

**Notes on the University of Strassburg / by Walter K. Sibley and W. Soltau Fenwick.**

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**Publication/Creation**

[London] : Printed at the office of the British Medical Association, [1890]

**Persistent URL**

<https://wellcomecollection.org/works/r4w7rwp>

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# NOTES

ON THE

## UNIVERSITY OF STRASSBURG.



BY

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AND

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Reprinted for the Authors from the **BRITISH MEDICAL JOURNAL**, 1889-90.

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PRINTED AT THE OFFICE OF  
THE BRITISH MEDICAL ASSOCIATION, 429, STRAND, W.C.

NOTES

UNIVERSITY OF STANFORD

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## CONTENTS.

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*Strassburg; Laboratories; Library; Pathological Department; The Building; Necropsies; Demonstrations; Histological Course; The Professor of Pathology; Museum.*

*Surgical Clinic; Operating Theatre; Antiseptics; Dressings; The Professor of Surgery; Operations; The Wards; The Assistants.—Psychological Clinic.—Maternity Clinic; The Professor of Gynæcology; Laparotomies.—Special Clinics.*

*Medical Clinic.—The Professor of Medicine.—Diagnosis of Diseases of the Stomach.—Washing Out the Stomach.—Typhoid.—Bathing.—Feeding.—Opium.—Thermometers; Temperature, Pulse, and Respiratory Charts.—Stethoscopes.—Percussion.—Treatment.—Nursing.*

*Medical Students: Method of Study, Hospital and Ward Work, Lectures.—The Professors and the Students.—Assistants.—Bacteriology.—Vacation Courses.*

*Examinations: Maturität, Physikum, Candidatus Medicus, Staats-Examen. Lectures: Scholarships.—Title of Doctor.—Public Speaking.—Assistants.*

*The Physiological Chemical Laboratory; Construction and Arrangements; Blowpipe; Water-Vacuum Filter.—Library.—Professor Hoppe-Seyler.—Work in the Laboratory.—The Anatomical Institute; Construction.—Dissecting.—Professor Schwalbe.—The Medical Reading Room.*

*The Pharmacological Institute: Construction; Laboratories; Experiments on Animals.—Professor Schmiedeberg.—Dr. Jacobi.—The Physiological Institute.—Professor Goltz.*







## THE UNIVERSITY OF STRASSBURG.

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THIS picturesque old city has passed through many phases of change during the last few centuries. At one time under French, at other times under German rule, it has survived the conflict of many antagonistic principles. But in its present period of peaceful progress it opens the doors of its University to all who wish to study any of the branches of learning. The University buildings are the finest in Germany. The present University was founded by the late Emperor Wilhelm I, in 1872, the laboratories being constructed with all the most modern improvements. The Town Hospital is, however, a very old one, and one of the most picturesque buildings in Strassburg. The chief buildings are situated on the east side of the town, and consist of a magnificent central block, the Collegienhaus, with its halls, large public rooms, and sculpture gallery, together with a large, well-fitted reading-room, containing papers and periodicals of all nations, including all our own magazines of any standing, whether literary or scientific.

Adjoining this block are the laboratories for chemistry, physics, and botany, each in a building of its own; behind the latter are the Botanical Gardens, and near this, again, is the observatory. In this district also is the Institute for Zoology, Mineralogy, and Geology.

In the centre of the town, opposite the cathedral, is the extensive Town and University Library, containing German and many foreign books, which can be taken out and kept for a month under comparatively easy conditions; attached to this library is also a reading-room.

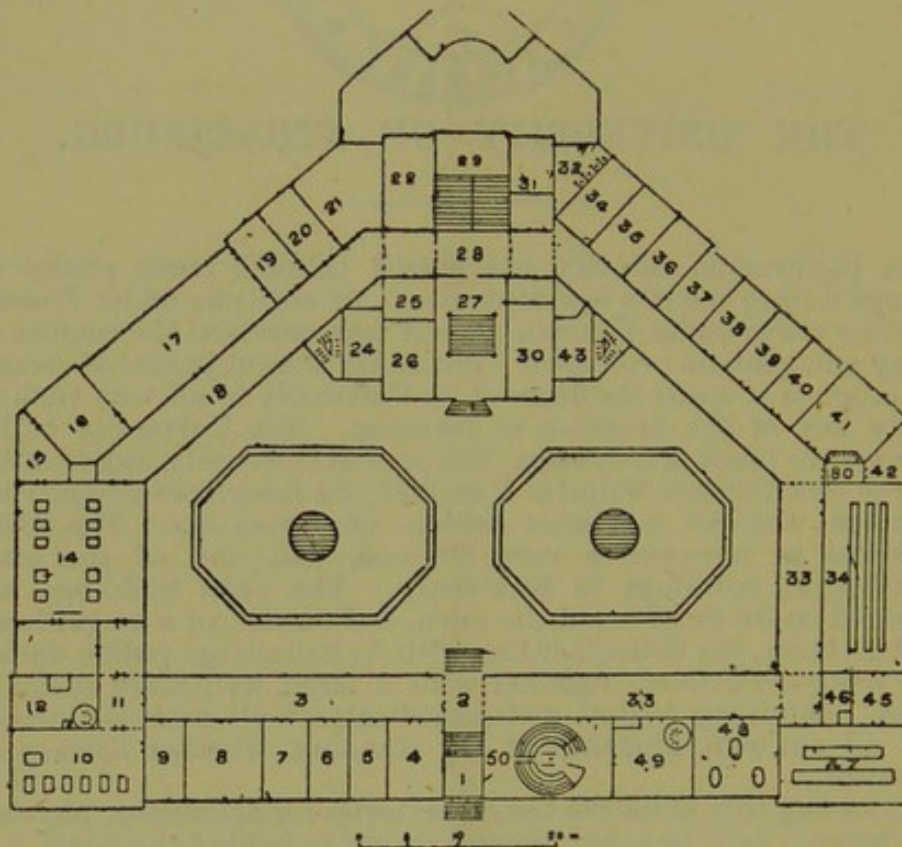
The Medical Department is some twelve minutes' walk from the University Buildings above described, and lies on the south side of the town. It is in the immediate vicinity of the old Town Hospital (*Bürger Spital*), and is made up of various subdivisions. A short description of the chief points of interest in the working of some of these will be given in this paper.

The laboratories form a group of buildings situated immediately within the line of fortifications, and close to the various "polikliniks." They include institutes set apart for physiology, pharmacology, anatomy, pathology, and physiological and pathological chemistry. The centre of this group is formed by the large two-storeyed building devoted to anatomy and pathology. The chief feature of the pathological department, as Professor von Recklinghausen is



always careful to point out, is that all the rooms are on one floor—lecture rooms, theatres, *post-mortem* room, research laboratories, students' laboratory, laboratory for bacteriology, the private rooms of the professor and of the assistants in the department, etc.—all opening to the right of one long corridor, the left side of which looks on a central inner quadrangle. The advantages of this arrangement in a pathological department are obvious, as constant cross ventilation is thus provided for.

Starting with the pathological department we ascend the steps at the entrance of the building, and turning along the corridor to the right, the first door leads into the clinical *post-mortem* theatre,

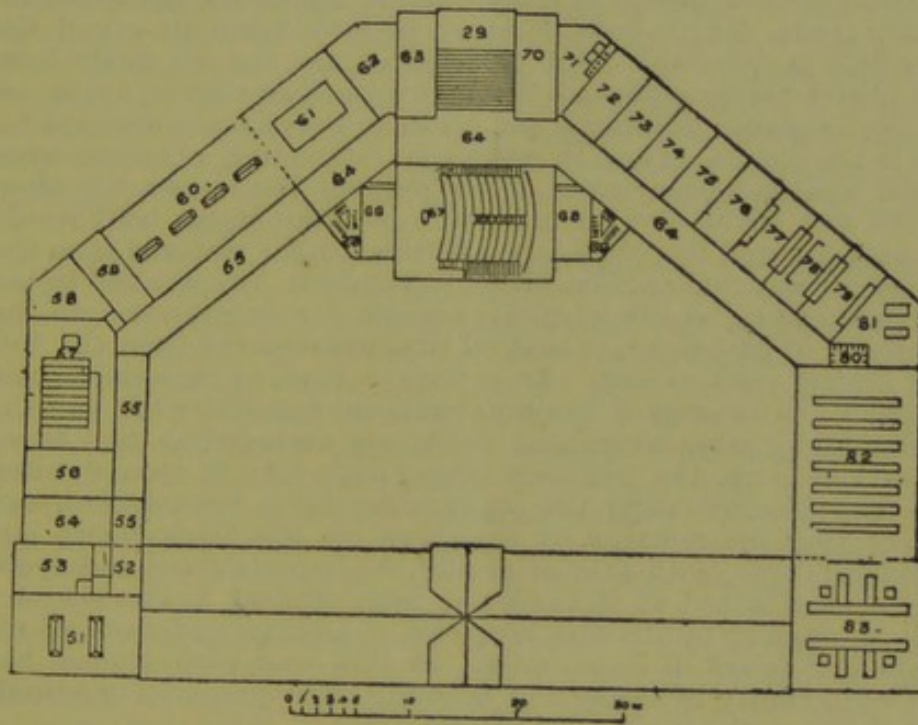


Ground Floor.

- |                             |   |
|-----------------------------|---|
| 1. Entrance                 | 26. Work room                           |
| 2. " "                      | 27. Entrance                            |
| 3. Corridor                 | 28. Main staircase                      |
| 4. " "                      | 29. " "                                 |
| 5. Reading room             | 30. Sitting room                        |
| 6. " "                      | 31. Work room                           |
| 7. Work room                | 32. Urinal                              |
| 8. Prosector                | 33. Corridor                            |
| 9. " "                      | 34. Workroom                            |
| 10. Smaller dissecting room | 35. Library                             |
| 11. Entrance                | 36. Director                            |
| 12. Corpse cupboard         | 37. " "                                 |
| 13. Director                | 38. Second assistant                    |
| 14. Larger dissecting room  | 39. Work room                           |
| 15. Anatomy attendant       | 40. First assistant                     |
| 16. First assistant         | 41. Spirit preparations                 |
| 17. Microscopical room      | 42. Instruments                         |
| 18. Corridor                | 43. Breeding room                       |
| 19. Laboratory              | 44. Lecture room                        |
| 20. Work room               | 45. Laboratory                          |
| 21. Repetition museum       | 46. Instruments                         |
| 22. Prosector               | 47. Laboratory                          |
| 23. Stairs                  | 48. <i>Post-mortem</i> room             |
| 24. Clerk                   | 49. Body room                           |
| 25. Glass chamber           | 50. Clinical <i>post-mortem</i> theatre |



where the necropsies are made of those cases which have proved of special clinical interest, and are therefore usually attended by the whole clinique (Professor Naunyn's). By the side of this is a second room for the reception of the bodies; this again communicates with a spacious *post-mortem* room with three tables, where the professor and his assistants perform necropsies, the work here often lasting the whole morning. To these daily *post-mortem* examinations the students, as a rule, do not come. Adjoining this, in the north-western corner of the building, is the main laboratory, which is open from 8 A.M. to 8 P.M. Here the students work when they like. Close to it is the class-room where the



First Floor.

- |                              |                               |
|------------------------------|-------------------------------|
| 51. Anatomical collection    | 68. Preparation room          |
| 52. Entrance                 | 69. Stairs                    |
| 53. Director                 | 70. Work room                 |
| 54. "                        | 71. Urinal                    |
| 55. Corridor                 | 72. Work room                 |
| 56. Library                  | 73. Glass chamber             |
| 57. Smaller lecture theatre  | 74. Work rooms                |
| 58. Preparation room         | 75. "                         |
| 59. "                        | 76. "                         |
| 60. Anatomical collection    | 77. Reserve collection        |
| 61. "                        | 78. "                         |
| 62. Second anatomy attendant | 79. Preparation room          |
| 63. Second assistant         | 80. Stairs                    |
| 64. Corridor                 | 81. { Pathological Collection |
| 65. "                        | 82. { Museum.                 |
| 66. Preparation room         | 83. }                         |
| 67. Greater lecture theatre  |                               |

demonstrations on morbid anatomy, and also the courses in morbid histology, are held. By the side of this class-room are the private rooms of the director and the two assistants, together with the library and bacteriological laboratory, and small laboratories for those engaged in special work. All these are heated by hot air. On the first floor is the pathological museum together with several small special rooms.

The various courses are presided over and almost completely worked by the indefatigable Professor von Recklinghausen. The *post-mortem* course is held once or twice a week, the students



doing the necropsies under the eye and direct guidance of the professor, who asks questions and demonstrates the morbid appearances, while two or more students are engaged in doing the dissecting. This course lasts from two to three hours.

The demonstration course of morbid anatomy, both macroscopic and microscopic, is held twice a week, and also lasts about two hours. The material for this is all fresh, all parts of interest being saved from each *post-mortem* examination and kept in cold chambers till required. The amount of material for these courses is very great, some 650 to 750 *post-mortem* examinations being performed yearly. Here the pathologist does not have to consider the sentiments of friends before a *post-mortem* examination is made, for the body of every patient dying in any of the hospitals is examined. Not only the organs, but all fluids from the pleura, peritoneum, and the various hollow viscera, are systematically placed in glasses, and bones and even limbs are kept for use in the course. Thus, in especially interesting cases, we wondered what had been buried, as not only all the viscera, but often skulls and limbs, and in cases of babies, the entire body would be passed round the class. In addition to the material from the *post-mortem* examinations, all parts removed by operation in the surgical and maternity hospitals are sent for examination to the professor of pathology, so that all tumours removed from the living subject are also seen. From time to time, as material comes to hand, the diseases of lower animals are demonstrated. All the organs and glasses containing fluids are arranged on zinc trays of various sizes, the professor taking each tray in turn, discussing and demonstrating the appearances for a few minutes, and illustrating his remarks by drawings on the black board, etc. Then each dish, with a label giving the important points for observation attached to it, is passed from student to student, and this is followed by the demonstration of sections under the microscope if they are of importance. In this way each student has the opportunity of seeing and handling every preparation according to the methods given by the professor.

The histological course is entirely given by the professor, who goes round from student to student and demonstrates to each individually. The professor generally remains throughout this course, which nominally extends over two hours, but often lasts for three; in fact, continues as long as any students remain to require help. The sections in this are nearly all cut by hand with a razor, many of them from the fresh tissue before it has been hardened or stained. The tissue being firmly held with the fingers against a piece of cork, or sometimes embedded in a piece of tough liver hardened in alcohol (amyloid liver being especially serviceable), is cut with a hand razor. Sections of fresh lung are sometimes cut with sharp scissors, when, on account of the elasticity of the tissue, it could not possibly be cut with a razor. The lung being held in the hand, and the area required rendered tense by placing the finger under it, a series of rapid sections are cut with the scissors from the tense surface. These methods, although it is exceedingly hard to cut thin, even sections, have many advantages over those in which a tissue is examined after it has become more or less changed by the action of hardening reagents, and then frozen before it is cut. With regard to the sections, the point most frequently urged by the professor, in opposition to what we are generally taught in England, is that we should not cut the sections too thin, as we must accustom ourselves to observe and examine tissues in more than one plane under the microscope. Of course, this only applies to fairly low powers, and could not be



practised with high ones. In this way our mental image of the structure of a tissue is much more accurate in detail than when we conceive of it in one plane only. Moreover, in this course a great number of fluids and tissues from different regions of the body are examined microscopically for diagnostic purposes, not only those taken from the *post-mortem* room, but also large quantities from operation and other cases occurring in the hospitals. Thus the student becomes acquainted with the characters and appearances of cells and other organic bodies under every possible condition, normal and pathological.

The regular lectures on pathology are given three days a week, in the afternoon, and special lectures, such as those on infectious diseases, and courses on bacteriology, are from time to time given by the first assistant, Dr. Stilling. In addition to these, on most evenings, the professor spends some two hours in the laboratory demonstrating to any students who happen to be working there. Microscopical work by artificial light is rendered comparatively untrying to the eye by the use of a blue glass placed over the ocular of the microscope.

The qualities of Professor von Recklinghausen as an original worker are sufficiently borne witness to by the innumerable references to his name that occur in pathological and medical literature. As a teacher his keenness of observation, together with his power of imparting knowledge, inspires the student with an enthusiasm for the science to which he devotes his life. His minute attention to detail, and patience in demonstrating to students of pathology, even the beginners, involve an expenditure of time and labour which but few in such a position would be found willing to give. Of a professoriate including such men as Goltz, Hoppe-Seyler, Schmiedeberg, Naunyn, and Lücke he is acknowledged to be one of the ablest and most indefatigable members.

The pathological museum here, as in most of the German universities, practically does not exist for the student, as it is always kept locked up. It is open, however, to the public for a few hours on Sundays. This strikes us as strange, for at home the students spend many hours in the museum, examining and reading up the specimens which they hope to recognise when they see them again in the examination-room; perhaps by the shape of the bottle or the arrangement of the glass rods in it, or by some other equally absurd sign. In Strassburg this time is no doubt more profitably spent in seeing fresh material than in puzzling over the probable original appearances or connections of prize specimens, faded by time and attempts at preservation.

For most of the acknowledged departments of medical science there are in Strassburg separate hospitals. It is intended to build a new general medical hospital, the medical wards of the existing hospital being old and behind the times.

The Surgical Hospital is built with two wings, one for male and the other for female patients, together with a central block in which are the children's wards. The hospital contains 60 male, 36 female, and 28 children's beds, making altogether 124 beds.

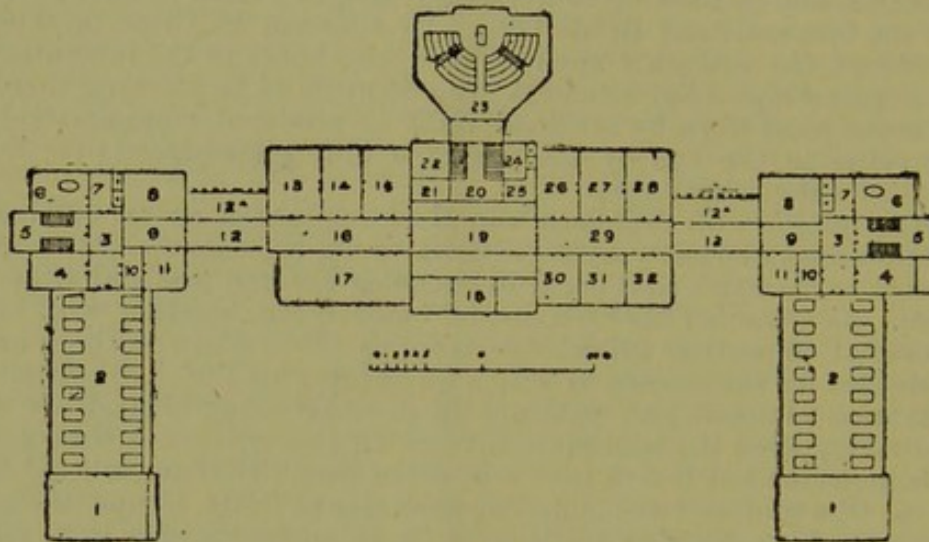
The operating theatre is immediately opposite the entrance hall on the ground floor; it is large and very well lighted, being built in the form of a semicircle, and fitted with seats extending nearly round the curve. The seats thus more or less surround the operating table, which stands on a tiled floor, the instruments being mostly kept in drawers and cupboards around.

The clinic takes place daily from 9.30 to 11 A.M., and consists usually of cases for operation, which are brought into the theatre, and, after being examined by a dresser, and discoursed upon by



the professor, are placed under an anæsthetic. Any cases of interest attending the polyclinic (out-patient department) are also exhibited and discoursed upon.

With regard to anæsthetics, chloroform is nearly always used, often preceded by a subcutaneous injection of morphine. Ether is seldom or never employed. The strictest antiseptic precautions are followed by Professor Lücke. The fluids for irrigation purposes—carbolic acid and corrosive sublimate—are kept in large vessels or irrigators attached high up on the wall of the theatre. These can be readily lowered by a cord passed over pulleys for refilling, each vessel having a long soft india-rubber tube, with a nozzle and stopcock at the end, so that a free supply is ever at



*Surgical Hospital.—Ground Floor.*

- |                 |                          |
|-----------------|--------------------------|
| 1. Day room     | 15. First assistant      |
| 2. Ward         | 16. Corridor             |
| 3. Corridor     | 17. Instrument room      |
| 4. Sister       | 18. Entrance hall        |
| 5. Stairs       | 19. Hall                 |
| 6. Bath room    | 20. Staircase            |
| 7. Closet       | 23. Operating theatre    |
| 8. Special ward | 24. Urinal               |
| 9. Corridor     | 26. Waiting room (o.-p.) |
| 10. Tea kitchen | 27. Out-patients         |
| 11. Nurses      | 28. „                    |
| 12. Passage     | 29. Corridor             |
| 12A. Balcony    | 30. Porter's lodge       |
| 13. Director    | 31. Assistant            |
| 14. „           | 32. „                    |

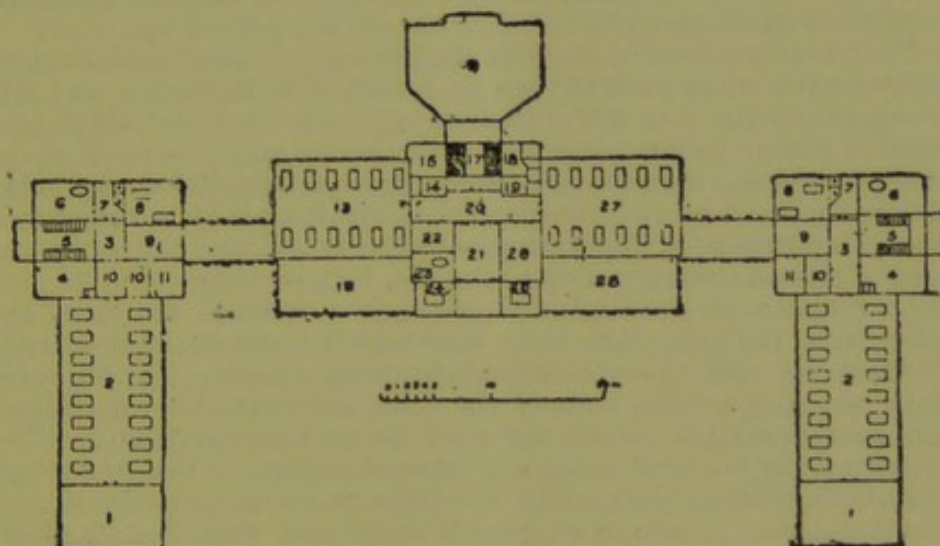
hand to wash out the wound when required, without moving the irrigators about the theatre.

The professor and his assistants are dressed in loose washing gowns, coming quite down to the toes, and, if the operation is likely to be accompanied by much hæmorrhage, a mackintosh apron is worn under the gown. Loose sleeves are dispensed with, and all have their arms bare to above the elbow. Much fluid is used for washing about the seat of operation, and, without any trouble being taken to catch it all in basins and trays, is allowed to flow over the operating table, where blankets and sheets are replaced by mackintosh and towels. Thence it flows on to the tiled floor, where it all rapidly drains off. In this way much labour and anxiety are saved, both to the operator and his assistants, as they have not to arrange a system of receptacles each time fluid is used for washing or disinfecting purposes; and the surgeon is not disturbed at every stage of the operation by having a sponge



thrust in his way to absorb excess of fluid. The view, moreover, is not unnecessarily interrupted, as it often is at home.

A very large amount of material is used for the dressings. Iodoform gauze is usually applied next to the wound, and, if necessary, stuffed into it; then many layers of soft bandage are applied, the whole dressing being generally surrounded by a few turns of starched gauze bandage. Thus a comparatively air-tight chamber is formed; the covering of starch being, however, thin enough to be readily cut with scissors, or unrolled when the dressings are changed. The bandages themselves are made of what is called *Mull-gauze*, which is very soft and light, and folded some three or four times. These mulls are often used to spread ointment on, and



*Surgical Hospital.—First Floor.*

- |                     |                       |
|---------------------|-----------------------|
| 1. Day room         | 15. Nurses' room      |
| 2. Ward             | 16. Operating theatre |
| 3. Corridor         | 17. Staircase         |
| 4. Special ward     | 18. Urinal            |
| 5. Nurses           | 19. Lift for food     |
| 6. Bath room        | 20. Corridor          |
| 7. Closet           | 21. Day room          |
| 8. Special ward     | 22. Tea kitchen       |
| 9. Corridor         | 23. Bath room         |
| 10. Sister          | 24. Special ward      |
| 11. Special ward    | 25. " "               |
| 12. Balcony         | 26. Sister's room     |
| 13. Children's ward | 27. Children's ward   |
| 14. Lift            | 28. Balcony           |

are then immediately applied to the wound instead of lint. The bandages are afterwards washed, and, after being sterilised by subjection to heat, are used over again. Occasionally a few turns of roller bandage are used to fix the dressings. Small bags made of these gauze bandages, often containing cotton wool, which when once used are destroyed, are substituted for sponges in cases with foetid discharges.

A large number of major operations are performed in Strassburg, and tumours are very frequent; at least, so it seemed during my stay there, especially compared with the experience of our London hospitals. Sarcomas of the limbs, comparatively infrequent with us, are here common. Professor Lücke, as is usual with German surgeons, is much bolder with his operations than we are; thus major operations are more frequently performed, and the incisions are comparatively freer, their extent not being considered of much importance, and thus the field is clearer. Professor Lücke has exceedingly good results with his cases, his care with



the dressings not ceasing in the operating theatre, but extending into the wards.

The wards are lofty, well ventilated, and clean, and all have a separate compartment at one end for the patients who are up to live and have their meals in. Small wards are also situated by the main ones for cases with offensive or infective discharges. Huge feather-bags are still used as a means of bed-covering instead of blankets; these must of themselves be a very ready medium for the preservation of germs. All the dressings, antiseptic fluids, and the like are arranged on a small table with two trays on wheels, which is rolled from bed to bed as the surgeon makes his round. Although osteo-myelitis appeared of frequent occurrence, we were never able to satisfy ourselves that many of the cases so described would not in England be called acute diffuse periostitis.

Fractures are treated more on the principle of mechanical extension by systems of pulleys than by means of rigid splints, and this is especially the case with children. Thus a fractured thigh in a child is put up in the following way: the leg and lower end of the thigh being enclosed in plaster bandages, an extension apparatus is thereby fixed to the limb. The whole limb is then raised in a vertical position at right angles to the trunk, and the extension cord is passed over a pulley above the bed, arranged so as to prevent rotation of the limb. Approximate weights are then applied, and the parts are thus maintained comparatively at rest, without any cumbersome bed sore-forming splints. At the same time, not only are the ends of the bone maintained in apposition, but every possible means are used to prevent shortening. The actual seat of fracture being left exposed to view, it can be readily examined without removing bandages or splints, so that if any rotation occurs it can be at once detected and remedied by altering the line of traction.

The hospital work is mostly done in the morning, the assistants commencing in their wards at 8 o'clock. The professor comes at 9, sees anything that is urgent in the wards, and commences his clinic at 9.30. There are four resident assistants, the senior having charge of the out-patient department, and operating in cases of emergency in the absence of the professor. The professor, assistants, and dressers all wear long washing aprons, both in the operating theatre and also in the wards. The nursing is performed by sisters with ecclesiastical uniforms, and by male attendants; in the operating theatre almost entirely by the latter.

Immediately opposite the Surgical Hospital is situated that for nervous diseases, including insanity in its many forms. This is quite new, and contains 120 beds. Here Professor Jolly gives very instructive clinics upon many cases of great interest.

Next to this building is the Hospital for Women, which has 58 beds for gynaecological diseases, and 40 for lying-in women. The laparotomies take place early in the morning in the large operating theatre, but to these the students do not come. Professor Freund is very strict in his antiseptics, and his methods of procedure are characteristic. Upon his arrival for an operation, the professor changes all his clothes, and takes a bath; then, dressed in clean washing trousers and loose gown, he commences the operation; the assistants and also any visitors present are requested to leave their coats outside, and are provided with loose washing gowns. Professor Freund is one of the most rapid and neat operators I have ever seen; he uses the cautery very largely instead of the knife upon all structures inside the abdominal cavity, and his results are remarkably good.

In addition to these there are the special hospitals. For ex-



ample, that for syphilis and skin-diseases, with 38 male beds, 12 for female skin-diseases, and 72 for female syphilis, making altogether 122 beds; the hospital departments for children, for the eye, ear, and so forth.

The General Medical Clinic is at present represented by 115 beds on the first floor of part of the old Town Hospital, which has in itself, apart from these beds set aside for the University, 127 medical beds in five wards, 109 surgical in four wards, together with 34 maternity beds. Many of these wards would correspond more to our infirmary wards, the arrangement between the two apparently being that during term time any cases of interest are admitted into the clinical wards, and during vacation the hospital and clinic take the cases as they come in turns.

The clinic itself is at 8 A.M., and consists, as in the surgical, of one or more cases being brought into the theatre and exhibited, that is, examined, demonstrated, and lectured upon. Patients are usually brought in with their beds by means of a very ingenious apparatus designed by Professor Naunyn, which consists of a stout iron frame on wheels connected with a lever; this machine is wheeled under the special bed in the ward, and then by pressing the lever the whole bed is at once raised off the floor and readily wheeled into the theatre. This saves distress to the patient such as would be caused by changing beds. Professor Naunyn, who has recently succeeded Professor Kussmaul, gives most excellent medical lectures on a genuine scientific basis. The following are some of the special points in the wards which struck us:

For the diagnosis of the condition of the digestive tract, such as the size of the stomach and—a point the Professor always lays great stress upon—the relation of tumours in the abdomen to the stomach or other part of the canal, the stomach would be distended with gas by giving acids and alkaline carbonates. At the same time or afterwards the colon is distended with water by means of a continuous enema, given by passing a tube a short way into the rectum, and attaching thereto a soft tube at the end of which is a glass funnel. By pouring water into this, which is raised or lowered at pleasure, very large volumes of water can be safely injected into the intestines. After this procedure tumours which at first were very obscure as to their exact seat are very clearly demonstrated, their exact relation to the stomach or colon being readily defined.

Professor Ewald, in Berlin, adopts what appears to be a still simpler method for diagnosis of the size of the stomach. He passes a soft stomach tube into the organ, attaching to the end of it compression india-rubber balls with a valve, and then slowly pumps air into the stomach. By this means the exact volume of air can be regulated, an advantage unattainable by the method of inflation by carbonic acid, and the air can be allowed at once to escape, if the symptoms require it, by opening the end of the tube. In like manner he also inflates the large and even the small intestine by passing a tube into the rectum, and in the same way pumps air into the gut as required, so that with care the seat of strictures or tumours in any part of the intestine can be ascertained, and of course the connections of tumours are thus clearly made out.

Washing out the stomach in cases of dyspepsia and even of gastric ulcer is very largely done. This is performed by a simple soft tube passed into the stomach, at the upper end of which a glass funnel is attached, the inflow and also the outflow being readily controlled by raising and lowering the funnel, which is held in the hand, and no pumping apparatus is required. The



contents of the stomach are then examined microscopically for sarcinæ and bacilli, and chemically for the relation between the amount of hydrochloric acid and pepsin present, etc., great stress being just now laid on these relations as a means of diagnosis. Thus, in some hospitals the contents of stomachs are examined almost as regularly as the contents of the urinary bladder; here a definite meal is usually given at a fixed time previous to the examination.

In puncturing for ascites usually a fairly large trocar is used. The patient is often sat up in a chair; puncture is nearly always performed in one spot, generally the left iliac fossa, and the fluid drawn off within a few minutes.

Gout is decidedly rare in Germany; nor do they appear to get cases of a mixed nature, such as those we speak of as rheumatic gout, where it is only by their reaction to drugs that we can express an opinion as to which of the two diseases is the more prominent.

Cold, in the form of the local application of ice-bags, is very often used, especially in heart cases, and also very largely in pneumonia. The ice-bags are kept in place by being suspended from a cross-bar of iron attached to the head of the bed; in this way the ice-bag is maintained in position without much difficulty.

Sputum and vomit are collected in glass jars, and thus can be readily examined from all sides.

Antipyretics are very rarely used by Professor Naunyn, antipyrin being generally given; antifebrin is considered too uncertain and risky in its action. Bathing is very generally pursued in typhoid cases; the bath is placed by the side of the bed, and there it apparently remains during the progress of the case.

Feeding with solid food is attempted very early in typhoid, and apparently is begun at once with beefsteaks, etc., and without any cautious prelude of rusks, custards, and fish. They appear to have a large percentage of relapses here, something over 30 per cent. we understood. Opium is not given so freely in typhoid as we have been accustomed to see it in London, from the belief that it causes paresis of the muscular walls of the bowels, and so much increases the accumulation of fæces and flatus. This accumulation is apt to give rise to extreme discomfort and danger to the patient, from the distension itself tending to produce rupture of weak points and hæmorrhage; and certainly we did not see cases of such extreme abdominal distension as we have seen in London, nor is the tongue usually so foul and dry.

Opium and morphine are given much more freely in cases of albuminuria than with us; in fact, in some hospitals in Germany the presence of albumen is not considered of itself to in the least contraindicate the use of these drugs.

With regard to thermometers, the Germans are ahead of us, in that they use for clinical purposes the Centigrade scale; but here they introduce confusion by using the Réaumur scale for the atmosphere and for water. Thus a patient with a given temperature Centigrade is placed in a bath of a certain temperature Réaumur, the two bearing no immediately obvious relation.

Very convenient charts, on which the temperature, pulse, and respiration are all represented together, are used. They are arranged as follows: a thick line, which represents the fever limit, is drawn, not through the normal temperature point,  $37^{\circ}\text{C}$ ., but through  $38^{\circ}\text{C}$ ., by which one understands that all temperature above this is genuine fever, and so allowances are made for idiosyncrasies and the like. Corresponding to this fever line, the pulse is given at 120, and the respirations at 40. The three curves are readily represented by ink, pencil, and blue crayon.



From this chart we can compare at a glance the relations of the three curves much more readily than when there is only a curve for temperature, and the others only represented by figures. A second thick line representing high fever is drawn at  $40^{\circ}\text{C}.$ , which also gives pulse 160 and respiration 60. Thus it will be seen that each degree of temperature on the chart is represented by 20 in the pulse rate, and 10 in the respirations, the base of the chart being respiration 0, pulse 40, temperature  $34^{\circ}\text{C}.$  This chart with slight modifications appears to be the most practicable, as it seems impossible to construct a chart on which the normal figures can be given together on any one line.

With regard to modifications used elsewhere, Professor Gerhardt in Berlin uses a chart in which, as above, the thick line is drawn at temperature  $38^{\circ}\text{C}.$ , and pulse 120, but he prefers a respiration of 50 and not 40; otherwise the chart is the same, the base of his being respiration 10, pulse 40, temperature  $34^{\circ}\text{C}.$

Along the top of both of these charts two lines are given for dates, the one for the day of the month and the other for the day of the disease.

Wooden stethoscopes are used, the binaural being practically as yet untried; but more frequently than with us the naked ear is applied directly to the chest; even here, however, this is done far less frequently than in Paris, where it is not usual to see a stethoscope used even for the heart, the reason, I suppose, being that a Frenchman invented the stethoscope. As in the case of thermometers, each nation uses that which was invented by the other, and despises that invented by their own countrymen.

Percussion is generally performed by means of a hammer and pleximeter; thus, though to a musical ear and for demonstrating to a class a sharper and more definitely-toned note is elicited, often much to the discomfort of the patient, that sense of resistance, which to the fingers of an experienced physician tells far more than the mere sound produced, is completely lost. That the pleximeter and hammer may sometimes be of service, especially in percussing for somewhat deeply-seated consolidation, is very probable; but for the general superficial percussion it is a mistake. Thus, for instance, slight enlargements of the liver downwards, which may be readily demonstrated by light percussion with the fingers, are completely lost with the pleximeter, the tympanitic note of the bowel situated beneath it being alone heard. It does not appear to be possible to percuss so slightly and superficially with the hammer as with the fingers. Thus, though well-marked differences can be more readily demonstrated by means of the hammer and pleximeter, slight and superficial ones are often missed.

After all that may fairly be said in favour of German universities and hospitals, and of the much more complete scientific foundation for medical knowledge which is found in them, not only among the professors and teachers, but also among the students, it must be admitted that their treatment of cases is often disappointing. This appears especially in regard to what we consider simple everyday remedies, but which are in many hospitals unrecognised. Thus, for instance, the application of a hot poultice to a part, with the primary object of relieving pain and local distress, is but rarely used, and, in fact, in the surgical wards, practically untried.

So, again, cod-liver oil in cases of phthisis and other chronic constitutional complaints, especially in children, is but very rarely given. We were much struck, also, with the non-administration of alcoholic stimulants (brandy, etc.) in many acute cases,

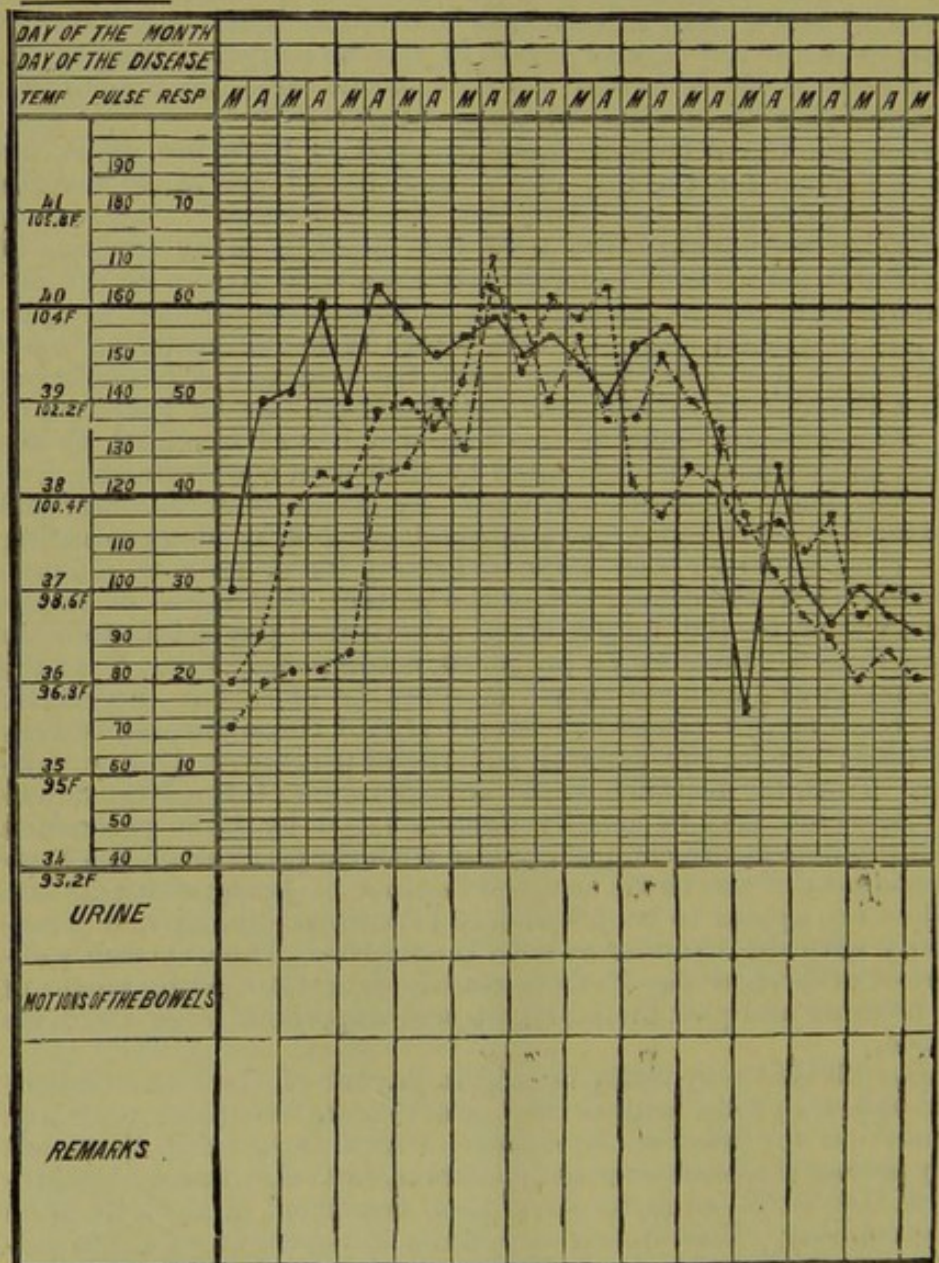


such as pneumonia, typhoid with prostration, where, according to general opinion in England, a few ounces of brandy sustain the pulse and save life in many a bad case. Here, if alcohol were given, it would be in the form of a thin red wine. We believe, however, that even with this method of treatment, the statistics would compare favourably with those of one of our special hospitals. In cases of acute disease (pneumonia, etc.) in young and

NAME \_\_\_\_\_

### *OCCUPATION*

ACE



Temperature, Pulse, and Respiration Chart.

The dark line represents the temperature curve. The line of dashes and dots represents the pulse curve. The dotted line represents the respiratory curve. The English equivalents of the German terms are given.

comparatively healthy subjects, when the pulse is hardly perceptible and running away at a great rate, in most of our wards probably the only, or at least the chief, prescription would be so much brandy every half hour; upon inquiry as to the treatment here,



we would be told the name and dose of some drug which very often we had never heard of before, but practically no alcoholic or other stimulant would be mentioned.

The system of nursing here, as we so often see in those hospitals on the Continent where the nursing staff are under the influence of the priests, and not of the medical men, is very rough and untidy. The wards are presided over by sisters in cumbersome uniforms, with heavy long cloth skirts and many voluminous appendages about the head and shoulders, who often appear to be rather absorbed in contemplation than attentive to the patients under their charge. Under these sisters are the so-called sick-nurses, who in their manner of action and appearance correspond very closely to the scrubbers of our hospitals. Nothing is more striking than the difference in the appearance and manner of the nursing staff in other German hospitals, where the priest has been replaced as controller by the medical man, and the ecclesiastical uniforms by neat washing dresses and white aprons. The change has now taken place in most of the hospitals in Berlin, especially we might mention that of Professor von Bergmann, and the magnificent hospital at Friedrichshain, where the appearance of the nursing staff is very similar to that of our own hospitals.

A large proportion of the medical students in Strassburg, now numbering over 400, are senior men. A student in Germany generally divides up his curriculum among two or more universities, and in this way he is enabled to work at each subject under the professor of his choice, provided he has money enough to be able to travel from one university to another. Thus a student may enter first at Heidelberg, and spend a few terms of merry student life in this most picturesque of European university towns; then when he settles down to work, he will come on to Strassburg, where the town itself presents but few attractions, but where he meets with men of a more serious turn of mind. It is not that there are no senior men in Heidelberg, but the large proportion are very young. In my opinion a German student realises the responsibilities of life at a relatively earlier period in his studies than an English student; but whatever may be said in favour of this opinion, he sadly lacks that "go" which characterises our own men, and after doing the many hours' work expected of him he is quite contented to spend the rest of the day sitting smoking, and drinking beer. Genuine sports are almost unknown, but of course those belonging to students' corps indulge in fencing and duelling, and after receiving the orthodox scar across the left cheek, have a photograph taken in a position to show it to the greatest advantage; but this distinction does not come to all. The students work more in the daytime and less at night than ours do; thus lectures commence comparatively early; in the winter the clinic begins at 8 A.M., and in the summer in many universities it commences at 6 A.M. daily; our own students find 9 A.M. early enough. This early work is entirely a matter of habit; so unless a student is working up for an examination (of which he has only two, unless he takes the M.D., when he has a third), he but rarely reads in the evenings. These he spends drinking beer, in the *cafés* in winter, and in summer in the numerous beer gardens, where he discusses with his friends many subjects of diverse interest, far more often talking over medical topics than is usual among our students in their hours of relaxation.

The professors make all their hospital visits in the morning, the afternoons being devoted to lectures and laboratory work, of which latter many students do many hours daily, quite apart from the set routine of the courses they are attending.



A German student, unless he is "amanuensis" (clerk or dresser, which post is not compulsory, and generally lasts one month, but may last longer), practically goes rarely into the wards of the hospital; he sees isolated cases in the clinic once, or occasionally twice, and that is all; he does not, as a rule, observe the condition of patients from day to day, or appreciate the changes in treatment from time to time, according to the condition and progress of the disease. In this way it is quite possible for a student to present himself in some universities for his final examination without ever having been inside the wards. The theory of medicine he learns perfectly in the daily clinic, but in the practice he has but little experience. Of course he attends classes on auscultation and percussion, and sometimes attends and sees patients in the out-patient department, where he accustoms himself to physical examination; but the daily observation of patients by the bedside is looked upon as a luxury to be indulged in by the few who become amanuenses or qualified assistants. On the professor's daily visit round the wards he is usually only accompanied by his assistants and any visitors who happen to be about. It is not that the professor never takes the students themselves into the wards, for occasionally the clinic is held in the ward instead of in the theatre, and then several special cases are shown; but then the whole crowd of students come, so that it is very hard to see or hear anything. The like, though in a more marked degree, applies to the surgical wards, which are here looked upon by the students as almost holy ground, to be trodden only by the feet of the professor, his assistants, and any other qualified men who may be about. We noticed that the student was not taught to cultivate his sense of touch to the same extent as in our hospitals; the application of the hands to the chest to elicit and appreciate differences of vocal vibration, etc., is not done as a matter of regular routine in the examination of patients. I believe this all follows from the excessive use of the hammer and pleximeter instead of the fingers in percussion, and the consequent tendency to substitute artificial means for natural ones.

To many of the lectures and courses the students come half an hour before time to get a front place, bringing with them books and papers, which they read till the professor comes in. When he appears there is no vulgar applauding, nor is there talking and joking during the lecture, nor did we notice students sleeping or reading books on other subjects to "kill the time," as may not rarely be observed in our metropolitan medical schools. Here the students attend the courses simply to learn and gain knowledge, and not to get "signed up," in order to be qualified to attempt some examination. Moreover, the professor lectures on his subject because he is interested and well informed in it, and not because, being a good anatomist, he has received a lectureship in botany.

The professors spend much time apart from their regular courses in working and giving individual attention to the students in the laboratory; so we might say that the chief demonstrator in the laboratory, as now in some of our own universities, is the professor himself. He often does little or no work for himself during term time, reserving all the special work he has in hand for the vacation. It follows from this that the professor is not assumed to be infallible, as he sometimes is at home; for he often learns much from discussions with the students, and is not ashamed to acknowledge it. This was certainly the case with the great master of pathology, Cohnheim, who, when convinced of the fallacy of some published theory at the hands of a simple student,



would renounce it completely and publicly. Thus, though the professor in theory lives in a different sphere of thought from his pupils he, nevertheless, in the body dwells and lives with them.

Having distinguished himself as a student and obtained his qualification, the medical man may apply for the post of assistant (that is, house-surgeon or house-physician) to one of the professors. These appointments are given by the professors to whom the application is made, and are more or less indefinite in their duration. Thus an assistant may only hold the post for a few months, but generally he continues for some years, even as many as six or ten; in fact, he remains until he has obtained a better appointment or goes into practice. While assistant every facility is given to him for doing original work, as all the hospitals, and, in Berlin, most of the polyclinics or dispensaries, are provided with a well fitted-up laboratory, most of them having complete bacteriological apparatus. Thus, during the time of his work in the hospital, the assistant may be carrying out some original research either in chemistry or in bacteriology. I believe that in all our great London schools for the education of students, and for the advancement of that part of science of which we, as Englishmen, are so proud, there are but three which even profess to have attached to them any bacteriological apparatus, or which offer any means whatever for the future British medical man to attempt to understand something of what he hears of the results of experimental research in other countries. Of these three only one has any organised system of instruction connected with it, and this was practically started and worked by a private person apart from the hospital staff.

In the larger German medical schools between sessions they have vacation courses for doctors in practice (our post-graduate courses which are now being established are of the same nature). These courses occur several times a week, and last for a month to six weeks; they are chiefly attended in the special branches, such as diseases of the skin, eye, ear, and so on. To these courses medical men of all nations come, together with several German doctors; in fact, most Germans attend several of the special courses at intervals during their professional career in order to keep up their work. Often quite senior men still attend; thus, in one course we lately attended in Berlin, a medical man of over 80 years was frequently present.

The system of examinations in Germany is simple, there being but one qualification given by the State. The examinations for this are held in all the universities, and are practically the same throughout the country. A student commences medicine after passing his final school examination, the *Maturität*, which he usually does between the ages of 18 and 21. He then joins some university, after having matriculated, that is, paid a small fee and filled up some papers of the university in which he intends to study.

There are two semesters, or terms, every year, a winter and a summer. After four semesters a student generally goes in for his first examination in the *Physikum* or *Vorprüfung*, in anatomy, physiology, physics, chemistry, botany, zoology, and mineralogy. The examination is entirely *viva voce*, lasting some three hours, about half an hour being devoted to each subject. In this examination no papers are written, nor is there any practical work; thus, for instance, in anatomy no parts or even bones are shown. Although a student is supposed to take all the subjects at once, it appears possible to take most of them separately. If he is plucked in any subject, he takes this up again after an



interval of at least six weeks, unless he fail in anatomy or physiology, in which case he must take the whole examination again.

Until a student has passed this examination, he devotes the whole of his time to the subjects set, and does not trouble himself about clinical work. Having passed this the student, who before was designated as *Studiosus Medicus*, is now *Candidatus Medicus*, and a student, who has passed his *Physikum*, is much offended at being addressed as "student" instead of "candidate," and he has the latter title printed on his visiting cards.

A candidate now prepares himself for his final examination, working in the various laboratories and hospitals, in which, generally towards the end of his time, he becomes *amanuensis* (clerk or dresser). This post he holds for a month, but he may occasionally hold it for two months, and may, of course, be *amanuensis* first in the medical and then in the surgical wards, or *vice versa*.

The student goes to lectures or not, as he likes. He has to take out and pay fees for definite courses, but no record is kept of his attendance, nor has he periodical examinations or prize examinations unless he is one of the holders of scholarships, who have to do satisfactorily in periodical examinations in order to retain them. Thus, if a candidate holds a money scholarship and ceases to keep up his work, the scholarship is withdrawn—a very good plan, for we so often see in England men with scholarships obtained upon first commencing their curriculum who never do good work afterwards, the scholarship holding good for three or four years without any conditions as to what use the student makes of it.

Some nine semesters, that is, four and a half years after commencing medical studies, or two and a half years after passing the first examination, a candidate may present himself for his final or *Staats-Examen*, which consists of the following subjects, each forming a part or section by itself:—1, Anatomy; 2, Physiology; 3, Pathological Anatomy and General Pathology; 4, Surgery and Ophthalmoscopy; 5, Medicine; 6, Midwifery and Gynaecology; 7, Hygiene.

It is possible for a candidate to pass in all these sections in four months, but most take six months over it, and each consists of written, practical, and oral parts. Each section is done separately, and a candidate must finish one section before he proceeds to the next. As each section takes about two weeks, the candidate often has to wait some days between the various sections. We will proceed to give a condensed programme of the various parts of the *Staats-Examen*, together with an outline of the method of conducting the examination itself.

I. *The Anatomical Examination*.—1. To dissect out one of the chief cavities of the body, and to demonstrate the parts and relations, or to expose and describe topographically a region of the trunk or of an extremity. 2. To demonstrate one of the anatomical preparations dissected by himself, and then to give a disquisition upon a subject from osteology, and also one from the digestive, nervous, or vascular systems. 3. To prepare and explain a microscopical anatomical preparation, and to mount a histological one.

II. *The Physiological Examination*.—To discourse upon two given physiological subjects.

III. *The Pathological Anatomy, and General Pathological Examination*.—1. To make a *post-mortem* examination, and to write a description of the same. 2. To describe one or more pathological



anatomical preparations, and then to discourse upon a subject from general pathology, and from pathological anatomy.

IV. *The Surgical and Ophthalmoscopic Examination.*—This consists of four parts, three in the surgical, and one in the eye clinic. A. 1a. To examine in the presence of the examiners, on two successive days, a patient, and to state the general outline of the case, together with a plan of treatment, and to record the case at once in one of the books; to write at home on the same day a critical essay on the case, which is to be given to the examiner the next morning. 1b. For the next seven days to visit the patient at least twice daily, and to write out a clinical journal of the case with notes as to progress and treatment. If the patient should die in the meantime, he must be present at the *post-mortem* examination, and write out the results. During these days he is also examined on other cases. 2. To give a disquisition on a point of operative surgery, and to discuss orally the value of some general method; to perform an operation on the body, together with ligature of an artery, and to show his knowledge of the instruments. 3. To give a disquisition on the bones and dislocations; to indicate the procedure on the dummy, and to bandage according to the rules of the art. B. To examine an eye case, to write it out fully and finish it at home, to watch and treat the case under the direction of the examiner, and to note the progress of the case for three days; also to be examined in other eye cases.

V. *The Medical Examination.*—1a and 1b. The same as in the *Surgical*; he is also examined in diseases of children and the nervous system. 2. To write a discussion on some medicine, and orally to give the maximal doses of given drugs.

VI. *The Midwifery and Gynecological Examination.*—1a. To examine and attend a woman in labour in the presence of one of the assistants, to state the prognosis and probable course of events, and within twenty-four hours to write a critical essay on the case. 1b. To visit the patient for the next seven days, twice daily, and to note the progress of the woman and child; during this time to show a general knowledge of pregnancy and diseases of women, and in case of the death of the patient to write out an account of the *post-mortem* examination. 2. To show a knowledge of the operations, and to diagnose the presentations on a dummy.

VII. *The Hygiene Examination.*—To discuss orally two given subjects.

Having passed these two examinations, the *Physikum* and the *Staats-Examen*, he is a qualified practitioner, and entitled to call himself *Praktischer Arzt*.

If a medical man wishes to become *Doctor*, he must pass another examination for this degree, which examination is not so hard as the *Staats-Examen*, but costs more money; for this he has a thesis to write. Here again he can take his M.D. in whatever university he pleases, not necessarily in the same where he has passed his final examination. This is usually done after the *Staats-Examen*, but in the universities of Prussia he can do it before if he wishes.

The *Staats-Examen* takes place, as we have seen, in the various universities, and generally the professors of the same universities are the examiners; but this is not necessarily so, the examination itself having nothing whatever to do with the university, but with the State. It is thus fairly uniform in severity.

It is quite different with the degree of *Doctor*, which is given by the university under conditions agreed upon by the several



universities separately, the main item for the degree being a thesis which is supposed to consist of original work; but here the boundaries of original work are very broad. Thus the thesis often consists of some statistical matter or the like. Having written a thesis, he must get one of the professors of the university to pass it; the candidate must then get it printed at his own expense, and a copy has to be sent to every university throughout Germany. The rest of the examination is generally purely formal, and consists of a short friendly discussion over the thesis.

The fee for the degree varies in the different universities from 300 to 500 marks (£15 to £25), and the cost of printing the thesis adds about another 200 marks, but this may be often considerably lessened or even avoided when it is accepted by one of the various medical journals, and therefore printed by them.

Special arrangements are made by the different universities for foreign medical men wishing to take their degree, the two fixed items being the fee and the thesis.

In Leipzig there appears to be a special arrangement by which foreign practitioners can do the *Staats-Examen* and *Doctor-Examen* together. The M.D. degree in itself without the *Staats-Examen* is no qualification, and the possessor of it cannot call himself *Arzt*.

The striking feature of the German examinations as compared with ours is the absence of written answers to set questions. A list of short questions to be answered on paper is unknown here, not only in the universities but also in the elementary schools. The examinations are almost entirely oral, nor do they consist of yes or no answers to catchy questions, where the number of correct answers given is in proportion to the good luck of the candidate.

Whatever are the failings of a German student, he undoubtedly learns to speak—a faculty which is sadly conspicuous by its absence in the majority of our students; in the examinations he has to discuss or speak upon a given subject for about half an hour, and this he has to do in every section of the examination, though, of course, he may be interrupted and questioned by the examiner in the middle of his speech. The result of this training is that every medical man in Germany can speak, and generally does upon every possible occasion. I am sure that this preliminary training in speaking would, if introduced to a greater degree into our teaching, be exceedingly beneficial. The system we often saw pursued in some of the wards in Paris struck us as very good; the professor, his intern and externs (assistant and clerks), would separately examine a case and give a short discussion upon it as to signs, diagnosis, and treatment. This would be gone over in turn, first by the clerks, then by the assistant, and afterwards the professor would criticise both, each giving his reasons for diagnosis and for treatment. This is done upon every new case admitted into the hospital, so that every clerk becomes well accustomed to discuss cases at the bedside with his colleagues and his superiors. But I believe this principle may be carried too far, so that in after-life, when once started upon a subject, the individual never knows when to stop. We have often observed that it is very hard to get a short, concise answer to a simple question out of a German. He must always make a small speech upon it, and, although this must be very good for the memory, it is often burdensome to the hearer. Thus, in asking a definite question we can obtain no answer without first hearing a few pages of some textbook practically repeated by heart; we noticed that many of the senior students were unable to give an opinion upon any given case,



but were most fluent in particulars of cases of a somewhat similar nature that they had read of. Here speaking aloud is carried somewhat too far, while with us it is completely neglected. Advanced as the Germans are in most of their systems of education, none of the universities or examinations are as yet open to women. Women here are still treated as inferior animals, and debarred from most of the higher intellectual paths open to the other sex.

Situated on the east side of the pathological laboratory, and separated from it by a large grass enclosure, is the fine institute of Professor Hoppe-Seyler. Planned by the professor himself, and fitted up with every convenience for the pursuit of the science of physiological chemistry, this laboratory offers, perhaps, one of the greatest attractions in the whole University to a man seeking opportunities for original research. The building itself consists of a long central block and two large wings, the latter containing the laboratories. The main entrance is situated in the centre of the building, and there is a private door in each wing allowing of direct access to its laboratory. A long passage runs the whole length of the central block, and serves as a means of communication between the two laboratories and the various rooms upon the ground floor.

Passing in at the main entrance, and proceeding along the passage to the left, we notice in succession the lecture theatre, the storeroom, the professor's private laboratory, the *bureau*, and lastly, the special laboratory. This latter is a fine room, situated in the north wing, and offering accommodation for a dozen investigators. The benches are about eight feet long, and are arranged parallel to each other, a convenient amount of space being left between them. Each bench is supplied with its own set of reagents, several lamps and burners of various shapes and sizes, and an excellently arranged water supply. Beneath it are numerous cupboards and drawers, where any special apparatus or material can be kept under lock and key.

Between the large windows are numerous shelves containing the more rarely used reagents, while each corner of the room is occupied by a stink-cupboard of considerable dimensions, and the whole room is warmed by hot-water pipes and excellently lighted.

Among some of the appliances in general use is a large blow-pipe, worked by hydraulic mechanism, by means of which a platinum crucible can be maintained for almost any length of time at high temperature, without the necessity of any exertion on the part of the operator. The waste heat of the water pipes is utilised in warming a series of small metal chambers, an arrangement exceedingly convenient for the drying, or maintaining at a uniform temperature, of precipitates or other manufactured material. Attached to the laboratory are several smaller rooms, some of which contain the glass and porcelain, and others the metal apparatus for use in the special laboratory. In one of these there is a large water-vacuum filter, the pipe from which, some thirty feet in length, passes through the flooring into a cellar. The advantage of this method of quick filtration is obvious; instead of being obliged to wait hour after hour while a tenacious fluid is slowly filtering, one has merely to connect the tube of the bottle with the filter, turn on the water, and in a few minutes the operation is satisfactorily performed. In addition to this large filter for general use, each bench is supplied with one of a smaller size, capable of being connected or disconnected at pleasure.

The library is a large and well-lighted room, situated upon the first floor, and immediately above the special laboratory. It contains an extensive and valuable collection of works upon che-



mistry and physiological chemistry, as well as most German and foreign periodicals relating to the science, these latter being regularly bound and arranged in series. The room is always open for study, and with the permission of the first assistant, books may be borrowed from it for a week or more. Adjoining the library is another large laboratory set apart for the study of practical hygiene; here demonstrations are given twice a week by the professor, and are largely attended by men from all parts of the empire.

The "general laboratory" is situated in the southern wing of the building and, though considerably larger, is fitted up in exactly the same manner as the special one. It is here that the student works daily during his fifth or sixth *semester*, the practical work being regulated by a definite scheme, and corresponding weekly with the subject of the lectures.

Beneath the ground floor are a series of cellars, some of which are used for preserving material at a low temperature, while others again are fitted with numerous forms of stoves, by means of which specimens may be maintained for weeks or months at a definite temperature, without lumbering up the laboratory with cumbrous apparatus.

The special laboratory is open only to those who are pursuing some original line of work, either of their own choosing or selected for them by the professor; hence to obtain a place in it it is necessary either to get the professor's approval of some original scheme, or else to accept and work out a subject suggested by him; a small fee to the laboratory and the matriculation fee to the University being sufficient to cover all the ordinary expenses. During the whole period of work the professor is always ready to demonstrate and to help any pupil to the utmost of his ability, and no day passes in which he does not personally inspect the progress of each individual piece of work. At the completion of the study, the student lays his results before the professor, who considers them and, should they be worth publishing, will suggest the scheme of the article. When it is finished he will himself revise it and often attend to its publication, either in his own *Archives for Physiological Chemistry*, or in some other scientific journal.

Situated, as the laboratory is, in close proximity to the hospital and *post-mortem* room, from both of which material can be obtained to any extent, the opportunities for original work in connection with the important relations of chemistry to medicine and pathology are unbounded, and we should doubt whether similar opportunities could be found in any other university in Europe.

The general laboratory, as before mentioned, is set apart for students commencing the study of physiological chemistry; but it is also available to strangers, on condition that they matriculate. This is a mere question of paying a guinea, unless they have previously matriculated in another university, in which case it is half a guinea, with the addition of the laboratory fee of about 40s. The first assistant, Dr. Thierfelder, is always present to give personal instruction, and the professor himself daily inspects the progress of each student, and explains any special difficulty that may arise. Since the day, now nearly thirty years ago, when he established the first physiologico-chemical laboratory in Germany, Professor Hoppe-Seyler has been the acknowledged leader in a science which he may almost be said to have founded; hence any attempt to describe his position in the scientific world might well seem superfluous. Not only, however, as an author, but also as a



teacher, is Professor Hoppe-Seyler undoubtedly pre eminent; always genial in manner, and never considering his time too valuable to help a pupil, even in the most trivial mechanical details, it is not to be wondered at that his name should be so popular and respected among the students as it is among those who can estimate more fully the benefits he has conferred upon the scientific world.

Well received as strangers always are in the University, the kindness of Professor Hoppe-Seyler towards Englishmen is almost proverbial there. Himself a thorough student of English literature, he welcomes and helps to his utmost ability any man coming to him with a determination to do good work, and, it may truthfully be said that no man has ever left him without having deep cause for gratitude to, and profound admiration for, one who may well be considered one of Germany's greatest men.

Space will permit only of a very brief note of the anatomical institute of Professor Schwalbe. Forming, as has already been described, the other half of the pathological institute, the two have a large common lecture theatre. The general construction, as seen by reference to the plan given in speaking of the pathological department, consists of a larger and a smaller dissecting-room situated in the south-east angle of the building, the two being in free communication, while a series of smaller preparation rooms, together with those of the director and his assistant, lie on either side of these. The chief feature of the dissecting room is that it is lighted by numerous side windows, and not by skylights, so that the students sit in the windows and dissect. There is an almost unlimited supply of material, and so the parts are separated as early as possible, and each after the day's work is placed in a large tank with spirit. With the parts themselves, only one is used for one system; thus the arteries are dissected out in one arm, the veins in another, and the nerves in still another, and finally, the muscles and ligaments in a fresh one. The viscera, both thoracic and abdominal, are taken out *en masse*, and then dissected. Professor Schwalbe and his assistant, Professor Joessel, are always present demonstrating personally to the students. Of the painstaking attention of Professor Schwalbe, it is superfluous to write, and his name is too well-known among anatomists to make it needful to praise his work. Anatomical literature, especially that relating to the nervous system, bears ample testimony to his fame. Numerous models stand about for the students to study and work at, as well as a series of frozen sections of different regions of the body, for the demonstration of the intimate relations of the parts.

While Professor Schwalbe gives a course of lectures, and takes charge of the men who are dissecting the muscles, ligaments, viscera, etc., Professor Joessel gives lectures on topographical anatomy and practical instruction in neurology and angiology.

We must not leave this institute without mentioning the medical reading-room situated on the ground floor, where the current numbers of the chief medical and scientific papers of every nation can be read. This is open to the students from 8 A.M. to 8 P.M., and on Sundays during rather shorter hours.

The last laboratory of the group, situated behind and to the south side of the *Bürger Spital*, is the Pharmacological Institute of Professor Schmiedeberg. A short description of this will doubtless be of interest to our readers, inasmuch as there does not exist in any of our English medical schools or universities a laboratory of a like nature or one used for a similar purpose. Built of the same kind of rough stone as the others, this labora-



tory is a large square building, whose main entrance immediately faces the southern fortifications of the town. Upon the ground floor we notice the lecture theatre, a fine room lighted by electricity, and affording accommodation for an audience of about 200. Adjoining the theatre is the *Vorbereitungs Saal*, a kind of pharmaceutical museum, in which all the material used for demonstration in the lectures is prepared. One of the chief points of interest in connection with Professor Schmiedeberg's system of lecturing is the method of limelight demonstrations. Behind the lecturer is a large ground-glass screen, upon which, by means of an ingenious system of lenses and prisms, enlarged images of subjects under the microscope can be thrown. Thus, a large audience can observe the effects of various drugs upon the circulation in a frog's foot or in the mesentery, while many physiological experiments, such as the inhibitory action of the vagus, muscle contraction curves, blood pressure, and the like, can also easily be demonstrated. To the right of the theatre lies the pharmacological laboratory, a room fitted up with every appliance that modern science can suggest, and reserved exclusively for the use of those engaged in original research.

Attached to the laboratory is a large instrument room, containing among other things a huge water bath always in action; the cover of this presents some thirty or forty various-sized holes for the reception of evaporating capsules. The great value of such an arrangement is obvious, since it dispenses with the otherwise unavoidable necessity of each man employing and watching several water baths at the same time. Another room in the vicinity, called the electrical laboratory, contains a valuable collection of electrical apparatus, a large dynamo in one of the cellars serving also to illuminate the various rooms and laboratories.

Ascending a fine broad flight of stairs, we reach the first floor and enter the library. This is a large, square-shaped room, lighted by gas and electricity, and containing most English, French, and German books upon pharmacology and pharmaceutical chemistry. To the right of the library is a smaller room, set apart for spectroscopic and polarimetric work, while another one adjoining it serves the purpose of a combustion and weighing room. To the left of the library is the professor's private laboratory and consulting room. Here, in his official capacity of Dean, he sits every day from 11 to 12 to give advice to any student who may apply to him. Proceeding still farther along the passage, we pass through a swing door and enter the physiological laboratory. This laboratory, as its name implies, is set apart entirely for experimental purposes, the chemical characters of a drug being investigated in the above-mentioned laboratory upon the first floor. It consists of a series of rooms of various sizes, the first being chiefly occupied by cages and large glass cases filled with the various birds and other animals used for experimental purposes. The second, the largest of all, is fitted up with tables and benches, and contains numerous pieces of apparatus, some of which are of very considerable size. In one corner of the room is a large machine, made by Miescher, of Bâle, for the carrying on of artificial respiration. So smoothly and regularly does this machine work, and so accurately can the volume of inspired air be regulated, that it is probably one of the most perfect instruments of its kind ever invented. Upon one of the benches is a large recording apparatus for variations in blood pressure, etc. It consists of a series of revolving cylinders, the sheet of paper upon which the movements of the levers are recorded being a con-



tinuous one, and its rate of movement easily regulated. The other benches are covered with smaller pieces of apparatus, such as kymographs, blackened cylinders, and the other instruments used for the study of drugs upon the action of the heart, muscles, respiration, etc. The room is illuminated by electricity, and, in addition to the fixed lamps, small incandescent lights can be used in any part of it by means of movable wires. The advantages of this method of special lighting are incalculable, since by its use the ordinary cumbrous and inefficient lamp or taper is dispensed with.

Among some of the later methods of experimental investigation we may mention one by which the action of any drug upon the various organs in the body can be directly observed and recorded. If, for example, it is desired to investigate the influence of a preparation upon one of the abdominal viscera, the method adopted is as follows: The animal is brought under the influence of urethane, and, when thoroughly narcotised and insensible, is strapped down upon the operating board, and a preliminary tracheotomy performed. The abdomen is then carefully opened in the middle line, from the ensiform cartilage to the pubes, and the animal, on its board, transferred to the water bath. This consists of an oblong glass case, about 30 inches by 15, in which the board is placed upright, and water containing 2 per cent. of sodic chloride is poured in until it reaches just below the level of the tracheotomy tube, the water being maintained at the normal temperature of the animal's body. By illuminating the bath a perfect view of the abdominal viscera is obtained, and a photograph is immediately taken. Should the breathing become embarrassed, the tracheotomy tube is connected with the machine for artificial respiration. A cannula is now tied into the right external jugular vein, and the drug whose action it is desired to investigate is introduced into the circulation, the cannula being left *in situ* for further use, if necessary. The viscera are carefully watched for any changes which may take place as the result of the action of the drug, and such changes as occur are photographed. In this manner Dr. Carl Jacobi, the inventor of the method, has observed the influence of numerous drugs upon the peristaltic action of the intestines, the rate of absorption of various substances from the intestines, the slightest change in the lacteals being clearly seen in the transparent medium. The movements of the viscera can be recorded, and any special organ can be dissected out and carefully watched. At the completion of the experiment, the animal is withdrawn from the bath and destroyed before returning to consciousness. Another important invention of Dr. Jacobi is a large and complicated apparatus for the maintenance of an artificial circulation. Until now, every attempt in this direction has met with only partial success; but the present scheme, the outcome of many years' work, promises to become one of great practical usefulness.

Adjoining the laboratory are various smaller rooms, one being set apart for the preparation of solutions; another for microscopical examinations; while a third, called the mercury room, contains numerous mercurial pumps, among which are those of Pflüger and Ludwig. Professor Schmiedeberg, the director of the institute, is a pharmacologist whose valuable contributions to science one can best appreciate by glancing through the literature upon the subject, which abounds with his name. Though still a comparatively young man, he holds the important post of Dean of the Medical Faculty, and discharges his onerous duties with such skilful tact as to retain his popularity with the least exemplary students in the university.



Unlike the other laboratories which we have had occasion to mention, the pharmacological one is open only to those who are engaged in original research; the ordinary student merely attending a course of lectures upon materia medica and pharmacology during his fourth or fifth semester.

Owing to its privacy and the splendid opportunities it offers for work, the laboratory is always full of researchers, some of whom are Englishmen; and seldom does a volume of the *Archives of Experimental Pathology and Pharmacology* (of which Professor Schmiedeberg is one of the editors) appear without at least one or two original articles emanating from his laboratory.

Before the medical laboratories of Strassburg can be left, we must describe the Physiological Institute of Professor Goltz. This large separate building is situated next to the Pathological Institute, and is also quite modern. Into the workings of the laboratory, space in the present article will not permit us to enter, but, before passing on, a word about the Professor of Physiology may be fitting. Professor Goltz, whose name is almost as well known here in England as in Germany, is at the present time Rector of the University of Strassburg, and has thus an enormous number of duties, apart from his professional ones, to perform. For many years an investigator of some of the more abstruse problems of physiology, especially those connected with the central nervous system, his work is ever prominently before the minds of physiologists. The Professor at home is (to use the expression of his wife) a slave to his pet dog, Bob. When he is at work in his study over some abstruse problems of physiology, if the dog rouses himself from his slumbers and utters a slight whine of discontent, he rises from his writing, seeks his hat, and takes Bob for a walk, and this may be repeated several times a day. But the great Professor is never happy unless his dog is also content. This is the man against whom, in conjunction with Dr. Ferrier, such accusations of cruelty were levelled during the London International Congress in 1881.







