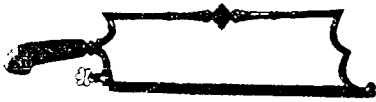


MEDICAL



COLLECTORS



ASSOCIATION

NEWSLETTER NUMBER 6

March 1986

Dear Colleagues:

The communication through my office seems to be increasing at an exponential rate. Several reports of the existence of the Medical Collectors Association have appeared in various newspapers, including the AMA News, which has given some impetus to our membership and has led to a large number of people joining the group in recent months. Also, there has been some increase in the contribution of items submitted by members, so that for the first time I will be unable to publish all of the material which I have received, and have had to defer some items for future Newsletters.

Response to the announcement of the Washington, D.C. meeting has been very good and at the time of writing this Newsletter, we have approximately 30 registrants for the meeting and have commitments for most of the Dealer tables. We do not yet have a count on the number of people who will be attending the dinner, but this presumably will represent the majority of the registrants. In this regard, I am hopeful that arrangements for a meeting next year can be discussed at the time of the meeting at the Smithsonian and the plans made then. If anybody has any suggestions or wishes to volunteer to help in a meaningful way with the meeting, please let me know as soon as possible because I would expect that by the time of the next Newsletter which will be in the summer, the meeting plans will be finalized.

In organizing the material for the Newsletter this month, a theme began to emerge and wherever possible I have adhered to that theme. In this regard a number of acknowledgements are in order. Wynona Crossgrove has abstracted some material from Woods Dispensatory and from the Universal Formulary by Griffith, which pertains directly to bloodletting. To complement this material, I have photocopied some material from two books which deal directly with bleeding, namely, a Treatise on the Medicinal Leech by Johnson, and Lectures on Bloodletting by Clutterbuck. The books which I was able to get hold of, unfortunately, were not in excellent condition and so I ask you to forgive some of the blotches which appear on the photocopies and which really represent the poor condition of the direct interest and I refer you to the originals if they arouse your interest. I happen to have in my possession a patent on a leech carrier which was made in France, and a copy of the French patent along with a translation and photocopies of photographs of the instrument are also included. Continuing our theme of bloodletting, we are particularly indebted to Dr. Gilbert Seigworth who was kind enough to supply me with reprints from an article which he published in the NEW YORK STATE JOURNAL OF MEDICINE in 1980 reviewing the subject. Reprints of this article are included with the Newsletter. Please note that I have just about exhausted my collection of patent models pertaining to medicine and if any of the membership has any patent models, I would be grateful if they could forward to me photographs in 5 x 7 format, high contrast black and white, of the model, along with copies of the patent.

An additional enclosure is a leaflet and order blank describing a new book "Send Us A Lady Physician" and a Newsletter outlining some pertinent material from an associated

Founder: M. Donald Blaufox, M.D., Ph.D.

Mazer Building • Room 324 • 1300 Morris Park Avenue • Bronx, New York 10461 • (212) 931-5770

exhibit. I have received a copy of the book and recommend it highly. We are indebted to Ms. Marsha Hurst of Paraphrase Incorporated for supplying this material, and she points out for those of you who are interested in the exhibit and who have missed it in New York, that it will be traveling around the country for the next three years and the next stop is the Museum of Our National Heritage in Lexington, Massachusetts, where the collection will reside until mid-July. Questions about that exhibit can be addressed to Paraphrase, Inc. 19 Eldridge St., New York, N.Y. 10002, (212) 431-0233.

Returning to our regular series, Professor Pengelley's Travelogue continues and in this issue he tells us about the medical museums of West Germany. Another contribution from the membership is an instrument for identification to the "Can You Identify This" column, submitted by Arthur Foresman and, in addition, Dr. Bonilla-Colon tells us something about one of the previous "Can You Identify" columns. Please send only high contrast black and white 5 x 7 photos for future contributions.

David Gunner of the Harvard University Warren Anatomical Museum, has again expressed his invitation to the membership and has suggested people contact him at 25 Shattuck Street, Boston, MA 02115, if they are interested in seeing the collection for which he is responsible. In addition, Professor Gunner has pointed out that Dr. Thomas Phillips, at the same address, is offering a small microscope collection for sale and suggests that members contact him directly for further information.

A number of people have written in to ask for information. Dale R. Beeks of Perceptions Scientifica asks if any of the members can tell him at what dates Tiemann & Company were located at 63 Chatham St., and at what date did they change from G. Tiemann to Tiemann & Company. Mr. Fred Wasserman, Research Historian, Metaform, Inc., 15 East 26th Street, New York, N.Y. 10010, writes and asks if any of the collectors have materials relating to the history of the immigration station and hospitals on Ellis Island. He is working for the National Parks Service to create exhibits for the new museum at Ellis Island and is looking for any artifacts, including instruments which may have originally been used there or are of direct interest. He can be reached at (212) 532-8580. Dr. William Niederland, 108 Glenwood Road, Englewood, N.J. 07631, writes that he trained in medicine in Wuerzburg and studied at the institute where Roentgen discovered x-rays. He has recollections of this man and of Virchow from his youth and offers to make his recollections available to anyone who would like to discuss his early experiences with him. He can be reached at (201) 567-8175.

Dr. Helfand's series on medical ephemera is reprinted once again by permission and along with it I have again copied an interesting piece from my own collection, which seemed to be relevant.

Overall, I think the Medical Collectors Association is well and active and once again I encourage all of you to submit materials to maintain the quality of the Newsletter. I am particularly anxious, as I said, for patent models. Alex Peck has once again written a fine article, but because of the volume of material, I have deferred publishing his commentary until the summer issue. He concerns himself with trephining and perhaps if I receive enough material from the membership, I could make that the theme for the summer issue. Certainly the trephine sets are a most exciting and ancient piece of medical history.

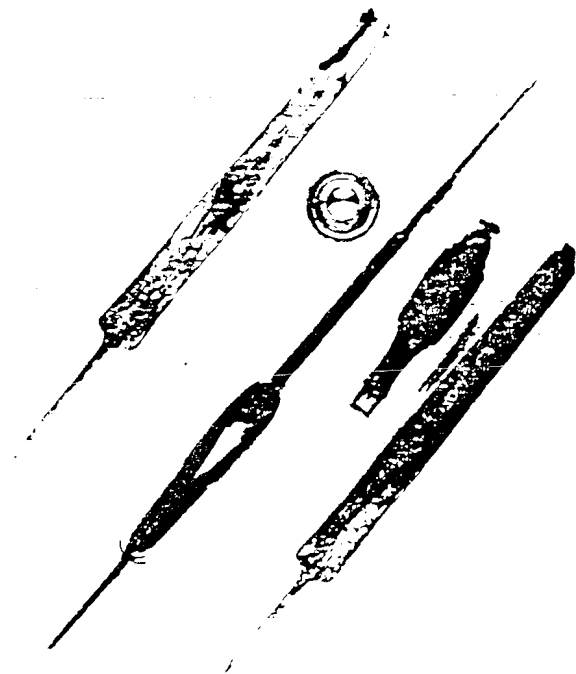
I hope to see many of you at the meeting at the Smithsonian and I look forward to hearing from all of you. Please forgive any delays in correspondence; the secretarial load is rather heavy. If any of your friends who are members of the association have not yet sent in their dues, please remind them because our policy is not to send out any further reminders at this point.

Sincerely,
M. Donald Blaufox, M.D., Ph.D.

REMEMBER OUR SUCCESS DEPENDS ON CONTRIBUTIONS AND SUGGESTIONS FROM MEMBERS

CAN YOU IDENTIFY THIS

Material: Mixed composition.
Maker: Litter in Wein.
Presumed Use: OB-GYN.
Date: 1890-1910



I think this is a:

From:

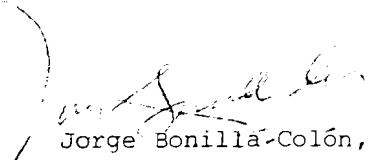
Please return to M. Donald Blaufox, M.D., Ph.D.

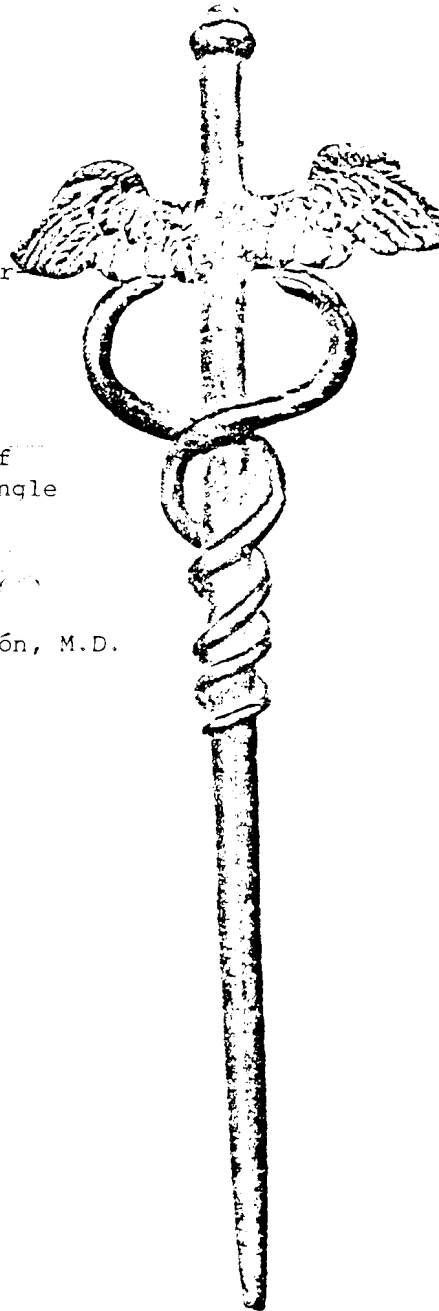
CAN YOU IDENTIFY THIS?

Material: Brass or Bronze 6 3/4" long.
Maker: Unknown
Presumed Use: Unknown
Date: Unknown

This is an illustration of the winged caduceus of Mercury encircled by two serpents. Mercury was the god of commerce and finance in Roman Mythology and had nothing to do with medicine.

It is a mistake, according to Storer, to confound this caduceus with the staff of Aesculapius without wings and with a single serpent.


Jorge Bonilla-Colón, M.D.



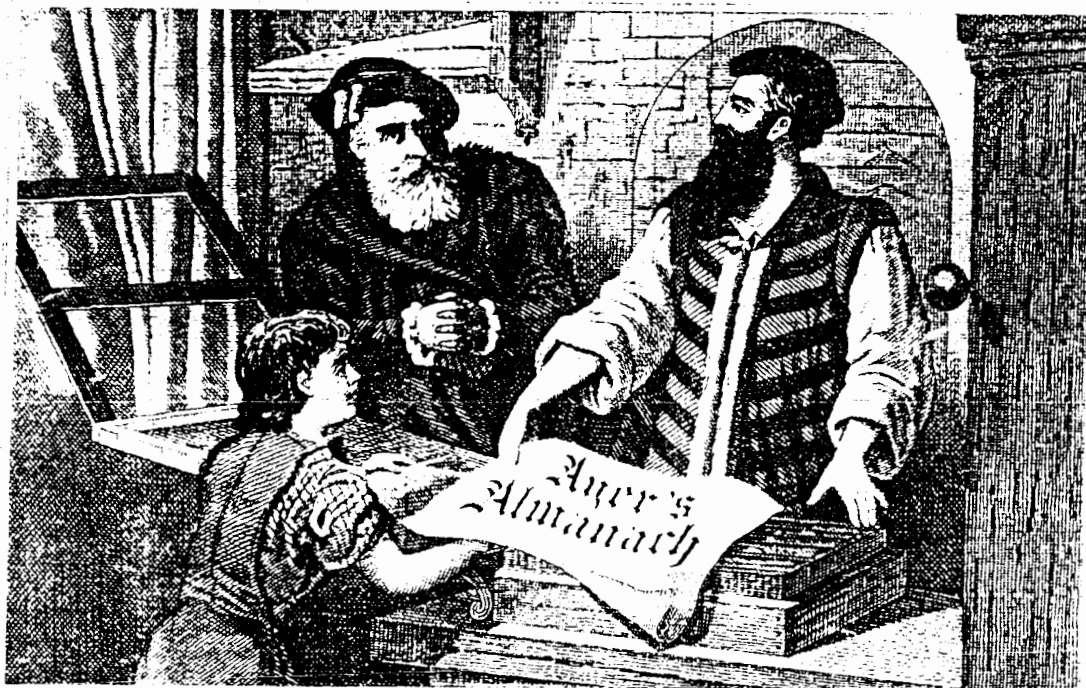
BIBLIOGRAPHY

Storer, Horatio R, M.D., LL.D.
Medicina in Nummis
Wright and Patter Printing Co,
Boston, 1931. P.23

I think this is a:

From:

Please return to M. Donald Blaufox, M.D., Ph.D.



Historical Images of the Drug Market—IV

by William H. Helfand

The illustration of Gutenberg printing a copy of *Ayer's Almanac*, if taken symbolically, is not quite as ridiculous as it seems at first glance. The J. C. Ayer Company of Lowell, Massachusetts, issued its first almanacs in 1852, and continued this practice until 1925. In addition to the English version, almanacs were issued in more than 20 languages including French, Spanish, Portuguese, Chinese, Yiddish, and Arabic. The almanacs are a mine of useful information including astrological phenomena, times to plant crops, statistical data on population, etc. Not sur-

prisingly they are also a compilation of useless data, including information on personal health, as well as hundreds of testimonials extolling the virtues of Ayer's Sarsaparilla, Cherry Pectoral, Ague Pills, and several other products. The total number of almanacs issued by Ayers has been estimated to exceed 200 million, and in one year toward the end of the century more than 25 million were published. These statistics certainly would have made Gutenberg rather proud! (Original Ayer's card, 6 x 9.3 cm., in the William H. Helfand Collection).

TEN DAYS' Test Medicines and Full Diagnosis of Your Case FREE.

DISEASES

OFFICE OF

Respiratory Organs:

DR. T. W. GRAYDON,

CONSUMPTION,

Sycamore and Sixth Streets,

CATARRH, BRONCHITIS,

+ CINGINNATI, OHIO.

- ASTHMA, ETC. -

If you suffer in any degree from Consumption, Catarrh, Bronchitis, Asthma, LaGrippe or other disease of the Respiratory Organs, the following will be of vital interest to you:—

Only a short time ago, the Medical World of Europe was startled by the ANDRAL-BROCA DISCOVERY for the cure of Consumption and other Diseases of the Nose, Throat and Lungs, and you may perhaps have read the accounts thereof, in the *New York Voice*, the *Christian Advocate*, the *Chicago Express*, the *Christian Index*, and other leading newspapers. Under this New Method of Treatment, the death-rate from Consumption in the Hospitals of Berlin, Vienna and Milan was at once reduced from over 85 per cent. to less than 15 per cent. of cases, while Catarrh, Bronchitis, Asthma, etc., were readily cured.

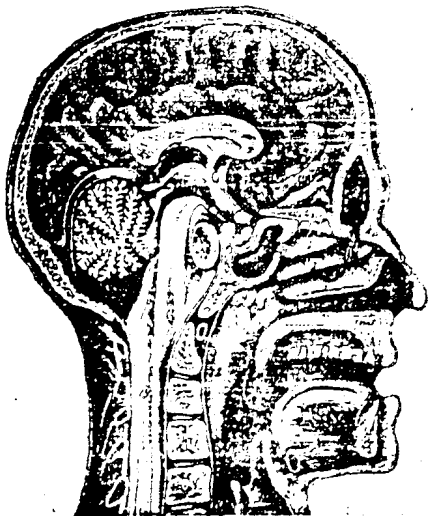
The ANDRAL-BROCA DISCOVERY consists of the use of Inhaled Medicines, which are inhaled or breathed into the Lungs, and thus come into contact and act directly upon the diseased parts, while at the same time the Blood is purified, the general system is built up, and the disease eradicated from the system by proper Constitutional Medicines, taken in the usual way by the Stomach.

This is exactly the same Method that I have for many years advocated and employed in my private practice for the cure of these Diseases, as attested by my published works and by Hundreds of Cures in the worst cases, where all other remedies had failed. Medical Science and Common Sense confirm the wonderful powers of this New Method, and the most intelligent physicians are rapidly adopting it in this large class of diseases. It is the only successful method, because it is the only one whereby the healing medicines are brought into actual Direct Contact with the diseased surfaces of the Nose, Throat and Lungs.

In many cases of Diseases of the Respiratory Organs, especially of long standing, there are allied disorders of the Heart, Kidneys, Stomach and Liver, which complicate the case and add to the suffering of the patient. These at the same time receive their proper care under my system of treatment, as described in my Book, so that the whole system is built up, the Blood purified and the Health restored.

TEN DAYS' TEST MEDICINES FREE.

A LARGE PROPORTION OF FATAL LUNG DISEASES ORIGINATE DIRECTLY FROM NEGLECTED NASAL CATARRH.



Vertical Section of Head and Neck through Median Line, showing the parts affected by Catarrh.

TEST IT FOR YOURSELF.

Knowing how often sufferers have been deceived by unworthy persons, I have concluded that the only satisfactory method is to give each patient the opportunity of testing the Andral-Broca Treatment in his own case before adopting it. I know so well the effects of the medicines, and I am so certain that they will cure any of these Diseases, that upon receiving a Statement of your case, I will at once send you, FREE, Ten Days' Test Medicines. If these do not fully satisfy you of the wonderful curative effects of the Andral-Broca Method, you are under no obligations whatever to continue the treatment.

I send these valuable medicines, FREE, at considerable expense to myself, and if you desire to take advantage of this offer, you should at once do so, sending me a full statement of your case as per the Question List provided.

This is an opportunity that you may never again have, and I trust that you may decide to take advantage of my most liberal offer. Very truly yours, THOMAS W. GRAYDON, M. D.

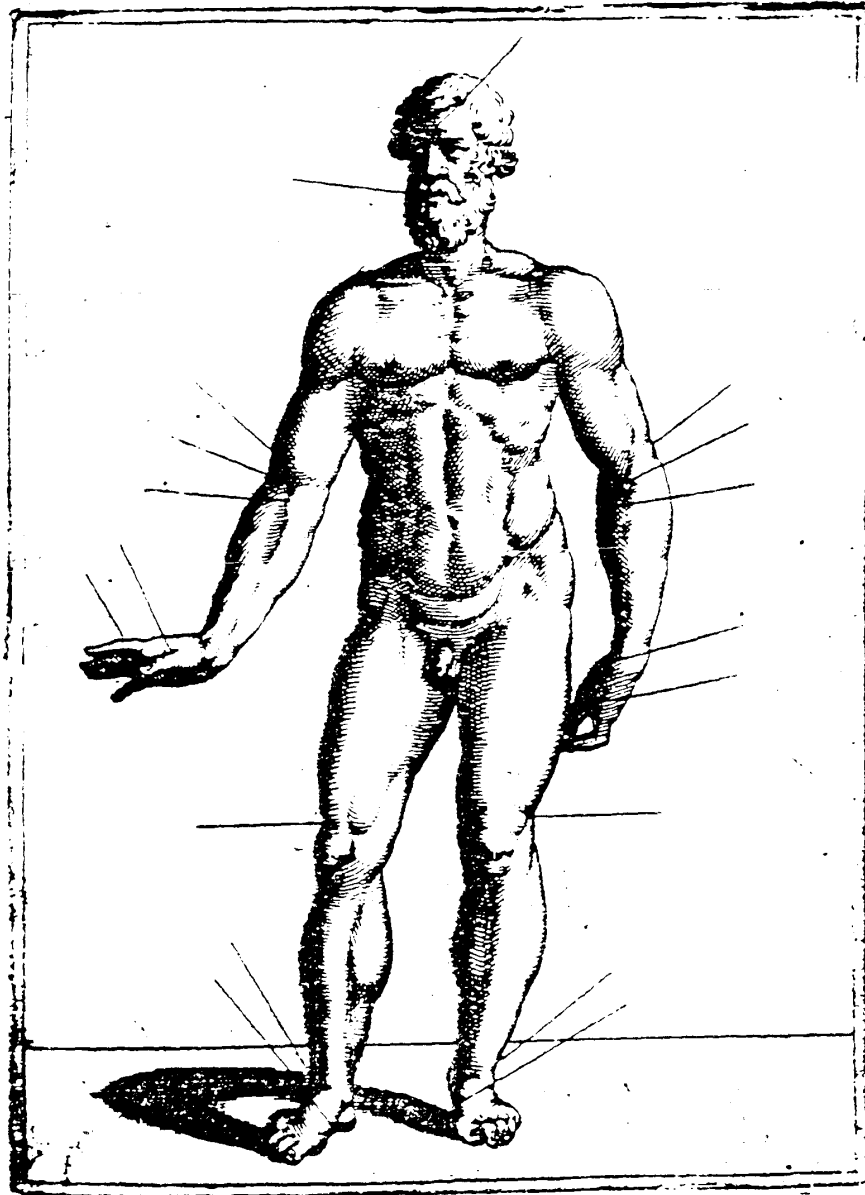
P. S.—If you will kindly send me the names and address of any sufferers from Diseases of the Respiratory Organs, you will greatly oblige me. I do not send free treatment to these persons as I can only do this in a limited number of cases, but I will mail them my book free.

SURE AND PERMANENT CURES GUARANTEED.

ILLUSTRATED 16TH CENTURY WORK ON BLOOD-LETTING

MAGNI, Pietro Paolo: Discorsi Intorno al Sanguinar I Corpi Humani Il Modo di Ataccare le Sanguisuche a Ventose e Far Frattioni e Vesicatorii con Buoni et Utili Avvertimenti

Rome [Bartolomeo Bonfadino & Tito Dieni], 1584





THE
DISPENSATORY
OF THE
UNITED STATES OF AMERICA

By George B. Wood, M.D.
Professor of Materia Medica and Pharmacy in the Philadelphia College of
Pharmacy, Member of the American Philosophical Society , &tc. &tc.

and

Franklin Bache, M.D.
Professor of Chemistry in the Philadelphia College of Pharmacy, One of the
Secretaries of the Americal Philosophical Society &tc &tc.

Published by Grigg & Elliot
No. 9 North Fourth Street
1834

second edition

page 349

HIRUDO MEDICINALIS. Dub.

The Leech.

HIRUDO. Class 1, Annelides. Order 3, Abranchiatae.
Family 2, Asetigeræ. Cuvier.

The leech belongs to that class of invertebrated articulated animals called ANNELIDES. This class contains the worms with red blood, having soft retractile bodies composed of numerous segments or rings, breathing generally by means of branchiæ, with a nervous system consisting in a double knotted cord, destitute of feet, and supplying their place by the contractile power of their segments or rings. The third order of this class ABRANCHIATAE - comprehends those worms which have no apparent external organ of respiration. This order is again divided into two families, to the second of which - the ASETIGERÆ, or those not having setæ to enable them to crawl, the leech belongs.

It is an aquatic worm with a flattened body, tapering towards each end, and terminating in circular flattened discs, the hinder one being the larger of the two. It swims with a vertical undulating motion, and moves when out of the water by means of these discs or suckers, fastening itself first by one and then by the other, and alternately stretching out and contracting its body. The mouth is placed in the centre of the anterior disc, and is furnished with three cartilaginous lins-shaped jaws at the entrance of the alimentary canal. These jaws are lined at their edges with fine sharp teeth, and meet so as to make a triangular incision in the flesh. The head is furnished with small raised points, supposed by some to be eyes. Respiration is carried on through small apertures ranged along the inferior surface. The nervous system consists of a cord extend-

ing the whole length, furnished with numerous ganglions. The intestinal canal is straight and terminates in the anus, near the posterior disc. Although hermaphrodite, leeches mutually impregnate each other. They are oviparous, and the eggs, varying from six to fifteen are contained in a sort of spongy, slimy cocoon, from half an inch to an inch in diameter. These are deposited near the edge of the water and hatched by the heat of the sun. The leech is torpid during the winter, and casts off from time to time a thick slimy coating from its skin. It can live a considerable time in sphagnous moss, or in moistened earth, and is frequently transported in this manner to great distances by the dealers.

Savigny has divided the genus *HIRUDO* of Linnaeus into several genera. The true leech is the *Sanguisuga* of this author, and is characterized by its three lenticular jaws, each armed with two rows of teeth, and by having ten ocular points.

Several species are used for medicinal purposes, of which the most common are the gray and the green leech of Europe, both of which are varieties of *HIRUDO MEDICINALIS* of Linnaeus; and the *HIRUDO DECORA* of this country.

1. *HIRUDO medicinalis*. Linn. ed. Gmel. I. 3095. - *Sanguisuga officinalis*. Savigny, Mon. Hir. p. 112, t. 5, f. 1. The green leech. - *Sanguisuga medicinalis*, Savigny, Mon. Hir. p. 114, t. 5, f. 2. The gray leech. Many of the best zoologists regard the *Sanguisuga officinalis* and *S. medicinalis* of Savigny as mere varieties. They are both marked with six longitudinal dorsal ferruginous stripes, the four lateral ones being interrupted or tessellated with black spots. The colour of the back varies from a blackish to a grayish-green. The belly in the first variety is of a yellowish-green colour, free from spots, and bordered with longitudinal black stripes. In the second it is of a green colour, bordered and maculated with black. This leech varies from two to three or four inches in length. It inhabits marshes and running streams, and is found abundantly throughout Europe.

The great use made of leeches in the modern practice of medicine has occasioned them to become a considerable article of commerce. They are collected in Spain, France, Italy, and Germany, and carried in large numbers to London and Paris. They are also frequently brought to this country, as the practitioners in some of our large cities use only the foreign leech, although our own waters furnish an inexhaustible supply of this useful worm.

2. *HIRUDO decora*. Say, "Major Long's Second Expedition," ll. 268. The medicinal leech of America has been described by Say under the name of *HIRUDO decora*, in the appendix to the Second Expedition of Major Long. Its back is of a deep pistachio green colour, with three longitudinal rows of square spots. These spots are placed on every fifth ring, and are twenty-two in number. The lateral rows of spots are black, and the middle range of a light brownish-orange colour. The belly is of the same colour, variously and irregularly spotted with black. The American leech sometimes attains the length of four or five inches, although its usual length is from two to three. It does not make so large and deep an incision as the European leech, and draws less blood.

The use of the indigenous leech is nearly restricted to the city of Philadelphia. The practitioners of New York and Boston depend for their supplies upon foreign countries, and leeching is seldom resorted to in the southern or western states. Those which are used in Philadelphia are generally brought from Bucks and Berks county in Pennsylvania, and occasionally from other parts of the state. It is estimated that from 200,000 to 250,000 are annually consumed.

The proper preservation of leeches is an object of importance to the practitioner, as they are liable to great and sudden mortality. They are usually kept in jars in clear water, which should be changed twice or three times a week. The jar must be covered with a linen cloth, and placed in a situation not liable to sudden changes of temperature. They will live a long time, and continue active and healthy, without any other attention than that of frequently changing the water in which they are kept. M. Derheims has proposed the following excellent method of preserving them. In the bottom of a large basin or trough of marble he places a bed six or seven inches deep, of a mixture of moss, turf, and fragments of wood. He strews pebbles above, so as to retain them in their place without compressing them too much, or preventing the water from freely penetrating them. At one end of the trough, and about midway of its height, is placed a thin slab of marble or earthenware, pierced with numerous holes and covered with a bed of moss, which is compressed by a thick layer of pebbles. The reservoir being thus disposed is half filled with water, so that the moss and pebbles on the shelf shall be kept constantly moist. The basin is protected from the light by a linen cover stretched over it. By this arrangement the natural habits of the leech are not counteracted. One of these habits, essential to its health is that of drawing itself through the moss and roots to clear its body from the slimy coat which forms on its skin, and is a principal cause of its disease and death.

MEDICAL USES. Leeches afford the least painful, and in many instances the most effectual means for the local abstraction of blood. They are often applicable to parts which, either from their situation, or their great tenderness when inflamed, do not admit of the use of cups; and in the cases of infants, are under all circumstances, preferable to this instrument. They are indeed a powerful therapeutic agent, and give to the physician, in many instances, a control over disease which he could obtain in no other way. Their use is in great measure restricted to the treatment of local inflammations; and, as a general rule, they should not be resorted to until the force of the circulation has been diminished by bleeding from the arm, or in the natural progress of the complaint.

In applying leeches to the skin, care should be taken to shave off the hair, if there be any, and to have the part well cleaned with soap and water, and afterwards with pure water. If the leech does not bite readily, the skin should be moistened with a little blood, or milk and water. Sometimes the leech is put into a large quill open at both ends, and applied with the head to the skin until it fastens itself, when the quill is withdrawn. Leeches continue to draw blood until they are gorged, when they drop off. The quantity of blood which they will draw varies according to the part to which they are applied, and the degree of inflammation existing in it. In the loose and vascular textures they abstract more than in those which are firm and compact, and more from an inflamed than a healthy part. As a general rule, our leechers apply six for every fluid ounce of blood. A single European leech will draw from half an ounce to an ounce. The quantity may often be much increased by bathing the wound with warm water. Leeches will continue to suck after their tails are cut

off, which is sometimes done, although it is a barbarous practice. They may be separated from the skin at any time by sprinkling a little salt upon them. After they drop off the same application will make them disgorge the blood they have swallowed. Some leechers draw the leeches from the tail to the head through their fingers, and thus squeeze out the blood, after which all that is necessary is to put them in clean water and change it frequently. Leeches which are gorged with blood should be kept in a vessel by themselves, as they are more subject to disease, and often occasion a great mortality among the others. They should not be again used until they have recovered their activity.

In cases where the bleeding from leech-bites continues longer than is desirable, it may be stopped by continued pressure, with the application of lint, or by touching the wounds with lunar caustic. It may sometimes be necessary, in the case of a deep bite, to sew the wound, which is readily done with a single stitch of the needle that need not penetrate deeper than the cutis.

D.B.S.

Leeches are seldom properly applied or managed. The part to which they are intended to be applied should be washed with a little soap and warm water, then with simple cold water, and, lastly it should be well dried. If the part be hot and inflamed, the leeches should be put, for a few minutes, into tepid water; and this should be done also when they are to be applied in the mouth, or to any part of the body, warmer than the general surface; but, at all times, before they are applied, they should be dried between the folds of a clean soft towel. The easiest and best mode of applying them is, first, to place the number to be used in a hollow made with the points of the fingers in a towel folded like a napkin; then, so to turn the towel and the leeches upon the part where it is intended they should fix, that the towel will cover them. The hand must be kept over the towel, to prevent their escape, until they all bite, which usually happens in a few minutes; after which, the towel may be removed. By this method, twenty or thirty leeches can be applied more rapidly and with less trouble than two, when each leech is separately applied. Another plan is to put the leeches into a pill-box or small glass, and apply this over the part to which it is designed that they should attach themselves. If this plan, however, cannot be pursued, owing to the nature of the part to which they are to be applied - as, for example, the inner or outer angle of the eye - then the simplest method is to scratch the skin with the point of a needle, and to apply the leech to the spot moistened with blood. When they are to be applied within the mouth, or any open cavity, each leech should be put into a large gull, with its head towards the open end of the gull, which should be applied to the part, and retained upon it until the leech is fixed, when the gull may be gently withdrawn; but a thread should be tied around the tail of the leech when it is to be applied within the mouth, to prevent it from being swallowed - an accident which has occasionally happened, and has been productive of serious consequences.

V UNIVERSAL FORMULARY:
CONTAINING THE METHODS OF
PREPARING AND ADMINISTERING
OFFICIAL AND OTHER MEDICINES
THE WHOLE ADAPTED TO
PHYSICIANS AND PHARMACEUTISTS
BY
R. EGLESFIELD GRIFFITH, M.D.
A NEW EDITION
CAREFULLY REVISED AND MUCH EXTENDED
BY
ROBERT P. THOMAS, M.D.
BLANCHARD AND LEA
PHILADELPHIA
1859

Leeches should never be forcibly detached, as their teeth are apt to separate, and being left in the wound, to cause an erysipelatous inflammation of the part. They should be permitted to drop spontaneously, which being the result of a temporary suffocation (asphyxia), all muscular energy ceases in the animal, and the teeth shrinking, it drops off entire. A Bread - and-water poultice, not too hot, should then be laid over the bites, to encourage the bleeding. The invalid should be kept warm in bed, when it is necessary to abstract a large quantity of blood. In general, the bites soon cease to bleed; but in some instances, a copious flow takes place; and therefore, to prevent exhaustion, the poultice should be frequently examined. This exhaustion is more likely to occur in children than in adults; and for the same reason, leeches should not be applied upon children late in the evening, unless they are very urgently required. It is also proper, in young patients, to select for their application a part which admits of pressure; for example the thorax and temples, where the bones are covered with a thin layer of soft parts. Sometimes the hemorrhage continues so as to become alarming; in such cases, where pressure is unavailing or cannot be practiced, creasote or some of the styptics applied to the bites will be found useful, Powdering the spot with rye flour has also proved effectual. When these means fail, cauterizing the bites by means of a fine point of nitrate of silver; or with a red-hot probe or knitting-needle generally proves successful.

LECTURES

ON

BLOOD-LETTING;

DELIVERED AT

THE GENERAL DISPENSARY,

ALDERSGATE STREET.

BY HENRY CLUTTERBUCK, M.D.

FORMERLY ONE OF THE PHYSICIANS TO THE GENERAL DISPENSARY.

Philadelphia:

HASWELL, BARRINGTON, AND HASWELL,

293 MARKET STREET

1839.

LECTURE II.

HISTORY OF BLOOD-LETTING.

It is not my intention on the present occasion, gentlemen, to enter with much minuteness into the *history* and *origin* of *blood-letting*. Such a discussion, though not without interest, is rather a matter of curiosity than of practical use, and would needlessly consume time that is already too limited for our purpose. It would be a fruitless task, indeed, to seek to discover when blood-letting was first introduced into the practice of medicine. Like most other branches of the healing art, its origin is involved in impenetrable darkness. It is certain, however, that the practice is of great antiquity, and was in general use long before the time of Hippocrates, the earliest writer on medicine whose works have reached us, and who flourished considerably more than 2000 years ago. Hippocrates appears, from his various writings, to have been familiarly acquainted with phlebotomy, or venesection, and also scarification, both with and without cupping. On different occasions he advises opening the veins of the arm, of the feet and legs, of the forehead, and those under the tongue. It is doubtful whether he practised *arteriotomy*, or was acquainted with the use of leeches for drawing blood. The purposes for which he had recourse to blood-letting are various, and not undeserving of notice even in the present-day. He employed it, in the first place, simply as an *evacuant*, in order to get rid of redundant matters in the system; secondly, for the purpose of changing the determination of the blood to or from particular parts, as circumstances might seem to require. You may here observe the germ of the doctrines of *derivation* and *revulsion*—points of theory that were so much dwelt on at a later period, and which have scarcely yet lost their influence on practice. A third purpose for which Hippocrates had recourse to blood-letting was that of restoring a free movement of the blood and animal spirits in cases where they were supposed to be stagnant or obstructed, as in *apoplexy* and *palsy*. Fourthly, he used this evacuation to *cool* the body when morbidly or preternaturally heated.

Such were the views with which blood-letting was employed by Hippocrates; and, accordingly, he had recourse to it in a great number of diseases where it was supposed to be needed to fulfil one or other of the indications mentioned. In particular he recommends it in violent and acute diseases, especially *inflammations*, but only where the patient is strong and at the middle periods of life, for he thought blood-letting not adapted to either infancy or old age: he forbade it also to pregnant women, as being likely to cause abortion. He especially mentions inflammation of the different viscera—the liver, spleen, and lungs, as calling for this remedy. The boldness of his practice on these occasions deserves notice. In pleurisies, for example, he allowed the blood to flow till the patient fell into complete syncope, especially if the pain were very acute. When, however, the blood, while flowing, underwent a change of colour, as from a red to a dark hue, or the reverse, he considered it right to stop. In quinsies, and other disorders of an acute form, Hippocrates bled in both arms at once. Difficulty of breathing is another case in which this remedy was resorted to by Hippocrates; and he mentions one species of inflammation of the lungs, which he calls

tumefaction from heat, in which blood is directed to be taken from various parts of the body at the same time, instancing, in particular, the arm, under the tongue, and the nostrils, as parts proper for the purpose. In cases of severe pain, he advises a vein to be opened as near as possible to the part affected. Thus, in pleurisy, the blood was taken from the internal vein of the arm of the affected side; but in milder cases he preferred taking it remotely, for the purpose of soliciting a flow of blood to a distant part of the body. He bled for the relief of pain simply as unconnected with inflammation. For the cure of diseases situated above the diaphragm he took the blood from the veins of the arm or upper part of the body; in those below the diaphragm, the blood was taken from the inferior parts, as the feet.

In fevers, even of the most ardent kind, Hippocrates did not draw blood, unless the fever were accompanied with some topical inflammation; thus making a distinction between primary fevers (that is, where the fever itself is the disease—the idiopathic,) and those which accompany or follow inflammation (symptomatic fever). It was in the latter only that he thought blood-letting advisable. In general, in acute cases, the patient was bled only once, but then to a large amount, even to fainting, as stated above, if the violence of the symptoms seemed to require it. In chronic inflammations, small and repeated bleedings were preferred; and instances are adduced of the good effects of this practice. He also advises it for the cure of dropsies under particular circumstances. It is remarkable that Hippocrates no where indicates the quantity of blood to be drawn in any particular case.

From what has been now stated, as well as from the general tenor of the writings of this most distinguished physician (a man who has had no equal in our art), you may perceive, and probably not without surprise, considering the disadvantages under which he practised at that early period, when medicine was little more than a science of observation, unaided, for the most part, by the lights of anatomy, physiology, or the other auxiliary sciences, how little reason we have to boast of modern acquirements, and how little, in fact, has been added to the stock of real practical knowledge since his time.

Erasistratus (who lived a century or more after Hippocrates, and who is distinguished as being the first, according to Galen, who ventured to dissect the human body,) prohibited both blood-letting and purging for the cure of diseases; at least he nowhere recommends their use. In hemorrhages, instead of drawing blood as his contemporaries did, Erasistratus substituted low diet and ligatures on the extremities, with the view, probably, of restraining the movement of the blood. The reason assigned by his followers for abstaining from blood-letting in general is not of much weight; namely, that as, in the treatment of fevers and inflammations, abstinence is indispensable, it would weaken the patient too much to use blood-letting at the same time. Other frivolous objections to the

practice of bleeding were made, such as that it is not always easy to discover the vein proper to be opened, and that there is even danger of opening an artery instead of a vein; that many persons fall into a state of syncope either before or after the operation; and that some have actually died of fright under it; that we cannot always tell the precise quantity of blood required to be taken away in any particular case in order to subdue the disease; and that if less than this be taken it does no good, and if more, that we run the risk of killing the patient. Others said that the escape of the blood from the veins might be followed by that of the animal spirits, which, on such occasions, were supposed to pass from the arteries into the veins.

Asclepiades, a Greek physician of high repute, who settled at Rome a hundred years before the birth of Christ, followed pretty closely the steps of Erasistratus, except in regard to blood-letting, which he employed to a considerable extent. Asclepiades pursued, on the whole, a more active practice than that of his predecessors, which, on account of its inertness, he called “a meditation upon death.” His reasons for abstracting blood, however, were of the most fanciful description, founded on the Epicurean doctrines, which represent all the phenomena of living bodies as depending on the motion of corpuscular atoms through corresponding pores, and disease as consisting in a want of correspondence between those corpuscles and pores. Asclepiades used blood-letting in inflammation provided pain were present, but not otherwise; thus, he bled the patient in pleurisy, but not in peripneumony or inflammation of the lungs themselves, because, in the latter, the patient does not suffer pain. He neither bled in fevers nor in phrenzies. The activity of his treatment in general, however, is shown in his treatment of quinsy, in which he employed at the same time, venesection in the arm, under the tongue, and on the temples. He also used scarification with cupping, with the view of opening the pores. If these means did not suffice, he incised the tonsils, and even recommends laryngotomy in extreme cases. All this, you will perceive, does not seem very consistent with the favourite and avowed maxim of this writer, that of curing *citò, tutò, et jucundè!*

Aretæus was very friendly to blood-letting, but he preferred, in general, small and repeated bleedings to large ones, which he considered to be dangerous. One motive assigned by him for the use of blood-letting was to produce relaxation of the solids; as for facilitating the passage of calculi through the urinary passages. This, you perceive, is in conformity with modern practice. Aretæus was amongst the earliest that practised arteriotomy. Speaking of this author, Haller says, “arterias incidit, ante Galenum, in temporibus et ad aures; albique.”

The Methodist Sect, of which Themison was the founder, used blood-letting frequently, and in the same diseases as Hippocrates did, but not with the same views. Instead of bleeding, in order to cool the body, they employed it to produce relaxation, all diseases

consisting, according to their tenets, either in too great rigidity, or its opposite, relaxation. They seldom bled the patient more than once, unless by scarification and cupping, which they carried to a great extent, and successively, over almost the whole body. This sect, the Methodic, comprised many individuals of great reputation.

Celsus, equally remarkable for the elegance of his style, and his intimate acquaintance with the whole art of medicine as it existed in his time, was a great friend to blood-letting, and appears to have possessed an extensive and critical knowledge of the subject. He advises it in many cases in which his predecessors had forbidden its use, as in infants and in old persons, and also during pregnancy, observing on those occasions, that it is a matter of little importance to inquire what the age of the patient is, or whether pregnant or not, but what is the strength in each case. A vigorous infant, a robust old person, and a strong pregnant woman, bear this evacuation, he says, without either danger or inconvenience. Favourable, however, as Celsus was, in general, to the employment of this invaluable means of cure, he complains of the almost indiscriminate use that was made of it in his time. His rules with regard to blood-letting are, indeed, in most respects, conformable with the best views of modern experience. The strength of the patient is to be looked to, he observes, more than the other circumstances of the case; and this is better judged of by the quantity and quality of the blood, than by the aspect of the patient. It may, however, happen, he adds, that the disease calls for this evacuation while the body is not able to bear it. Still, if no other means offer themselves for saving life, he does not hesitate to recommend a trial of it; for, "*satiùs est anceps auxilium experiri, quam nullum.*" In short, Celsus appears to have employed blood-letting in nearly the same cases in which it is resorted to at present, especially in violent fevers, where the face is much flushed and the veins distended. In pleurisy, he used it only when the disease was recent, and the pain acute. In peripneumony, he only had recourse to it when the patient was strong; if otherwise, dry cupping was employed. Apoplexies, palsies, convulsions, difficulty of breathing, internal contusions (indicated by spitting or vomiting of blood), and violent pain, are all of them cases requiring, in the opinion of this justly esteemed writer, the loss of blood. A rather curious observation is made in regard to apoplexy, namely, that bleeding sometimes appears to save—at other times, to kill the patient. This seeming anomaly I shall have occasion to explain to you hereafter.

With respect to time, Celsus did not bleed (except in urgent cases) earlier than the second day of the disease, on account, as he observes, of the crudity of the humours that are not yet ripe for evacuation; and he objected, likewise, to taking away blood later than the fourth day, for the reason that, by this time, the bad humours would be dissipated spontaneously, or, at least, have made their full impression on the system, in which case the only effect of bleeding would be, that of needlessly weakening the patient. By

the by, do you not observe here, gentlemen, as on other occasions, the baneful influence of hypothesis on practice † through which the advantages of experience itself are often sacrificed; for certainly experience does by no means sanction the limitations here suggested. Celsus makes an observation confirmatory of that of Hippocrates, which I before noticed—namely, that when the blood, as it flows from the veins, begins to assume a bright vermilion hue, the further evacuation ought to be put a stop to; as being then rather hurtful than beneficial. Celsus was no friend, in general, to large blood-letting, so as to induce syncope; but he advises rather, that if a large quantity is required to be drawn, as necessary to the cure, that it should be taken at different intervals. This justly celebrated writer makes no mention of leeches, though they were in use long before his time, Themison having employed them. Celsus's independence as a writer is manifested in the ridicule he casts on the critical days of Hippocrates, the establishment of which he ascribes to the influence of the mysterious numbers of the Pythagoreans.

We find little that is original, or particularly deserving notice, on the subject of blood-letting, in the writings of physicians between the period when Celsus lived—that is, at the commencement of the Christian æra—and the time of Galen, who flourished in the second century afterwards. Galen attached himself chiefly to Hippocrates as his guide, whose system he laboured to re-establish and bring to perfection, in opposition to the prevailing sects of the time. With the exception of Hippocrates, no individual, perhaps, ever enjoyed so high a degree of celebrity, both living and posthumous, as the subject of our present remarks; and, for the most part, his fame was well deserved; for his knowledge of philosophy in general, as well as of medicine, was of the most extensive kind. Galen's vanity, however, was at least equal to his merits. He decries, in the most opprobrious terms, all who differed from him, either in opinion or in practice. The manner in which he expresses himself in regard to Hippocrates, sufficiently shows his excessive self-esteem, "No one, before myself," he says, "has pointed out the true method of treating diseases. Hippocrates, indeed, indicated the road; but as he was the first to discover it, it is not likely that he would be able to proceed so far as was desirable in it;" and he goes on to compare his own works in medicine with the great social and political improvements effected by the Roman emperor, Trajan; leaving his readers to draw the conclusion, that as Trajan was the greatest and most beneficent of emperors, so he (Galen) was the first and greatest among physicians. In another place he thus addresses his pupils:—"I never cared about the reputation I might gain in the world; truth and knowledge have been the only objects of my ambition. On this account, I never put my name at the head of my writings, and you know I forbade your lavishing extravagant encomiums on me, as you were wont to do."

Our present concern, however, with this distinguished physician, is in reference to blood-letting, which he employed to a considera-

bright, indeed, was the dispute carried, that the University of Salamanca, in the fifteenth century, took part with the Arabians, and made a decree that no one should dare to let blood from the side affected; and, to add authority to their decree, they endeavoured to procure an edict from the emperor, Charles the Fifth, to confirm it, alleging that the contrary practice was as prejudicial to the community as Luther's heresy itself; nor was the controversy terminated till the discovery of the circulation of the blood, by our distinguished countryman, Harvey, put at once an end to the dispute.

The Egyptians, as we learn from Prosper Alpinus,* used blood-letting in all its varieties, and to a great extent. They opened the veins of the temples, forehead, ears, corner of the eyes, nostrils, and throat, as well as others. Arteriotomy appears to have been nearly as much in use among them as venesection, especially in diseases of a chronic character. They opened the arteries about the temples, ears, and hands, with great freedom; nor had they any dread of the consequences usually apprehended from the operation. Prosper Alpinus says he had frequently witnessed the practice of arteriotomy while he was in Egypt, and observed the puncture to heal as readily almost as after venesection. They used certain precautions, however, in the employment of arteriotomy, both for insuring the success of the operation, and preventing inconvenience afterwards. By the application of a ligature at the proper part, the artery became much distended; it was then opened with the sharpest instrument, and by the smallest puncture possible, on account of the difficulty experienced in healing any large wound of an artery. When as much blood had been discharged as was thought requisite, some lint was placed on the wound, and a small piece of coin was strongly bound over it; and this was left on the part for three days, when the wound was found to be healed. The ancients seldom had recourse to arteriotomy, from an apprehension that life might be endangered by it, either from the artery not healing afterwards, or from gangrene taking place, owing to the great pressure required to stop the flow of blood. Galen, on account of the mischief he had observed to follow in cases where the artery was accidentally opened in venesection, was not very favourable to the use of arteriotomy, unless for special purposes. He relates an instance, however, in which he opened the artery between the thumb and fore finger, in order to procure sleep; and he adds, that he witnessed the cure of a pain in the side, by opening the artery of the arm, and without aneurism following.

Scarification was so common among the Egyptians, Prosper says, that out of a hundred children you might meet in the street, you would scarcely find forty whose ears were not covered with cotton, on account of the scarifications they had undergone.

* De Medicina Ægyptiorum.

† Lib. de Curatione per sanguinis missionem.

ble extent. In this point, indeed, as in most others, he followed the steps of Hippocrates, drawing blood with similar views—viz. to diminish plenitude (plethora), and to make a diversion (revulsion) of the humours; but he used the remedy with more freedom than his great predecessor. Galen appears to be the first that mentioned the absolute quantity of blood necessary to be taken on different occasions: neither Hippocrates, Celsus, nor any preceding writer, taking any notice of this. In ordinary cases, the largest quantity mentioned by Galen did not exceed a pound and a half; the smallest, seven or eight ounces. He held, that on certain occasions, blood might be properly taken till the patient fainted; and he mentions, as an extraordinary circumstance, that he had drawn from the same individual fifty-four ounces in the space of a single day. This was done at the commencement of an acute fever, where the patient was of a plethoric habit, and the blood in a state of great commotion. He limits this mode of practice, however, to the cases just mentioned; and as a caution against the general use of it in this way, he observes, that he saw two persons die in consequence of its adoption. As a safer practice, he advises that the patient should be bled to a smaller amount twice in the same day, or on successive days. Galen always bled the patient at the time of the day when the fever was at the lowest ebb, and, like Hippocrates, he took the blood from the side affected. He did not hesitate to bleed old persons when of a robust habit, but he never bled children under 14 years of age.

The physicians, many of them of high reputation, who lived in the two succeeding centuries, up to the period when the schools of physic and philosophy were transferred to Arabia, were for the most part compilers merely from the writings of Hippocrates and Galen. We are indebted to the Arabians, however, for the introduction of a number of articles into the *materia medica*, that were not before known or in use. We also owe to them the first description of several new and important diseases, that appear to have been totally unknown to the Greek and Roman physicians, such as the small-pox, measles, and other eruptive fevers, as we term them—diseases possessing strikingly peculiar or specific properties, and of totally unknown origin.

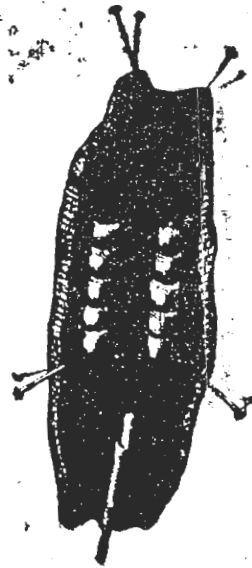
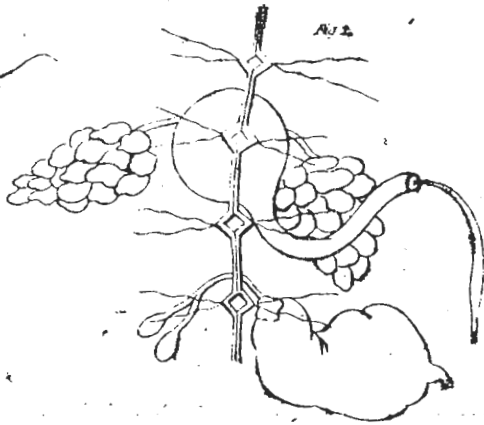
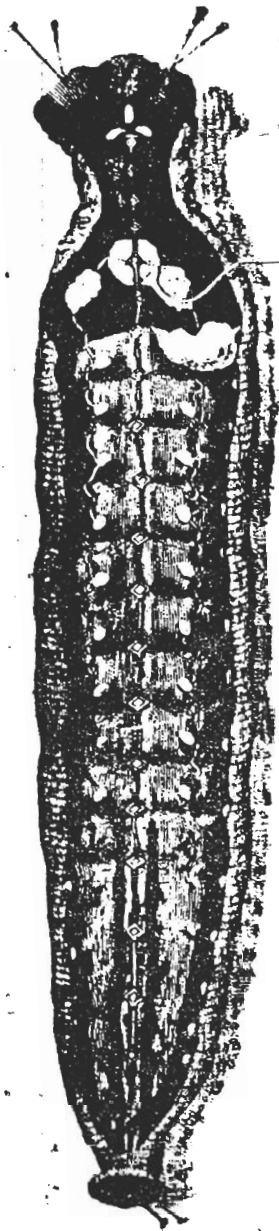
The Arabian physicians, of whom Avicenna was the chief, copied the Greeks in all essential respects, both as regards theory and practice. They were accustomed, however, to attach importance to some minor points, which are at present considered as of no moment. Thus, in cases of pleurisy, they said that the blood ought to be drawn from the side opposite to the disease, contrary to the injunction of Hippocrates, who directed that, for the relief of pain in general, the blood should be taken from the vein the nearest to the part affected. This difference of opinion, trifling and unimportant as we now consider it, was the cause of great and lasting discussion in the schools of physic, and entire volumes were written and published on the different sides of the question. To such a

Leeches do not appear to have been in use in Egypt; perhaps from these animals, as is suggested, not being found in that country.

Paracelsus, the prince and prototype of quacks, though far more learned and illustrious than the modern race to whom we are accustomed to apply this designation, has the merit of introducing into practice several active preparations from the mineral kingdom. Paracelsus appears to have employed blood-letting, as well as other means of cure, though the particular views with which he used it are not stated.

If, now, you inquire into the fate of blood-letting in modern times (including under this denomination the long interval between the revival of learning in the fifteenth century and the present times), you will find that with few, and those trifling exceptions, the advantages of blood-letting have been highly, if not duly, estimated. In all ages indeed, not excluding the present, a few individuals have been found to decry the practice altogether, as fraught with evil consequences; some have even spoken of it as if it were unjustifiable on Scriptural grounds, arguing that "the blood is the life," and we are forbidden, in Scripture, "to take away life." An argument of this sort is not likely, I presume, to meet with many supporters in the present day. The opposition to the practice has been chiefly founded, I believe, in an affectation of singularity, for the sake of vulgar notoriety: it is certainly not sanctioned by experience.

It would occupy too much of your time, were I to pursue further the history of this all-important subject. I shall conclude, for the present, with observing, that at all times, and amidst the prevalence of every variety of medical doctrine, the merits of blood-letting have been fully recognised by the most observant, as well as the most experienced, physicians. Seeing then, the almost universal use that has been made of this remedy for the treatment of disease, from the earliest periods to the present time, and that it has been made the subject of innumerable writings, you will perhaps wonder that it should be thought requisite to discuss the subject further in the present day. When, however, you are told, that many and important differences of opinion still subsist with regard to it, amongst those even who are the most favourably inclined towards it, as to its mode of operation—the circumstances that influence its use—the extent to which it ought to be carried at different times and under different circumstances—as well as various other important points—you will admit, with me, that there is still room for further investigation of the subject. This I purpose to enter upon in the ensuing lecture.



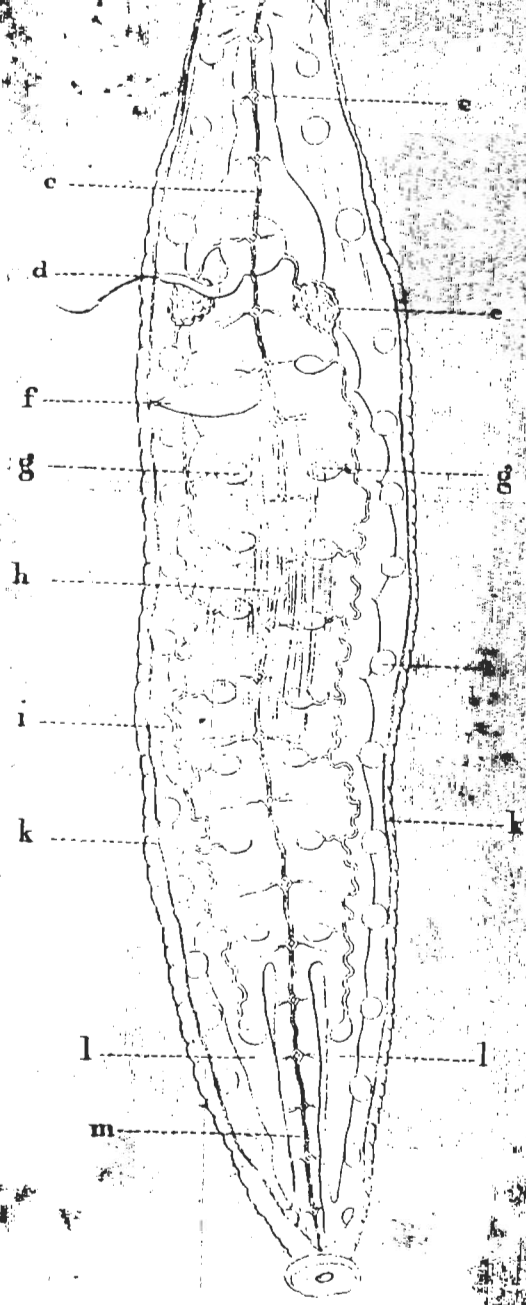
A
TREATISE
 ON THE
MEDICINAL LEECH;
 INCLUDING ITS
 MEDICAL AND NATURAL HISTORY,
 WITH A
 DESCRIPTION OF ITS ANATOMICAL STRUCTURE,
 ALSO, REMARKS UPON THE
 DISEASES, PRESERVATION AND MANAGEMENT
 OF LEECHES.

BY
JAMES RAWLINS JOHNSON, M. D. F. L. S.
 Member Extraordinary of the Royal Medical Society, Edinburgh.

ILLUSTRATED WITH TWO ENGRAVINGS.

Δεῖ μὴ δυσχεραίνειν παιδικῶς τὴν περὶ τῶν ἀνηλικιωτέρων ζώων
 ἐπίσκεψιν: ἐν πᾶσι γὰρ τοῖς φυσικοῖς ἐνεστὶ τι θαυμαστόν.
 ARISTOTLE; B. i. c. 5.

LONDON:
 PRINTED FOR
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 1816.



SECTION THE THIRD.

The Anatomical Structure of the Leech.

IN this section we shall first treat of the *external structure*, then of the *organs of the senses* and the *respiratory organs*, and lastly of the *internal structure*, which will be found to merit our notice on account of its great singularity.*

* As the references will only apply to the annexed outline, we shall here give an explanation of the Frontispiece.

Fig. 1

Represents the internal structure of the Leech, slightly magnified. At the superior part we notice the piercers, improperly called the teeth, and the male and female organs of generation; at the inferior parts, the two last long cells or stomachs, and the intestine. The abdominal blood-vessel is seen taking a direction from the mouth to the anus, forming several diamond-shaped expansions in its course. We find on each side of this vessel, the cells or stomachs ranged in

THE EXTERNAL STRUCTURE.

The body of the Leech is elongated, round, more or less flattened, tapering towards the extremities, and composed, after the manner of the Earth-Worm, of a number of rings.

The mouth, or that portion formed by the upper and lower lips, usually presents a circular or rather a horse-shoe shape, and is employed by the Leech as a sucker, to attach itself to surrounding bodies.

At the anal extremity is another sucker,

regular order. To the surface of each is attached a small oval-shaped body, forming a connexion, the one with the other by means of a tortuous tube.

Fig. 2

Represents, under a highly magnified form, the body of the male generative organ, with the penis hanging from its sheath. The uterus with the ovaria and the testes.

Fig. 3

Represents a dried preparation, shewing a few of the cells disseminated with common shot, and a portion of the intestine in which a slip of wood has been inserted.

broad and circular, answering the same intention.

There are two openings in the belly, termed generative.

There is also an opening at the lower part of the back, termed the anus.

The body of the Leech, in a state of rest, is of an arched form, and about an inch or an inch and a half in length; but when in motion, may be extended to four, five, or even six inches.

In regard to the number of *rings* or *anular muscles* with which the body is furnished, we are told that it increases with the age of the Leech. This is, however, incorrect; for I have counted, in a very young Leech, as many rings as we are accustomed to meet with in an old one of the largest size—usually about one hundred. It therefore appears, that as the age of the animal increases, there is an augmentation of the rings

in size only, and not in number. On the most prominent part of each ring, there is a row of minute tubercles.

The mouth is, as before noticed, of a circular or horse-shoe form, but from the great extent of motion the lips possess, may be made to assume whatever figure the Leech finds most convenient. The external surface of the mouth is of a dark grey, and the internal of a light grey colour. The upper lip is lightly bent downward, having something like a cleft in the middle. The lower lip is bent inward, and like the upper lip, is in form semicircular. When these lips are attached to any foreign body, the strong muscular apparatus in the upper part of the œsophagus is brought into action, and by enabling the Leech to form a vacuum, renders its attachment the more secure.

The sucker at the superior extremity, or what properly speaking constitutes the mouth, consists of several fasciculi of muscular fibres.

The sucker at the inferior extremity, consists also of an assemblage of muscular fibres. Some pass from a central point towards the circumference, whilst others interlace these and dispose themselves circularly.

The first foramen, or opening in the belly termed *generative*, is round and small, situated at about half an inch from the lower lip. From this foramen the penis issues. The Ancients entertained the idea of its being serviceable to the Leech for breathing. At this opinion I feel little surprise, having never witnessed the penis hanging from its sheath in the living Leech, although in the dead Leech this is so frequent an occurrence, that it cannot, I should think, have escaped the notice of the most cursory observer.

At a little more than a quarter of an inch below this first foramen, or at the distance of five rings, we find a *second foramen*, termed *the vagina*. This leads to the uterus, and is seldom seen unless closely inspected.

CHEVALIER 1830

Apparatus to Which the Author Has Given the Name De Bellaphore or Porte Sangsues

The apparatus is made of gold, silver, platinum and tin.

It is composed of a series of tubes of glass of indeterminate composition. These are attached to a ring. There are 17 tubes with the same number of plugs which act by pressure on the leeches.

These plugs, which are made of the same material as the apparatus, are mounted on a small ring for easier manipulation. The bottom part of the plug terminates in a boxwood disc (and it is possible for the plug to be made of other kinds of wood).

This apparatus of cylindrical form is made up of one to thirty-or-more compartments. The highest is ordinarily 2" and it can be raised as necessary. The diameter of the apparatus is 2 1/2" and it can be increased or decreased as desired.

Each compartment is held together by a hinge which can be used to vary the length.

A perforated plate on the bottom of the apparatus provides air for the leeches and can be removed when using the apparatus. The cover holds everything together.

THIS IS A LITERAL TRANSLATION OF THE PATENT APPLICATION SHOWN IN FRENCH ON THE NEXT PAGE.

Appareil, auquel l'Auteur, a donné le nom
de Bellaphore, ou Porte-Sangues.

Description:

merces: Appareil, se fait en Or, Argent, Platine, —
fer blanc &c.

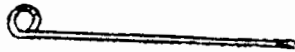
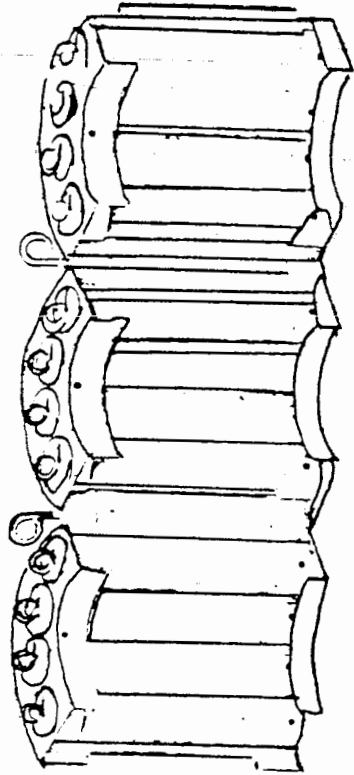
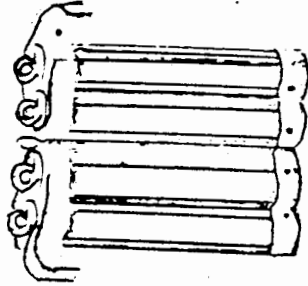
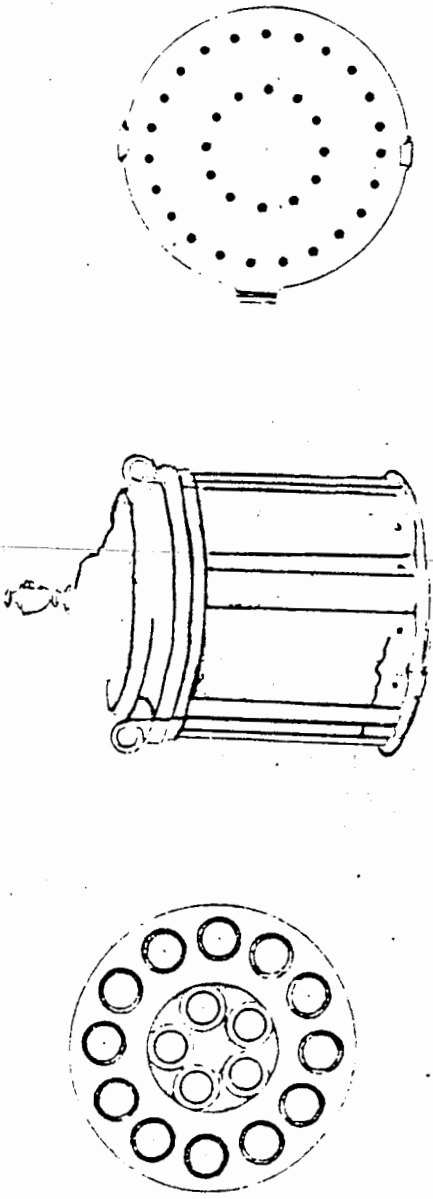
Il se compose, d'une série de tubes, en Cristal indéterminés,
celui dont le dessin ci-joint, est composé de dix sept tubes, et
autant de fouloirs, qui agissent par pression sur les
Sangues.

Ces fouloirs, de même nature, que l'appareil, sont
surmontés d'un petit Anneau ou Bouton, pour les mouvoir à
volonté; La partie basse est terminée par un Disque en Bois
(et peut se faire en tout autre Bois).

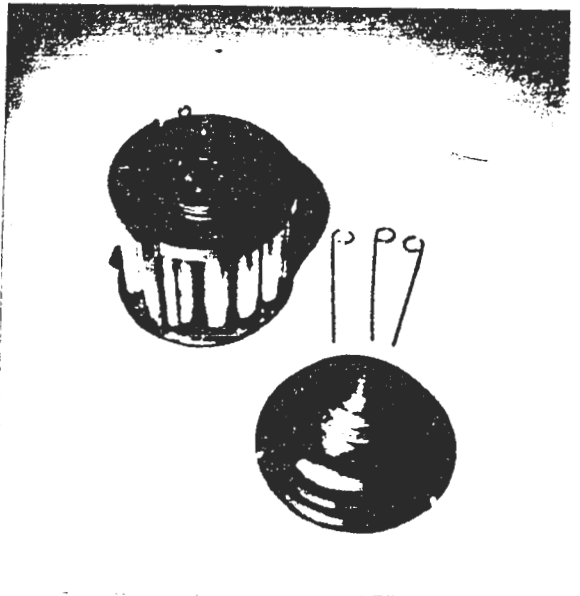
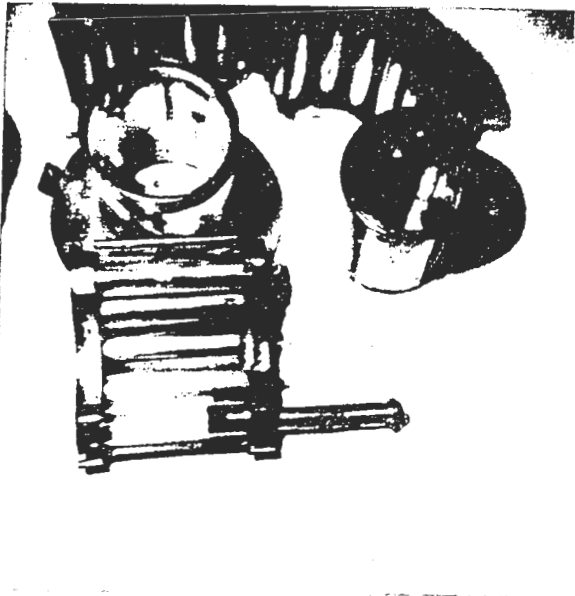
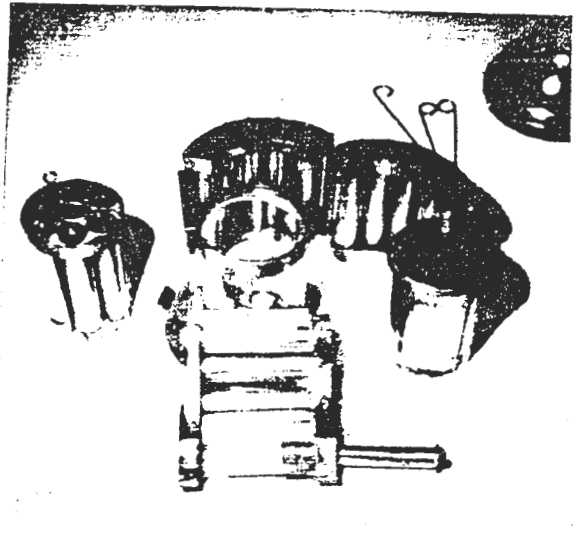
Cet Appareil, de forme Cylindrique, se déploie depuis
un, jusqu'à trente et plus, de Compartimens. Sa hauteur
ordinaire est de deux Ponces, et peut s'élever d'avantage au
besoin. Son Diamètre, est de deux ponces, et demi, et peut
diminuer ou augmenter à volonté.

Chaque compartiment, est tenu par une Goupille, à
charnières, afin de se déployer, à une longueur indéterminée.

Une Plaque Perforée, soutient cet Appareil, en-dessous,
donne de l'air aux Sangues, et s'enlève lors de l'application, et
le Converse réunit le tout.



1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



MEDICAL MUSEUMS OF THE WORLD

PART IV

THE FEDERAL REPUBLIC OF GERMANY (WEST GERMANY)

BY

PROFESSOR E. T. PENGELEY

THE FEDERAL REPUBLIC OF GERMANY

(WEST GERMANY)

Like France and Britain, Germany has traditionally been one of the top ranking countries in the world in the advance of biological and medical knowledge. In the 19th century, Germany took second place to none in science, but with the coming of World War I and particularly the Nazi regime of the nineteen thirties, followed by World War II, Germany's scientific position declined, and is only now coming back into its own. Furthermore from our particular point of view here, the destruction occasioned by World War II was so great that much of Germany's visible and tangible scientific heritage has gone forever. Nevertheless, some things survive, which I will describe, and I will also explain other important aspects of which there is virtually no surviving record. Germany is politically divided into West and East, a division stemming from the end of World War II. West Germany is a very beautiful country, and has excellent roads, their Autobahns being the originators of our freeways. However, there are often much more pleasant routes than the Autobahns. In addition their national railway, the Deutches Bundesbahn, is unsurpassed, and there are many good bus services as well.

CLAUSTHAL-ZELLERFELD

Location - 340 kilometers northeast of Bonn, and about 50 kilometers northeast of Göttingen.

Train - From various places.

Road - From Bonn take the A59 north towards Köln, but skirt Köln to the east and join the A1 or E73 towards Wuppertal and continue towards Dortmund. Just west of Dortmund join the E63 towards Kassel. Just south of Kassel turn north along the E4 or A7 towards Göttingen. North of Göttingen turn off along the 241 to Northeim and follow this through Osteröde to Clausthal-Zellerfeld.

Clausthal-Zellerfeld is situated in the beautiful Harz Mountains not far from the border of East Germany. The town was the birthplace of the great German doctor and bacteriologist Robert Koch (1843-1910).

Robert Koch was contemporary with Louis Pasteur (see under France), and between the two of them they founded the concepts and techniques on which modern bacteriology is based. To put it in more meaningful terms, they established the ideas which formed the basis for the conquest of infectious diseases.

He was born the third child in a family of 13, and his parents encouraged their children to learn and to travel. By the age of 5 he had taught himself to read and write, and before entering school he was an avid and knowledgeable collector of plants and animals. He did well at the local Gymnasium School, and at 19 he entered Göttingen University to study natural sciences. However, he soon transferred to medicine and was greatly influenced by the Professor of Physiology, Jacob Henle. No bacteriology was then taught in medical schools, but Henle firmly believed that contagious agents were living organisms, and there can be little doubt that this had a profound impact on Koch's mind.

He received his doctor's degree in 1866, and in 1867 married Emmy Fraatz, also from Clausthal. For five years after this the couple moved to a variety of places, but none suited them until they settled in Wollstein (now Wolsztyn, Poland), and it was here that Koch did the basic work which established him as one of the foremost scientists of his day. Whenever his practice would permit he spent his spare time at the microscope in his make-shift laboratory, and more and more began to observe bacteria. In particular, he started to examine the rodlike bacteria causing the disease anthrax in sheep, and with a stroke of true genius he cultured these (in vitro) using the aqueous humor of a cow's eye as the medium. The aqueous humor is the fluid in the chamber of the eye between the cornea and the lens, and is about as free from bacterial contamination as any living substance can be. Thus he was able to get a pure culture of the anthrax bacillus, something never achieved before. Later he used solid gelatin to ensure pure cultures. He described the whole life cycle of the organism, and demonstrated that when his pure cultures were injected into mice they did indeed contract anthrax. With this work he established the basic principles of bacteriology, which are still valid today. Namely, that bacterial cultures must be pure to have any biological meaning, and that these pure cultures will produce a specific disease when injected into an appropriate animal.

Koch's work soon brought him recognition, and in 1880 he was appointed an advisor to the Imperial Department of Health in Berlin, and this became his permanent home. From Berlin, Koch's techniques rapidly spread throughout the world. He demonstrated that steam surpassed hot air and carbolic acid sprays (see Lister under England) in its sterilizing power, and thus revolutionized hospital procedures. In fact Koch's ideas of hygiene were soon applied to every aspect of private and public health, and are still in use today. Perhaps his greatest achievement of all came in 1881 when he isolated the tuberculosis bacillus, and demonstrated the disease could be transmitted by inoculation. It is almost impossible for us today to realize the scourge of tuberculosis, since in the last 100 years it has been virtually eradicated in many parts of the world, principally due to the pioneer work of Robert Koch. He tried unsuccessfully to use so called "tuberculins" to control tuberculosis. Its control had to wait for more modern techniques.

Koch did not confine his investigations to Berlin. Wherever there was epidemic disease, it was likely that he would be found there to investigate its causes at first hand. He studied cholera in Egypt and India, sleeping sickness in Africa, and malaria in New Guinea. In all cases preliminary controls were effected.

The latter half of the 19th century was a time of imperialist expansion, intense nationalism and rivalry between nations, particularly between France and Germany. It is really not surprising therefore that Koch as a German and Louis Pasteur as a Frenchman became embroiled in this, and their scientific judgements suffered the consequences. In addition Koch was not the easiest of men to deal with. He was authoritarian, often aggressive, and vicious in his criticisms of other people's ideas. Thus he had many enemies, and his reputation was not helped in 1893 when he separated from his wife to marry a young actress by the name of Hedwig Freiburg, with whom he had become infatuated. However, his scientific achievements were so great that his reputation survived all. He was awarded the Nobel prize for medicine in 1905,

and died 5 years later a national and international hero. His ashes were deposited in his Institute in Berlin.

The Birth House of Robert Koch
Osteröder Strasse 13 (corner of Bartelsstrasse)
Clausthal-Zellerfeld

This house was where Robert Koch was born. It is state property and preserved, but is privately occupied. There is an easily visible plaque over the front door which reads:

ROBERT KOCH
wurde am 12 Dezember
1843
in diesem Hause geboren.

Robert Koch House
Kronenplatz (near the Post Office)
Clausthal-Zellerfeld

This is the house where Koch spent his childhood, and like his birth house it is state property but privately occupied. A plaque over the front door reads:

In diesem Hause verlebte
ROBERT KOCH
seine Jugendzeit
1854-1862.

FRANKFURT-AM-MAIN

Location - 140 kilometers southeast of Bonn and one of the principle cities of Germany.

Train - From all major cities direct.

Road - From Bonn take the A3 or E5 towards Frankfurt and Wiesbaden, and exit at Frankfurt (there are many exits).

Frankfurt-am-Main is a huge industrial city, badly damaged during World War II but largely rebuilt. It was here that Paul Ehrlich (1854-1915) did much of the work that has so profoundly effected modern medicine.

Paul Ehrlich's place in the history of medicine, rests not on any one major discovery, but on the fact that his work laid the foundations on which modern hematology, immunology and chemotherapy are built. Through his demonstrations of the chemical reactions of dyes with living cells, hematology and later histology came into their own as sciences. Likewise his methods of assaying and standardizing antitoxins are still the basis of immunology. Finally he was the first person to produce a chemical substance (Salvarsan)

which had meaningful chemotherapeutic effects. All remarkable contributions to biology and medicine.

Ehrlich was born of middle class parents in Strehlen (now Strzelin, Poland). His mother and father encouraged education, and by all accounts Paul was a happy and enthusiastic boy. He attended the local primary school, and at age 10 went to the Gymnasium in nearby Breslau. He entered the University of Breslau at 18 to study natural sciences, but soon transferred to Strasbourg University to study medicine. His student days at university were checkered, for he returned to Breslau and also attended Freiburg and Leipzig Universities, finally receiving his medical degree in 1878. However, before he graduated, he had already published his first paper of the effects of aniline dyes on living cells, and his doctoral dissertation was on the same subject. Fortunately the importance of his work was recognized at once, and upon graduation he was appointed to the research staff of the famous Charite Hospital in Berlin.

In Berlin, Ehrlich continued his research on the reactions of dyes on living cells, and gradually developed the fundamental concept that to understand biological processes, it would be necessary to describe them in chemical terms. The importance of this in the future development of biology cannot be overstressed.

In 1883 Ehrlich married Hedwig Pinkus, and the marriage proved extremely happy. They had two daughters to whom both mother and father were closely attached, and the family relationship no doubt helped Ehrlich in his somewhat troubled and insecure professional career. Shortly after his marriage he received an appointment at the University of Berlin, but due to changes in those in control this did not last long. In 1889 he was without appointment, but set up his own private laboratory where for many years he conducted fundamental experiments in immunology. In particular he worked out methods for assaying toxins and antitoxins, and for determining their correct physiological doses.

As a result of this work, Paul Ehrlich's genius was once more recognized, and in 1899 he was made director of a new "Serum Institute" in Frankfurt-am-Main. Here he spent the rest of his active life, during which time he developed the first effective chemotherapeutic drug, Salvarsan. It was particularly effective against a bacterial group referred to as "spirochaetes," which includes the organism causing the deadly disease syphilis. Salvarsan can be described as a first step only, for it had many undesirable side effects, but it was effective enough that it gave hope for the future discovery of better chemotherapeutic drugs, and this has indeed proved to be the case, first with sulpha drugs and later penicillin (see under London and Fleming). He was awarded the Nobel prize in 1908.

Paul Ehrlich's great work "Die Experimentelle Chemotherapie der Spirillosen" (Experimental Chemotherapy of Spirochaetal Diseases) was published in 1910, and although the last 5 years of his life were personally happy for him, he was very distressed by the tragedies of World War I. He died in 1915 after a short illness. Paul Ehrlich was basically a simple man, who never sought fame or fortune, but his life's work has had a lasting effect on biology and medicine. He is buried in the Jewish Cemetery in Frankfurt.

Paul-Ehrlich-Institut
Paul-Ehrlich-Strasse 42-44
Frankfurt-am-Main

Opening Hours - Normal business hours, and there is no charge for admission. Literature is available.

Paul Ehrlich founded this institute and directed it for the last 15 years of his life. It is now owned and operated by the Ministry of Health and its function is the control and testing of vaccines. There is a small "memorial room" of Ehrlich memorabilia which is open to the public, and worthwhile seeing. It is also of great historical interest that although Paul Ehrlich was Jewish, he was so highly regarded by the German people that the Nazis saw fit not to rename Paul-Ehrlich-Strasse to suit their political ends.

HEIDELBERG

Location - 85 kilometers south of Frankfurt-am-Main.

Train - From many major cities direct.

Road - From Frankfurt-am-Main take the A5/E4 Autobahn south and then take the A656 turnoff to Heidelberg.

Heidelberg is one of the oldest and most picturesque towns in Germany. It is on the River Neckar, which is a tributary of the Rhine. Its origins are lost in time, but its famous castle (the Schloss) was begun as early as the 13th century, and its university was founded in 1385, making it one of the oldest in Europe. During the Reformation the latter was a center of Calvinist doctrines, and the same was true of Nazi doctrines under the Hitler regime. However, after World War II the university was reestablished on traditional free academic foundations, and today it is one of the leading universities in Germany. Fortunately, Heidelberg escaped any serious damage during World War II.

The University

The University of Heidelberg has throughout its history been noted for its achievements in areas other than the natural sciences. Nevertheless, it would be a pity to miss it entirely for this reason. Its facilities are scattered, but much of the historical aspects are centered around the Gabengasse, and these are well worth a visit. In particular do not miss their famous library, with holdings going back many centuries.

Apotheken-Museum
 Heidelberger Schloss
 69 Heidelberg

Opening Hours - Daily 10.00-17.00. There is a small charge for admission, and literature is available; some of it in English.

Apothecaries were the forerunners of the modern druggist. However, the transition was not a simple one. Very often they competed with physicians, and the two professions were often at odds. By modern standards most apothecaries would be considered quacks, but it must be remembered that their transition into druggists was completely dependent upon the development of modern chemistry, and this did not really occur until well into the 19th century. Be that as it may, "the wares and the arts" of the apothecary, throughout the ages, are a major part of medical history. Since apothecaries were an important part of society, there were many of them, and a lot of their materials have survived. Throughout Europe, and indeed in parts of the United States too, there are many apothecary museums, but none surpasses this one in the Heidelberger Schloss.

One has to climb the hill up to the castle to reach the museum, which is housed in a wing of a former Renaissance Palace built in the middle of the 16th century by the Elector Palatinate Otto Heinrich. Other parts of the castle are much older, and the whole setting is very beautiful. The museum was founded in 1937, and opened to the public in Munich in 1938. There, however, it was badly damaged in 1944 during World War II, and it was not until 1957 that it found a new home in its present location.

There are about 15 rooms, with displays going back four centuries. The historical knowledge and artistic abilities of the curators are outstanding, and in addition to the actual materials used by apothecaries, whole contemporary laboratories have been constructed, also a priceless collection of old and rare books on the apothecary's profession.

INGOLSTADT

Location - 80 kilometers north of Munich.

Train - From Munich direct.

Road - Take the A9/E6 Autobahn north from Munich and exit at Ingolstadt.

The town of Ingolstadt, being on the Danube, has played a long and important role in the history of Bavaria, and fortunately escaped serious damage during World War II. What concerns us here is the history of the university, and particularly what survives in the form of an Anatomy Theater, which is now a superb medical museum. The University of Ingolstadt was founded in 1472, and the original building survives in the form of the Hoheschule in Goldknopfgasse. For 200 years the university was a leading educational institution. However, during the thirty years war (1618-1648) it suffered badly and went into decline, but rose again in the 18th century. In

1800 the University of Ingolstadt was moved, first to Landshut and then in 1826 to Munich, where it became the University of Munich.

Deutsches Medizinhistorisches Museum
Alte Anatomie
Anatomiestrasse 20
Ingolstadt

Opening Hours - April 1-October 31st 10.00-12.00 and 14.00-17.00. Closed Mondays. November 1-March 31st; Tuesday, Thursday and Friday 10.00-12.00; Saturday and Sunday 14.00-17.00. Closed Mondays and Wednesdays.

The Anatomy Theater of the University of Ingolstadt was built between 1723-1736, and it is the oldest north of the Alps. It was a major training place for medical doctors until 1800, when the university moved, and this magnificent building fell into private hands, eventually becoming a laundry! In 1930 it was rescued from complete decay, being purchased by the town of Ingolstadt, but it was not until 1969 that restoration was begun, with the subsequent establishment of a medical museum. In 1972 the University of Munich celebrated its 500th anniversary, and the following year the museum was opened. It is of interest to note that it is really the "brain child" of Dr. Heinz Goerke, a distinguished Munich physician, whose drive and dedication has created it in its present form.

The exterior part of the building is completely restored to its original form, and is most striking. At the back is a little courtyard garden, which was the original herb garden of the medical school. The historical displays are on two floors, arranged more or less chronologically, so that one gets a feeling for the whole historical development of medicine. Upon entering there are displays of Egyptian, Grecian and Roman medicine, and fascinating displays of "home medicine" in the 17th, 18th and 19th centuries. The displays are not confined to cases of instruments, as is so commonly the case, but include large pieces of medical apparatus such as autoclaves, iron lungs, anaesthetic machines, etc., including the original sterilizer from the laboratory of Robert Koch (see Clausthal-Zellerfeld). The second floor is mainly devoted to military medicine, which has played such a large role in the development of medicine in general. This is a medical museum in a lovely setting, with rich collections and a uniqueness of character with which the visitor will not be disappointed.

KAISERSWERTH

Location - 80 kilometers north of Bonn. It is a northern suburb of Düsseldorf near the airport.

Train - From Düsseldorf direct.

Road - From Bonn take the A555 north skirting Köln to the west and join the A57 north and then the A52 towards Düsseldorf. Cross the Rhine and then turn left (north) along route 1 towards Duisberg. This leads past the airport (to the west) and straight into Kaiserswerth.

Kaiserswerth is a very old and beautiful town and is best known today for its famous nursing school, where no less a person than Florence Nightingale studied (see under London and Middle Claydon, England).

Diakoniewerk Kaiserswerth
Alte Landstrasse 121
4000 Düsseldorf 31

Opening Hours - Normal business hours. Literature is available, some of it in English.

A literal translation of Diakoniewerk is "service in the name of God," and it is an order of Protestant Deaconesses. In English it is referred to as The Institute of Protestant Deaconesses. The Institute set in a large and beautiful park is an easy walk through the cemetery from the town center. It was founded in 1836 by Theodor Fleidner, and quickly became known for its dedication to nursing the sick, and eventually for training nurses. Florence Nightingale visited it twice, first in 1850 for two weeks, and again in 1851 for three months. The original hospital in which she studied still stands. It is called Altenheim Stammhaus and is at 32 Kaiserswerther Markt (corner of An St. Swibert). Florence Nightingale was very impressed with the administration of the hospital, and the dedication of the deaconesses, but thought little of their sanitation procedures. In any case Florence Nightingale quickly became their most famous student, and her methods of sanitation soon found their way to the deaconesses.

The historical aspects of the institute are preserved in the archives of the library, presided over by Sister Ruth Felgentreff, who speaks fluent English. She is very enthusiastic, and delighted to show everything to interested visitors. Her treasures contain handwritten letters by Florence Nightingale and first editions of all her works, as well as many other interesting things. In 1975 a new 410 bed hospital was added to the complex, and its has been named the Florence Nightingale Hospital. Inside the lobby is a lovely bronze bust of her. Of great interest also is the adjacent cemetery where all the nursing sisters are buried. I find it amusing that it is segregated into protestant and catholic sections! The Diakoniewerk Kaiserswerth has a major place in the history of nursing, and will not disappoint the historically-minded visitor.

MARBURG/LAHN

Location - 130 kilometers east of Bonn, and 80 kilometers north of Frankfurt-am-Main.

Train - Direct from Frankfurt-am-Main, and many other cities.

Road - From Bonn take route 478 to Waldbröl and Siegen. At Siegen take route 62 to Biedenkopf and Colbe, and then turn south along route 3 to Marburg/Lahn.

Marburg is a very old and beautiful university town astride the river Lahn, and fortunately escaped damage during World War II. Today it is the home of the Behringwerke und Institute, which were founded by the great German doctor Emil von Behring (1854-1917) towards the end of the 19th century.

Behringwerke AG und Institut
Marbach
D-3550 Marburg/Lahn 1

Opening Hours - Normal business hours. There is no charge for admission and literature is available.

This enormous complex is at the village of Marbach, about 3 kilometers northwest of the center of Marburg/Lahn.

It is to Emil von Behring (1854-1917) that we chiefly owe many of the concepts of antitoxin therapy, and the control of the dread diseases of tetanus and diphtheria. He was one of twelve children in a teacher's family in Hansdorf (now part of Poland). While at school he developed his interest in medicine, but due to the poverty of his family he saw little chance of ever becoming a doctor. However, one of his teachers was able to have him admitted to medical school in Berlin, on the condition that upon graduation he promise to serve in the Prussian Army for 10 years. Behring accepted this and carried out his promise. While still a student he began to think about the problem of combating infectious diseases, and shortly after he graduated he wrote a paper raising the question as to whether it might be possible to "disinfect" the living organism internally as well as externally, and he pursued this theme all his life.

In 1896 he married Else Spinola. It was a happy marriage and he was devoted to his wife. They had six sons.

While in the army, Behring was sent to Berlin where he joined the staff of the Institute of Hygiene and worked under its director, Robert Koch (see under Clausthal-Zellerfeld). Here he also met and collaborated with Paul Ehrlich (see under Frankfurt-am-Main). On completing his army service in 1889 he stayed on at the institute, and it was here that he developed his brilliant ideas on serum therapy and his theory of antitoxins. In good scientific fashion these theories were tested in the laboratory, and by 1890 he had proven that the blood of tetanus-immune rabbits possessed a substance which destroyed the tetanus toxin, and, most important, that this property was maintained when the serum of the rabbit was injected into other animals. This discovery made it possible to achieve therapeutic effects by serum transfusions. It was a giant step along the road to "internal disinfection." Behring coined the word "antitoxin" to describe this effect, and in due course reliable inoculations were developed for both tetanus and diphtheria.

In 1894 Behring moved to Marburg/Lahn where he set up what is now known as the Behring Institut and continued his active research. He later established the Behringwerke. By this time he was being hailed as an international hero and honors increasingly poured in upon him. He was raised to the nobility, and in 1901 was awarded the first Nobel prize in medicine for his life's work.

At Marburg, Behring devoted himself to the fight against tuberculosis, although he admitted that he had little success. His later life was saddened by the horrors of World War I, but he was able to take some consolation in the fact that his tetanus vaccination saved the lives of millions of soldiers. He died in Marburg in 1917.

Behring's ideas and techniques have since been used to combat many other infectious diseases, and his name is certain to live as one of the great benefactors of mankind.

The Behringwerke is today a large corporation, with worldwide operations, manufacturing pharmaceuticals, and doing research mainly in various aspects of immunology. The Behring Institute is housed in the library, and comprises Emil von Behring's papers and other memorabilia concerning his life and work. This is all under the direction of Frau L. Zedlitz, the archivist, who is very cooperative. However, the "gem" is the so-called "Behring room" in another building nearby, and can be seen by request (in advance). Tours of the works are also available, but arrangements must be made well in advance. The "Behring room" itself is not the original office he occupied, but is an exact replica of it, but everything in it is the original--his personal library, desk, furniture, pictures, etc. It is beautifully cared for, and truly a great experience to be in it. He is buried in a private mausoleum on company property, but his grave can be seen by request, again, in advance.

In Marburg itself there is also a monument to Emil von Behring, consisting of a head bust. It is set in a nice alcove, and located on Pilgrimstein (at the corner of Deutschhausstrasse) opposite the side of the Elisabeth-kirche.

Also associated with Emil von Behring, is his former residence "Villa Behring" (now offices and research laboratories of the University of Marburg), situated at Wilhelm-Roser-Strasse 2. It is off Ketzerbach, a few-hundred meters from the Elisabeth-kirche.

MUNICH

Location - 190 kilometers east of Stuttgart.

Train - From many major cities direct.

Road - Take the A8/E11 direct from Stuttgart.

Munich is the capital of Bavaria and the principle city of southern Germany. It lies astride the River Isar, a tributary of the Danube, and its origins go back to at least the 11th century. From then until now it has played a major role in the political, cultural and economic life of the area. Unfortunately Munich was severely damaged during World War II, and much of its tangible cultural heritage has gone. However, two major things survived, namely its university and the Deutsches Museum--the latter only just! Munich has a modern and magnificent railway system, the S-Bahn and U-Bahn, with its hub at the Hauptbahnhof.

Universität München
Leopoldstrasse
Munich

Opening Hours - Normal business hours.

U-Bahn - Universität.

The center of the University of Munich is located in the block at the corner of Schelling and Leopold strasse, but there are other parts of it scattered around the area. The origins of the university go back over 500 years, to when it was located in Ingolstadt. However, it is only in recent times that it has played a major role in the sciences, but it would be a pity to miss it on that account. The university is close to many of Munich's great art galleries, and the visitor will find much of interest there.

Deutsches Museum
Munich

Opening Hours - Daily 9.00-17.00. Closed on public holidays. There is a small charge for admission, and literature is available.

S-Bahn - Isartor

The Deutsches Museum is one of the great science museums of the world, and is located on an island in the River Isar, with entrances off the Steinsdorfstrasse and Erhardtstrasse. Some of their priceless collections were severely damaged during World War II, but a remarkable job of restoration has been achieved.

As an introduction to the Deutsches Museum, I can do no better than quote from one of their guidebooks:

The Deutsches Museum, which was founded in Munich in 1903 by Oskar von Miller (1855-1934), is a cultural and educational institution devoted to the whole field of exact science and technology. Its aim is to familiarize the widest possible public with the basic phenomena and laws of science and with the methods and tools of technology. It aims also to present visually the historical development of scientific knowledge and of its technical applications. The Museum tries to achieve these objects by the display of originals and reproductions of historic apparatus and machinery and by means of models and demonstrations. Many of the demonstrations are either permanently working or designed so that they can be operated by the visitor. In many cases tools and machines are represented together with the workers using them. Reconstructions of factories and workshops, either full-scale or in the form of dioramas, give some conception of industrial conditions at various times.

The Deutsches Museum not only presents German achievements, but also displays outstanding achievements of other countries. By showing that so many peoples have contributed to the growth of science and technology, it seeks to promote mutual understanding between nations.

Most of the displays in this extensive museum tend to be in the physical sciences and technology. However, many of them have played such a major role in the development of biology and medicine, that they are entirely relevant to the latter, and every visitor interested in the development of science cannot fail to appreciate them. There is, however, some biology, and a particularly fine "Hall of Fame" with portraits of many great scientists throughout the ages. There is also an extensive library in the history of science, which can be used by qualified scholars upon application to the librarian.

I cannot recommend the Deutsches Museum too highly. For what it is, it is unsurpassed in the world.

NEUSS

Location - 70 kilometers north of Bonn and 15 kilometers west of Düsseldorf.

Train - Direct from Düsseldorf.

Road - From Bonn take the A555 north, and skirt Köln to the west and join the A57 north. Exit at Neuss.

Neuss is a heavily industrialized town, but it was here that one of the founders of the cell theory was born--Theodor Schwann (1810-1882), and his memory is preserved.

In all probability the English scientist Robert Hooke (1635-1703) was the first person to see and describe "cells" as we understand them today. In addition, Jean Baptiste Lamarck (see under Paris) described them in 1809. However, it was a long time after this before the universal nature of cells as the basic unit of life was understood, and this discovery was made by Mathias Schleiden (1804-1881) and his compatriot Theodor Schwann. The importance of this discovery cannot be overestimated; it is one of the basic foundations on which all modern biology rests.

Schleiden was the son of a physician. He was born in Hamburg and spent his childhood there. At the age of 20 he went to the University of Heidelberg to study law. In 1827 he received a doctorate degree, and returned to Hamburg to practice law. However, he became deeply dissatisfied with the legal profession, finally abandoning it, and at the age of 27 he started in again at the university to study natural science, with a concentration in botany. At first he attended Göttingen and then Berlin where he met Theodor Schwann. Schleiden received his doctorate from Jena University in 1839, and although he stayed on there for a while, he had a restless nature and subsequently moved to Dresden and Dorpat.

In 1838 while still at Jena, and before he got his doctorate, he published a paper "Beiträge zur Phytogenesis" (Contributions to Phytogenesis) in which he clearly put forth the basic cellular nature of plants, and in 1842 this was elaborated in detail in his text book "Grundzüge der wissenschaftlichen Botanik" (Foundations of Scientific Botany). It is one of the great books in scientific history, establishing that plants are cellular, and set the stage for modern botany. This is the work for which he is remembered most, but he was a very prolific writer on a whole variety of subjects. He was also popular as a lecturer, and did much to improve the standards of education in the natural sciences. He died at Frankfurt-am-Main in 1881.

Theodor Schwann was a rather rare type of individual, who had a very short productive scientific career, while most of his life was spent in pondering religious problems and in teaching. He was born in Neuss, and by all accounts was a model child and very religiously oriented. In view of this it was assumed by all that he would enter the church, and at 16 he went to study at a Jesuit College in Cologne. However, the Jesuits did not quite have the expected effect on him, and he soon renounced theology to study medicine at the University of Bonn, and there he met for the first time the famous physiologist, Johannes Müller. Schwann went on to Würzburg and eventually Berlin where he received his doctorate degree in medicine in 1834. In the meantime Müller had also moved to Berlin, and upon receiving his degree Schwann immediately went to work in Müller's laboratory, and soon afterwards met Mathias Schleiden who was also working there. Müller, Schleiden and Schwann had an enormous influence on each other, and it was here between 1834-1839 that Schwann did his brilliant work culminating in the publication in 1839 of his book "Mikroskopische Untersuchungen über die Übereinstimmung in der Stuktur und dem Wachsthum der Thiere und Pflanzen" (Microscopic Investigations Dealing with the Parallels of Structure and Growth in Animals and Plants).

Not only did this firmly establish the "cell theory" as we know it today, but Schwann argued for the theory in purely mechanistic terms. In so doing he made it plain that the theological theories of life were quite unnecessary, and that it was a phenomenon subject to the same laws as the physical sciences. Thus just as the cell theory is part and parcel of biology today, so also is the mechanistic view of life.

With the publication of this classic work, Schwann's productive scientific career was more or less over. He was violently attacked for his ideas, and quickly turned back to theology and teaching. In the same year as his great work was published he went to Louvain as a Professor of Anatomy, and finally in 1848 to Liège where his career was completed. The evidence suggests that he was a lonely and unhappy man all these years until his death in 1882. Nevertheless, Schwann's place in biological history is secure as one of the chief founders of the cell and mechanistic theories of life.

Unfortunately very little of the physical associations of Schleiden and Schwann survive. However, in Neuss there is a large bronze statue of Schwann. He is seated, and it is twice life-size. It is located in its own alcove at the entrance to the Haupt Post (main post office) at the corner of Neustrasse and Promenadenstrasse. The inscription at the base reads simply:

SCHWANN
1810-1882

I find it a pity that there is apparently no other tribute to Schleiden and Schwann.

REMSCHIED-LENNEP

Location - 60 kilometers north of Bonn and 30 kilometers east of Düsseldorf.

Train - Direct from Düsseldorf.

Road - From Bonn take the A59 north and skirt Köln to the east, then join the A1 or E73 towards Remscheid and Wuppertal. Exit at Remscheid-Lennep.

Remscheid-Lennep is a manufacturing town known for its textiles in the heart of the Ruhr industrial region. But above this it is famous as the birth place of Wilhelm Conrad Röntgen (1845-1923), the discoverer of x-rays, and in the town is a large museum dedicated to him.

Deutsches Röntgen-Museum
Schweimerstrasse 41
(near the Moll Platz)
5630 Remscheid 11 - Lennep

Opening hours - Monday-Thursday 10.00-17.00. Friday 10.00-14.00. Sunday 14.00-17.00. Closed Saturday. There is a small charge for admission and literature (in German) is available. The director Herr Ernst Streller and his secretary Frau Erika Hamburg both speak English and welcome visitors from foreign countries.

Wilhelm Röntgen was born at 1 Gänsemarkt (also near the Moll Platz) on March 27th, 1845 and there is a plaque on the house to this effect. At the age of three the family moved to Appeldoorn in Holland, and here Wilhelm attended school, and at 16 he entered the Utrecht Technical School. Some minor thing happened to him here, which is not clearly understood, but the result was that he was denied admittance to the University of Utrecht. However, this did not stop him and he was soon admitted to the Polytechnic School in Zurich, Switzerland, as an engineering student. In 1868, at the age of 23, he graduated as a mechanical engineer, and the following year received his doctor's degree. At this time he became associated with the physicist, August Kundt, and in 1871 he followed Kundt to the University of Würzburg, (see under Würzburg). The following year he married Bertha Ludwig. However, Röntgen did not at this time stay at the University of Würzburg, but went on to Strasbourg and Giessen, finally returning to Würzburg in 1888 as Professor of Physics. In 1894 he became Rector of the University.

Röntgen's momentous discovery was made in 1895 in his small laboratory in the Physics Institute, and it is of great interest that this was a case of "chance favouring the prepared mind," for the discovery was really outside his main field of research, which was the physics of solids. The moment Röntgen suspected he had observed a new phenomena he concentrated wholly on it. Within six weeks he had demonstrated the extraordinary penetrating powers of the rays, had taken what we would now call x-ray photographs and observed the outlines in these of the bones in his fingers. He also took an x-ray photograph of his wife's hand. So clear and of such obvious importance was his discovery that before the end of the year he sent a short paper on it to the Physical and Medical Society of Würzburg. By January 1896 he was world famous, and a new tool for medicine was released which in many respects has revolutionized the science. Röntgen himself named his new discovery x-rays (they are called Röntgen rays in Germany), simply because they were unknown, and he clearly pointed out their potential uses in medicine, radiology, physics, metallurgy, etc. Since then they have been applied in even more ways.

Not surprisingly, Röntgen quickly became a German national hero and was awarded the first Nobel prize for physics in 1901. But, as was characteristic of his nature, he gave the prize money to the University of Würzburg. He also had no intention of seeking fame and glory, and was soon back in his laboratory studying the physics of solids. He wrote over 70 papers on physics, of which only 3 were on x-rays. He was always disappointed that the rest received little recognition! The later years of his life were clouded by World War I and the death of his wife in 1919. He himself retired in 1920 to his country house at Weilheim, near Munich, and died there in 1923. His name lives on in the rays he discovered, as does our debt to this modest man.

The Deutsches Röntgen-Museum was established in 1930 by a group of local doctors. However, it rapidly became so important that it was acquired by the town of Remscheid and is now responsible to a Board of Directors, comprised of distinguished citizens.

The displays are very extensive and educational, and are constantly added to by gifts from manufacturers of their latest x-ray equipment. The various rooms and displays include:

1. Röntgen's personal effects, including his many photographs taken on his travels in Europe.
2. Portraits of his family and other contemporaries.
3. Busts and original articles, letters, etc.
4. A reconstruction of a doctor's office circa 1905.
5. Röntgen's private library, also his lovely old desk and clock.
6. A reconstruction of Röntgen's laboratory at Würzburg.
7. Reconstructions of diagnostic treatment rooms with life-size displays and equipment.
8. Demonstrations of technical applications of x-rays.

There are many others. Röntgen's birth house is only 300 meters up the road and it is used as the museum's library and also as a guest house for visiting scholars.

In summary, I cannot recommend this museum too highly. Remscheid is also a pleasant place to spend a night while visiting the museum, and there is an excellent and comfortable hotel, the Berliner Hof, close by in the Moll Platz. A nice place to toast Wilhelm Röntgen and his legacy.

WÜRZBURG

Location - 100 kilometers east and slightly south of Frankfurt-am-Main.

Train - Direct from Frankfurt-am-Main.

Road - Take the A3/E5 Autobahn from Frankfurt-am-Main to the east and exit at Würzburg.

Würzburg on the river Main is one of the oldest cities of Germany, has been the seat of a Bishop since 741, and its university was founded in 1582. Despite the fact it was severely damaged in the final days of World War II, it is an extremely picturesque and fascinating old town. Of great interest to us, is that it was here in the University of Würzburg in 1895 that Wilhelm Conrad Röntgen (see also under Remscheid-Lennep) discovered the rays named after him, more commonly known as x-rays. The consequent impact of this discovery on both biology and medicine can hardly be exaggerated.

Physikal Institut
Universität Würzburg
Röntgenring 8b
87 Würzburg

Opening hours - Normal business hours.

It was in this building in 1895 that Röntgen discovered x-rays. It is located on the Röntgenring close to the corner of the Koellikerstrasse. On the outside of the building is a large plaque which reads as follows:

In diesem hause
entdeckte
W. C. Röntgen
Im Jahre 1895
Die nach ihm
Benannten
Strahlen

which in translation reads: "In this building in the year 1895, W. C. Röntgen discovered the rays named after him." The actual room where the discovery was made is still there, but is now a modern physics laboratory. Permission to see it and other items of historical interest in the Physics Institute can be requested at the office. It is also possible to see the lecture room that Röntgen used. It is more or less the same as in his day. Of great interest also are three display cases containing some of Röntgen's equipment, etc. Amongst other things exhibited here are:

His Nobel Laureate Certificate;

His hunting gun, with a very early x-ray photograph of the loading breech;

An x-ray photograph of the hand of Professor G. Kolliker (Professor of Anatomy), and another of his wife's hand;

A commendation from the German Physics Society, signed by both Max Planck and Albert Einstein!

These are of great interest, but it should be realized that the main Röntgen Museum is in Remscheid-Lennep (see previously).

It is also a help to know that not far from the Physics Institute is an Institute for the History of Medicine, which is in the charge of Professor Dr. Gundolf Keil, who is very knowledgeable about Röntgen. It is located as follows:

Institut für Geschichte der Medizin der Universität Würzburg
Koellikerstrasse 6, Rückgebaude
87 Würzburg

It is slightly off the street, behind some main buildings and is not easy to find--but persevere!

In concluding this chapter on Germany I would like to say that no doubt many people who read this may have their image of Germany tainted by the memories of two terrible world wars. Be that as it may, in recent years I have found Germany a magnificent and hospitable country to be in, and nothing can erase its great scientific tradition and contributions.
