *personnel* and *matériel* ready for active service in case of need. The Association has built an establishment for the education of nurses in the neighbourhood of the Augusta Hospital.

One of the finest hospitals in Berlin is that at Friedrichshain in the north-eastern outskirts of the town. It was opened in 1874, and is constructed entirely on the pavilion system. It cost £235,925.

The main building contains in the basement heating and disinfecting apparatus, and on the ground floor are the reception rooms, administration department, dispensary, consulting rooms, together with a library for the medical staff and a room for the attendants. Upstairs are the private apartments of the directors. Behind this block are situated twelve isolated pavilions at a considerable distance from one another. There are four two-storied pavilions, each with 64 beds for the medical division, and two two-storied pavilions with 64 beds, and four one-storied ones with 32 beds for the surgical department. There are also two one-storied isolation pavilions for infectious diseases (typhus, scarlet fever, etc.), each with 44 beds. In 1886 a special pavilion for diphtheria, with 26 beds, was erected.

Six of the pavilions are for men and six for women, the thirteenth being for children. Each pavilion forms a complete hospital in itself, and contains on each floor a ward with 28 beds, small wards with one or two beds for special cases, a day room, together with adjacent rooms and apartments for the resident sisters, attendants, etc. In the isolation pavilions there are only eight beds in each ward.

The ground floor is paved with special tiles manufactured at Mettlah, the upstairs flooring being of wood; the walls are oil-painted. The beds consist of an iron framework with straw sacking, Indian fibre mattresses, and horsehair pillows.

In each pavilion there is a medium pressure hot-water apparatus, the pipes of which are laid for the greater part in heating chambers under the ground, by means of which the ingoing fresh air is warmed. In the other buildings the air is heated by means of *calorifères* in the basement.

The diphtheria pavilion is provided with a low pressure steam heating apparatus, so that, if need be, steam can be freely ad-

mitted into the wards. The foul air is drawn out through suction chimneys, which are heated in winter by the warm air of the wards and in summer by the hot water from the baths. For the purpose of more thorough ventilation the double windows are provided with perforated overpanes, and the lattice-valve system is used, besides Firsl's ventilating system, which was applied here for the first time. In 1882 an operating theatre, together with a consultation room, was built, the fittings of which consist chiefly of iron and glass.

Opposite the main building is the administrative block, together with one, fitted up with steam, for washing and cooking, bath-houses, and deadhouse with two *post-mortem* rooms.

The number of beds in general use is 620. Of these, 572 are for adults and 48 for children; the number has been increased to 700 in times of emergency.

The expenses for the year 1888 amounted to 602,400 marks (£30,120). The average number of patients daily was 611, the amount paid by patients being 1.75 marks (1s. 9d.) for adults and 1.25 marks (1s. 3d.) for children.

The director of the medical department is Professor Fürbringer and of the surgical Professor Eugen Hahn. There are also 11 assistants, 2 dispensers, 45 nurses, 29 male attendants, and 12 probationers.

There are no regular courses of lectures at Friedrichshain, but post-graduate vacation courses are given by Professors Fürbringer and Hahn; these are attended by numbers of qualified men.

HOSPITAL REFORM IN BERLIN.

At a time when so much discussion is taking place in our various medical journals with regard to hospital reform, and especially the abuse of these public charitable institutions by a large number of people well able to pay a private medical man, it may be of interest briefly to summarise the state of affairs at present prevailing in Berlin as regards the principles of hospital support and the payment by patients. For the following notes of the subject I am largely indebted to my friend Dr. Claude du Bois Reymond. Until recently there existed innumerable private societies for health insurance, and the present scheme attemps to reorganise and centralise some of these.

The "Kranken-kassen-gesetz," (sick funds law), was passed a few years ago. This is an attempt to legalise and regulate some of the existing private and voluntary institutions of the nature of insurance companies and clubs. Many of these were often merely traditional arrangements, confined sometimes to single branches of handicrafts or professions, and sometimes to various societies of workmen, often founded on democratic principles by the labourers themselves or by the employers. These were essentially of two kinds the one embracing any number of men of very differen occupations, spreading sometimes over many towns, or even over the whole country; the other mostly restricted to the working men of a single factory or firm. The present law adds certain conditions and regulations to the statutory plans and ad-

ministrative principles of these societies, at the same time forbidding the reception of new members into any existing societies which refuse to subject themselves to these regulations, and thus leaving these to die out.

The law of Germany as it now stands is briefly as follows: Every man, woman, or child employed in profession, trade, or common labour—in short, everyone who is not in an independent position or belonging to one of the higher professions—must subscribe to one of the insurance funds above mentioned. Each one then receives a small book containing the statutes and a number of printed forms for his contributions. These are, of course, proportional to his wages, and range generally from 0.15 to 0.50 marks (1½ to 6d.) weekly. After the lapse of a few weeks he is entitled to the benefits of the insurance. Every week a receipt is added to the book. The employer generally retains the insurance money on pay day, keeps the books, and in most cases contributes an equal amount from his gains. In the case of illness the patient is examined by a "Kassenartz" (club doctor), and, if necessary, sent to a hospital, or, if only a mild case, is invalided from work for a few days.

In either case, after the third day the patient may draw from the sick fund a daily allowance of from 1.75 marks to about 5 marks (1s. 9d. to 5s.), the law being that the sum must not exceed half the individual's usual wages. If the patient be in a hospital this money goes to pay his expenses while there, 1.50 marks (1s. 6d.), being the usual minimum per day. Thus, generally, there will be a small surplus; this, if the patient has a family, goes to the wife during his stay in hospital. He is assumed not to have a wife and family if he is only earning very low wages, which give no surplus from hospital expenses. In the case of death a sum of from 60 to 100 marks (£3 to £5) is handed over to the nearest relative.

The liability of the sick fund to pay these expenses generally extends to one year. If, at the termination of that period, the patient is unable to resume work, he is made a pauper, and, if without means of support, falls to the charge of the "Armen-direction" (poor guardians) of Berlin, or of his parish or community, unless he be "heimathsberechtigt" in the place where he works. This is a charitable institution worked by the town government and supported by the tax-paying citizens. To a certain extent it is also supported by the charitable contributions of rich people and by bequests, but these are both very exceptional in Germany. The working expenses of this institution are very little, as all the higher posts are honorary.

The amount paid by the "Armen-direction" for a pauper is considered as a debt incurred by him, and he is made to understand that in the event of an improvement in his position at any time he will be called upon to refund these expenses. They continue to pay the hospital expenses or a small pension as long as necessary, or, if the case be incurable, provide a place for the patient in a hospital for incurables. Moreover, there are in most of the hospitals a number of "Freistellen" (free beds) founded and maintained by private or royal charity, and these are under the administration of the "Armen-direction," so that a certain number of pauper patients can be placed by them in a hospital free of expense. In most hospitals the arrangement is that they have the right of occupying beds on so many days of the year, and thus are not limited to the number of beds at any given moment in use, but have the right of so many "Pflegetagen" (nursing days), as their expression is.

At present the whole system is in an unsettled and transitory state, and will apparently remain so for some years, until the struggle for existence shall have eliminated some of the innumerable societies.

These changes are probably for the better in the end, though at present much discomfort and discontent exist, especially among the medical men, who, if not now salaried by the societies, are greatly embarrassed by the loss of their lower class patients. As it happens, but few men are salaried, and these are greatly overworked and underpaid. Immense sums of money are being stored up, and invested to serve as future capital, the idea being that in some not far distant period the whole will be self-supporting, and the working man's contribution will be reduced to a nominal amount. So the German doctors' outcry now is, "We are being bled to feed the population of the twentieth century.'